SRNT 2022

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ABSTRACTS

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SRNT Notes

2022 SYMPOSIA

SYM1-1

UNDERSTANDING TOBACCO

Patricia Nez-Henderson. Black Hills Center for American Indian Health.

The colonization of Turtle Island (North America) and nations around the world has altered, and continues to alter our cultures, languages, and traditions and practices, including relationships with tobacco. This presentation discusses the impacts of colonization on tobacco, the introduction of commercial, industrialised tobacco, the relationship between tobacco and Indigenous populations, and the implications of colonization in tobacco and nicotine research.The Background presentation will be followed by an Introduction to Indigenous worldviews and understanding of tobacco and wellbeing.

SYM1-2

INDIGENOUS WORLDVIEWS AND UNDERSTANDING OF TOBACCO AND HEALTH

Raglan Maddox. The Australian National University.

As Indigenous peoples around the world are disproportionately targeted with commercial tobacco and nicotine marketing and impacted by commercial tobacco-related harms, a fundamental aim of public health and commercial tobacco control must be to support Indigenous peoples to end exposure to and use of commercial tobacco and nicotine on our own terms. This must be seen within the context of Indigenous models of health and wellbeing that connect physical, psychological, social and spiritual health. This common commitment to protecting the health and wellbeing of our peoples is also consistent with the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and the World Health Organization's Framework Convention on Tobacco Control (FCTC). Indigenous peoples' interests (and rights) and our public health and commercial tobacco control initiatives to promote health.This Introduction presentation will be followed by an Indigenous data sovereignty presentation as the Method for this Symposium.

SYM1-3

INDIGENOUS DATA SOVEREIGNTY

Ray Lovett, RN, BN, BHSc, MAE, PhD. ANU.

In Australia and around the world, Indigenous Data Sovereignty and Indigenous Data Governance are terms that have become increasingly common. The concept of IDSov has emerged from Indigenous communities concerned about extractive data practices within communities, and the need to better honor, balance and reflect Indigenous sovereignty principles. We will discuss intellectual property and the protection of Indigenous / Traditional Knowledges (TK) resources and heritage in support of Indigenous knowledges and data sovereignty in nicotine and tobacco research, science and practice. The presentation will be followed by discussion on Decolonizing tobacco - Where to from here?

SYM1-4

DECOLONIZING TOBACCO - WHERE TO FROM HERE?

Michelle Bovill, BA (Hons) MA Social Sc[1], Heather Gifford[2]. [1]The University of Newcastle, [2]Whakauae.

There is significant potential in Indigenous peoples' decolonizing tobacco, and consequently improving health and wellbeing, by addressing this completely preventable, industrialised and commercialised cause of morbidity and mortality. Further, bringing attention to this issue is expected to lead to significant benefits within Indigenous communities, and better informing policies and programs aimed at eliminating the harm of commercial tobacco. While these efforts are a positive step in the decolonization process, they must work carefully in such a way that does not continue to disenfranchise Indigenous peoples, or restrict the use and understanding of ceremonial tobacco, but embed and uphold the following principles and define our own, Indigenous-led, commercial tobacco 'end game':1.Ensure supportive and safe contexts, 2.Support Indigenous

leadership, 3.Broaden the definition of 'science', evidence, and knowledge, and 4.Foster Indigenous research.The presentations will be followed by a facilitated discussion with Discussant, Hershel Clark.

SYM2-1

THE NEED TO ADDRESS INEQUALITIES: TIME FOR MORE TARGETED SMOKING CESSATION INTERVENTIONS

Natalie K. Walker[1], Billie Bonevski[2], Mohamed Hammoud[3], Garrett Prestage[3], Peter Saxton[4]. [1]NIHI, University of Auckland, [2]College of Medicine and Public Health, Flinders University, Adelaide, South Aust, [3]Kirby Institute, University of New South Wales, Sydney, New South Wales, Austral, [4]University of Auckland, Auckland, New Zealand.

Throughout the world there are subgroups of the population who have significantly higher rates of tobacco use than the general population. These marked disparities are apparent by, and within, sexual minority and ethnic subgroups, as well as according to socioeconomic status and health state. The impact of smoking on population health is correspondingly inequitable. In the USA 34% of the socioeconomic disparity in all-cause mortality is due to smoking. Similarly in New Zealand smoking contributes to an estimated 1020% of ethnic health inequalities and 20-30% of socioeconomic inequalities in all-cause mortality. These findings highlight the importance of taking a comprehensive, equity-based approach to smoking cessation research to inform strategies and policy, so that 'no smokers are left behind' as countries move towards a smoke-free future. Dr Walker will set the scene for the symposium by outlining the extent of the above disparities in various countries around the world. The presentation will include as yet unpublished cross-sectional survey data on smoking prevalence in population subgroups in Australia and New Zealand - both countries with strong tobacco control policy but opposing policy around vaping as a harm reduction tool. Data will include smoking and vaping findings from the Flux study, an online observational study of 1896 gay and bisexual men in Australia and New Zealand. Dr Walker will then discuss the need for interventions that have reach into these priority populations, are acceptable and relevant, plus low cost, effective, and safe. Three presentations will then follow, presenting clinical trial findings for interventions designed to reduce tobacco use in people who identify as African American (Bricker) or indigenous American Indian/ Alaska Native (Santiago-Torres), and in people from low-income populations (Kendzor).

SYM2-2

EFFICACY AND UTILIZATION OF AN ACCEPTANCE AND COMMITMENT THERAPY-BASED SMARTPHONE APPLICATION FOR SMOKING CESSATION AMONG BLACK ADULTS: ANALYSIS OF THE ICANQUIT RANDOMIZED TRIAL

Jonathan B. Bricker, PhD[1], Kristin E. Mull[1], Brianna M. Sullivan[1], Diana M. Kwon[1], Nicole L. Nollen[2], Michael J. Zvolensky[3]. [1]Fred Hutchinson Cancer Research Center, [2]University of Kansas School of Medicine, [3]University of Houston.

Background: Black adults who smoke are more likely to make quit attempts, yet less likely to seek treatment and to succeed in quitting compared to other racial groups. The lack of efficacious, accessible, and engaging trials for smoking cessation further contributes to this disparity. This study aimed to determine the efficacy of an Acceptance and Commitment Therapy (ACT)-based smartphone application (iCanQuit) vs. a US Clinical Practice Guidelines (USCPG)-based smartphone application (QuitGuide) for smoking cessation among Black adults. Methods: Recruitment of Black adults was conducted through tailored Facebook ads. A total of 554 Black daily smokers recruited from 34 U.S. states were enrolled in the iCanQuit parent trial and randomized to either receive iCanQuit (n=274) or QuitGuide (n=280). The primary outcome was self-reported 30-day point prevalence abstinence (PPA) at 12 months. Self-reported PPA was also collected at 3 and 6-month follow-ups. Study data retention, treatment engagement and satisfaction, and change in ACT-based processes (acceptance and valued living) were also compared between treatment arms. Results: Data retention rate was 89% at the 12-month follow-up with no differential retention by study arm (OR=0.68 95% CI: 0.38, 1.20). The 30-day PPA primary outcome was 28% for iCanQuit vs. 20% for QuitGuide participants at the 12-month follow-up (OR=1.60 95% CI: 1.03, 2.46). Increased acceptance of internal cues to smoke mediated the effect of treatment on smoking cessation at the 12-month follow-up (Indirect effect: OR=0.20 95% CI: 0.05, 0.29). Compared to QuitGuide, iCanQuit participants were significantly more engaged with the iCanQuit

application as measured by the number of logins from baseline to 6 months (Incident rate ratio=3.26 95% CI: 2.58, 4.13). Conclusions: In a nationwide sample with high data retention and participant engagement, this study provides evidence of a digital intervention that is efficacious for helping Black adults who smoke quit. Future testing of an iCanQuit application tailored to the unique barriers to cessation among Black adults who smoke nationwide is warranted.

SYM2-3

SMALL FINANCIAL INCENTIVES PROMOTE SMOKING CESSATION AMONG SOCIOECONOMICALLY DISADVANTAGED ADULTS

Darla Kendzor, PhD[1], Summer Frank-Pearce[2], Joseph Waring[2], Michael S. Businelle[1], Jocelyn M. Barton[2], Sarah J. Ehlke[2], Laili Kharazi Boozary[2], Stefani Madison[2], Michael D. Swartz[3], Adam C. Alexander[1], David W. Wetter[4]. [1]University of Oklahoma Health Sciences Center, [2]TSET Health Promotion Research Center, Stephenson Cancer Center, Oklahoma City, [3]University of Texas Health Science Center, [4]University of Utah, Huntsman Cancer Institute.

Background: Socioeconomically disadvantaged individuals are less likely to quit smoking. A total of 320 adult daily smokers with Medicaid or without health insurance enrolled in a randomized trial to evaluate the efficacy of offering small financial incentives for smoking abstinence. Methods: Study participants were randomized to Usual Care (UC; clinic-based cessation program; N=161) or UC + abstinence-contingent financial incentives (UC+FI; N=159), and followed through 26 weeks post-quit-date. Participants earned a $20 gift card for biochemically-verified abstinence on the scheduled quit day, and this amount increased by $5 weekly at each successive abstinent visit. Participants who were non-abstinent at any visit during the first 4 post-quit weeks were able to earn incentives for abstinence at the next visit, though the payment was reset to $20. Participants could earn an additional $50 incentive for abstinence at the 8 and 12 weeks post-quit follow-up visits. Results: Participants (N=320) were primarily female (63.1%), of non-Hispanic White (60.6%), Black (25.3%), or other (10.9%) race, and 3.1% endorsed Hispanic ethnicity. Most participants (80.3%) reported an annual household income of <$21,000, and 19.7% had not completed a high school education. Among the first 275 participants (of 320 total) to complete the study, biochemically-verified 7-day point prevalence abstinence rates in the UC+FI and UC only groups were 41.0% vs. 19.1% at 4 weeks post-quit, 33.1% vs. 16.2% at 8 weeks post-quit, 30.2% vs. 13.2% at 12 weeks post-quit, and 15.1% vs. 10.3% at 26 weeks post-quit. UC+FI participants earned a mean of $37.20 (of $150 possible) for abstinence during the first 4 weeks post-quit, and a mean of $60.47 (of $250 possible) during the first 12 weeks post-quit. Of note, study participation during the coronavirus pandemic appeared to adversely impact cessation outcomes. Follow-up visits will be completed by February 2022 and final outcomes will be presented.Conclusions: Offering small financial incentives for smoking abstinence is a low-cost means to improve cessation rates among socioeconomically disadvantaged adults.

SYM2-4

EXTENDED SELF-HELP SMOKING CESSATION INTERVENTION FOR SPANISH-SPEAKING HISPANICS IN THE UNITED STATES, OUTCOMES OF A RANDOMIZED CONTROLLED TRIAL

Patricia Medina-Ramirez, Steven K. Sutton, Margaret M. Byrne, Ursula Martinez, Karen O. Brandon, Cathy D. Meade, Thomas H. Brandon, Vani N. Simmons. H. Lee Moffitt Cancer Center & Research Institute, Tampa, FL, USA.

Significance: Hispanics/Latinxs are the largest racial/ethnic minority group in the United States (18%), yet relatively few culturally and language specific interventions exist specifically for Hispanic/Latinx smokers. Thus, we translated and culturally adapted an efficacious English self-help smoking cessation intervention for Spanish preferring, Hispanic/Latinx smokers. This intervention, Libre del Cigarrillo (LDC), was tested in a randomized controlled trial with a nationwide sample. **Methods:** Participants (*N*=1,417) smoked ≥5 cigarettes/week over the past year, resided in the US, and preferred health-related material in Spanish. Participants were randomly assigned to Usual Care (UC; a single self-help booklet from the National Cancer Institute) or the LDC intervention comprising a series of 11 booklets and 9 pamphlets delivered monthly over 18 months. The primary outcome was 7-day point prevalence abstinence assessed every 6 months for 2 years. Multiple imputation was used to manage missing data. Generalized estimating equations (GEE) evaluated abstinence at 6, 12, 18, and 24 months using a model with treatment, time, and their interaction. Cost-effectiveness was also evaluated. **Results:** The sample

was 52% male; 39% had an annual household income less than $10,000; mean age was 50.0 years; 81% smoked 20 or more cigarettes in the past week; mean FTND was 5.0. GEE analysis revealed a significant linear increase in abstinence rates (*p*<.001) and higher abstinence for those receiving the LDC intervention as compared to UC at all assessments (*p*<.002). At 24 months, the abstinence rate for LDC was greater than for UC (33.1% vs. 23.3%; OR=1.53 [1.12-2.10], *p*=.002). The incremental cost/quitter in the LDC arm relative to the UC arm was $648 at 18 months and $684 at 24 months. **Conclusion:** Results support the efficacy and cost-effectiveness of an extended self-help smoking cessation intervention for Hispanic/Latinx smokers. This intervention has potential to improve the reach of smoking cessation assistance to a large, underserved population of Spanish-speaking individuals throughout the US.

SYM2-5

REDUCING SUSCEPTIBILITY TO SMOKELESS TOBACCO AMONG RURAL BOYS WITH FDA'S THE REAL COST SMOKELESS PUBLIC EDUCATION CAMPAIGN

Matthew Farrelly[1], Nathaniel H. Taylor[1], Alexandria Smith[2], James Nonnemaker[1], Jessica K. Pepper[1], Megan Wall[2]. [1]RTI International, Research Triangle Park, NC, USA, [2]U.S. Food and Drug Administration, Silver Spring, MD, USA.

Background: The U.S. Food and Drug Administration (FDA) expanded *The Real Cost* smoking prevention campaign in 2016 to reach rural male youth at risk of smokeless tobacco (SLT) use. The campaign targeted boys ages 12 to 17 in rural segments of 35 media markets across the United States. We examine how the campaign influenced intentions to use SLT in the future, overall and by age. **Methods:** The evaluation team conducted a randomized controlled field trial in 30 rural markets in the U.S. with 15 treatment markets (randomly selected from the 35 campaign markets) and 15 control markets. We surveyed a longitudinal cohort of 2,168 male youth ages 11 to 16 at baseline from January 2016 through December 2018. We created a summary measure of susceptibility using 3 dichotomized variables (will use SLT soon, in next year, if friend offers); any response among never smokeless tobacco users other than "definitely not" indicates susceptibility. We used difference in difference (DID) multivariate regression models to compare changes in susceptibility over time between respondents in intervention markets and control markets, for the full sample and stratified by age group (i.e., 11-13, 14-16). **Results:** In adjusted DID analysis that included both age groups, we found that susceptibility decreased by 6.0 percentage points (pp; p=0.01) from baseline to final follow-up in the treatment group compared to the control. These results were driven by decreases in susceptibility among the younger (11-13) age group (-8.8 pp; p=0.01). Among the older group (14-16), there were no significant differences in susceptibility from baseline to final follow-up between the treatment and control group. **Discussion:** The results show evidence of a significant campaign effect on SLT susceptibility among never-user boys overall and among younger ages (11 to 13 at baseline), suggesting that the campaign could have an effect on SLT initiation among rural boys who have never used SLT. In previous analyses of the whole sample, we found that the campaign influenced beliefs among the older age group but not the younger group. Additional analyses are needed to understand these differential campaign responses by age.

SYM3-1

THE SMOKEFREE AOTEAROA 2025 ACTION PLAN: A MAORI PERSPECTIVE

Andrew Morehi Waa, B.Soc.Sc., MPH. University of Otago.

Aotearoa's/New Zealand's Smokefree goal is rooted in principles of equity and Indigenous self-determination. This presentation will outline the rationale for, and apply, these principles as a lens for examining how the proposed Action Plan could address smoking disparities and support Maori (the Indigenous peoples of Aotearoa) development. The presentation will begin with an overview of the historical context and how Maori leaders set in motion an overhaul of how we think about addressing harm from commercial tobacco. New findings will then be presented from the first survey wave of Maori who smoke (n=701) from the Te Ara Auahi Kore project, an Indigenous led partner project to the ITC. Among survey participants more supported than opposed reducing the retail availability of commercial tobacco by 95% or mandating only very low nicotine content (VLNC) tobacco could be sold. For both measures over half reported they would quit or cut down if they were introduced. Support for the introduction of VLNCs was associated with a history of making more quit attempts, having greater trust in government

and having a lower sense of control over your life. The presentation will conclude by critiquing how the plan reflects the original vision of our Maori leaders, our research findings and principles of equity and self-determination.

SYM3-2

THE SMOKEFREE AOTEAROA 2025 ACTION PLAN

Richard Edwards, MB BChir MPH MD. University of Otago, Wellington.

This presentation will provide detailed information about the Smokefree Aotearoa 2025 action plan, its current status and key features which should maximise the likelihood that it will result in the achievement of the endgame goal. These features include: •a focus on eliminating disparities in smoking and commitment to strengthening Maori (Indigenous) governance in tobacco control.•acknowledgement of the need for structural measures to change the broader environment in which people live in order to make it easier for young people to stay smokefree and for smokers to quit.•a focus on protecting future generations by minimising smoking initiation and uptake (as well as aiming to greatly increase quitting among existing smokers)•the comprehensive nature of the plan, including interventions in previously unaddressed areas in New Zealand: notably reductions in the supply of smoked tobacco products and regulation of tobacco product design and constituents.•inclusion of bold measures (mandated denicotinised smoked tobacco products, large reductions in the retail availability of tobacco products, and the smokefree generation proposal) likely to have a profound impact in achieving rapid, profound and sustained reductions in smoking prevalence in all population groups. •additional novel measures such as a ban on cigarette filters and a minimum price for tobacco products •strengthening of 'business as usual" polices and interventions such as enhanced mass media and social media promotions, increased smoking cessation support for priority populations, and community-based smokefree interventions•a commitment to risk proportionate regulation with a focus on much more robust regulation and population level policies for smoked tobacco products complemented by risk proportionate regulation of alternative nicotine delivery products through a Bill and supporting regulations introduced in 2020 and 2021.Initial consultation has been completed and a final version of the action plan will be presented to Cabinet later in 2021. The passage of legislation and initiation of implementation is anticipated to begin in 2022.

SYM3-3

QUANTITATIVE AND QUALITATIVE RESEARCH FINDINGS ABOUT SUPPORT AMONG PEOPLE WHO SMOKE FOR PROPOSED MEASURES IN THE SMOKEFREE 2025 ACTION PLAN

Janet Hoek, PhD. Departments of Public Health and Marketing, University of Otago.

Critics of smokefree policy measures have argued these represent a paternalistic top-down approach that constrains people who smoke and undermines their agency. Endgame strategies attract even more trenchant criticism because these contain powerful behavioural levers that will fundamentally change smoking experiences and galvanise cessation. Yet viewing people who smoke as passive objects acted upon by policy makers belies the strong support many have for innovative measures that will reduce the appeal and availability of tobacco products. Drawing on data from around 1100 people in the NZ ITC study who smoke or who have recently quit, and qualitative work with 20 people who smoke and manage high material deprivation, we present evidence on attitudes to smoking and support for measures in the proposed Smokefree Action Plan. The NZ ITC survey found high levels of regret (82%) among people who smoke with 71% intending to quit (36% in the next six months); findings were similar for Maori and non-Maori participants. There was strong support for many measures included in the proposed action plan including mandated very low nicotine cigarettes (76%), the smoke-free generation proposal (78%), and increased campaigns to foster cessation (70%) or prevent youth smoking (93%). The only measure not to receive majority support was large reductions in retail outlets selling tobacco (36%). A qualitative study of 20 people who experienced high financial stress found strong support for reducing nicotine to non-addictive levels and enhancing personal cessation support. All participants wanted to become smokefree but several opposed measures they thought would remove their ability to choose when to quit. Nonetheless, others felt stronger policies could restore the agency smoking had removed and saw stronger regulation as enabling, not constraining, freedom. Use of "choice" rhetoric by many participants

echoes the tobacco industry's framing of smoking as a personal choice; challenging this framing could decrease self-blame among people who smoke and present endgame goals as likely to enhance agency.

SYM3-4

TOBACCO INDUSTRY RESPONSES AND ARGUMENTS IN RESPONSE TO THE PROPOSED ACTION PLAN FOR NEW ZEALAND'S SMOKEFREE 2025 GOAL

Lindsay Robertson, PhD. University of Bath.

Transnational tobacco companies (TTCs) have sought to shape stakeholder opinion about policies through conducting and disseminating their own research, polls or petitions, and via media advocacy. They have also created, co-opted or worked with third party organisations to advance their arguments. Evidence suggests TTCs' strategies and arguments are largely consistent regardless of the jurisdiction or the specific policy under consideration, and this consistency has offered public health advocates the opportunity to prepare counterarguments and strategies to protect policy-making from TTC interference. Most evidence about TTC policy interference has been documented prior to the emergence of new nicotine products and purported tobacco "industry transformation". To our knowledge, there are no published examples of how TTCs have responded publicly to tobacco endgame ideas. We describe the initial response to New Zealand's 2025 Action Plan by TTCs, and by individuals and organisations who appear to be working to advance industry interests. Using thematic analysis, we draw on submissions to the 2025 Action Plan consultation, and news articles published following the release of the Government's proposals, to identify overarching themes and arguments used to oppose the proposals. Preliminary analysis suggests opposition to the proposed measures is thematically similar to well-documented TTC arguments that predict far-reaching negative unintended consequences (e.g. measures will increase illicit trade and organised crime, criminalise smokers, cause job losses and business closures, create greater health harms and health system costs, breach trade laws) while denying potential public health benefits (e.g. measures unnecessary or ineffective; inadequate evidence). References to potential human rights implications, and the role of tobacco harm reduction as an alternative to the proposals, reflect the adaptation of TTCs' strategies to align with changing market and policy environments. We will discuss how our findings could be used by policy-makers and advocates to help safeguard endgame policies and their implementation from industry influence.

SYM4-1

THE IMPACT OF CANADA'S MENTHOL CIGARETTE BAN ON QUITTING AMONG MENTHOL SMOKERS: POOLED ANALYSIS FROM THE ITC PROJECT AND THE ONTARIO MENTHOL BAN STUDY AND IMPLICATIONS FOR A MENTHOL BAN IN THE UNITED STATES

Geoffrey T. Fong, PhD[1], Janet Chung-Hall[1], Gang Meng[1], Lorraine V. Craig[1], Mary E. Thompson[1], Anne C.K. Quah[1], Rob Schwartz[2], Eric Soule[3], Joanna Cohen[4], K. M. Cummings[5], Andrew Hyland[6], Richard J. O'Connor[6], Maansi Bansal-Travers[6], David T. Levy[7], Cristine Delnevo[8], Ollie Ganz[8], Michael O. Chaiton[2]. [1]University of Waterloo, Waterloo, ON, Canada, [2]Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada, [3]East Carolina University, Greenville, NC, USA, [4]Bloomberg School of Public Health, Johns Hopkins University, Baltimore, MD, USA, [5]Medical University of South Carolina (MUSC), Hollings Cancer Center, Charleston, SC, USA, [6]Roswell Park Comprehensive Cancer Center, Buffalo, NY, USA, [7]Georgetown University, Washington, DC, USA, [8]Rutgers School of Public Health, Piscataway, NJ, USA.

Significance. Between 2015-18, all Canadian provinces banned menthol in cigarettes. Two pre-post studies found that the menthol ban led to increases in quitting among menthol smokers compared to non-menthol smokers. This study pools data from those two cohort studies—the ITC Canada Survey and the Ontario Menthol Ban Study—which used the same definitions of menthol smoker and of quitting at post-ban, and were conducted within 1-2 months of each other at pre-ban (2016) and post-ban (2018) waves, to derive a more precise estimate of the impact of Canada's menthol ban on quitting and to apply this estimate to project the impact of a proposed menthol ban in the US. Method. We analyzed pooled pre-post data from the ITC Canada Survey across 7 provinces (83% of the Canadian population; n=1236 adult (18+) smokers, 128 pre-ban mainly menthol smokers) and the Ontario Menthol Ban study (n=1084 adult smokers, 295 pre-ban mainly menthol smokers). Logistic analyses compared post-ban quit suc-

cess (those reporting no longer smoking at post-ban) of menthol smokers compared to non-menthol smokers (for daily smokers and for all smokers), controlling for common covariates (sex, age, ethnicity, education, baseline smoking status, baseline cigarettes per day, and province). Results. Daily menthol smokers were significantly more likely to quit than daily non-menthol smokers (21.2% vs. 13.2%: effect size=8.0%, p=0.005; 95% CI: 2.4%-13.7%) This was also true of all (daily and non-daily) smokers, (menthol quitters = 22.3%; non-menthol quitters = 15.0%; effect size=7.3%, p=0.006; 95% CI: 2.1%-12.5%). There were no provincial differences in effect sizes. Conclusions. Applying these effect sizes to a menthol cigarette ban in the US, where menthol market share is much higher (35-40% overall), using number of U.S. menthol smokers obtained from NSDUH 2019, leads to the following estimates: 786,204 additional quitters among daily smokers (95% CI: 235,861-1,346,375), and 1,357,022 additional quitters among all smokers (95% CI: 390,376-2,323,668). The more precise, pooled estimates of Canada's menthol ban supports FDA's decision to move forward in their plans to ban menthol cigarettes.

SYM4-2

MENTHOL SMOKERS' QUITTING BEHAVIOURS AFTER THE EUROPEAN UNION BAN ON MENTHOL: LONGITUDINAL FINDINGS FROM THE 2020 ITC NETHERLANDS SURVEYS

Christina N. Kyriakos, MPH[1], Pete Driezen[2], Janet Chung-Hall[2], Anne C.K. Quah[2], Geoffrey T. Fong[2], Marc Willemsen[3], Filippos T. Filippidis[1]. [1]Imperial College London, London, United Kingdom, [2]University of Waterloo, Waterloo, ON, Canada, [3]Maastricht University, Maastricht, Netherlands.

Significance: In an effort to reduce the attractiveness and palatability of tobacco, the European Union (EU) banned menthol as a characterizing flavour in cigarettes in May 2020. The aim of this study was to evaluate short-term quitting behaviours among adult smokers from the Netherlands before and after the EU menthol cigarette ban. Methods: Longitudinal data from International Tobacco Control (ITC) cohort surveys of adult smokers and recent quitters (N=1,732) in the Netherlands, conducted in Wave 1 (February-March 2020, pre-ban) and Wave 2 (September-November 2020, post-ban). Bivariate and logistic regression analyses were conducted in Stata using weighted data. Results: Prior to the menthol ban, 7.5% (95%CI: 6.3-8.9) of smokers reported menthol as their usual flavour compared with 3.8% (95%CI: 2.9-4.8) after the ban. Females were significantly more likely than males to smoke menthol at both waves (aORs=2.4 and 2.8, respectively). Among females, pre-ban menthol smokers were significantly more likely to report having quit at Wave 2 than non-menthol smokers (aOR=2.5, 95%CI: 1.0-6.3). No significant differences in quitting were found overall or among males. Overall, among pre-ban menthol smokers, 10.5% quit smoking, 46.3% switched to non-menthol cigarettes, and 43.2% claimed to have continued to smoke menthol cigarettes at follow-up. Among post-ban menthol smokers, 7.5% purchased cigarettes from outside of the EU within the last six months, while 3.4% reported buying cigarettes that may have been smuggled. Conclusions: The use of menthol cigarettes among smokers in the Netherlands decreased shortly after implementation of the EU menthol ban. The menthol ban was significantly associated with quitting among pre-ban menthol smokers compared to non-menthol smokers, but only among females. Most smokers reported either switching to non-menthol cigarettes or continuing to smoke menthol cigarettes. However, for the latter, these may be products that are compliant with the ban/ menthol 'replacement' products. Post-ban menthol use does not appear to be due to smuggling/ illicit trade. Efforts are needed to improve cessation support and policy compliance.

SYM4-3

E-CIGARETTE FLAVORS, DEVICES AND BRANDS USED BY YOUTH BEFORE AND AFTER PARTIAL FLAVOR RESTRICTIONS IN THE US: FINDINGS FROM THE ITC YOUTH TOBACCO AND VAPING SURVEYS IN CANADA, ENGLAND, AND THE US

David Hammond, PhD[1], Jessica L. Reid[1], Robin Burkhalter[1], Maansi Bansal-Travers[2], Shannon Gravely[1], Andrew Hyland[2], Karin Kasza[2], Ann McNeill[3]. [1]University of Waterloo, Waterloo, ON, Canada, [2]Roswell Park Comprehensive Cancer Center, Buffalo, NY, USA, [3]King's College London, London, United Kingdom.

Significance: We examined flavored vaping product use among youth, including the impact of flavor restrictions implemented in the US in February 2020, which prohibited flavors other than menthol and tobacco in cartridge/pod-based e-cigarettes, as well as restrictions implemented in some provinces in Canada beginning in 2020. Methods: Data are from five cross-sectional waves of the ITC Youth Surveys, conducted online with youth aged 16-19 from consumer panels in the US, Canada, and England. Regression models tested differences in 'usual' e-cigarette flavor, device type, and brand reported by past 30-day vapers (n=9,512) before (2017-2019), during (February 2020) and after (August 2020) implementation of US flavor restrictions. Results: In August 2020, 78.7% of vapers in the US reported using a flavor prohibited in cartridges/pods (i.e., non-menthol or non-tobacco), compared to 86.3% in Canada (AOR=1.73, 95% CI=1.25-2.40) and 79.8% in England (AOR=1.10, 95% CI=0.78-1.55). In August 2020, fruit remained the most common usual flavor among vapers in the US (63.5%), Canada (68.1%), and England (63.5%), with no significant changes before versus after the US restrictions. Among vapers in the US, no changes were observed in the usual use of tobacco flavor (11.1% to 10.9%) or mix of tobacco flavor and menthol flavor (6.4% to 6.9%)—those not subject to restrictions—before and after flavor restrictions. Disposable e-cigarettes (exempt from the flavor restrictions) increased in all countries, but to a greater extent among vapers in the US (13.2% to 36.8%) compared with Canada (7.7% to 14.2%, AOR=2.01, 95% CI=1.33-3.04) and England (10.8% to 16.4%, AOR=2.33, 95% CI=1.52-3.57), before versus after restrictions. In 2020, after implementation of the restrictions on flavored cartridge-based e-cigarettes, Puff Bar (a disposable e-cigarette available in a variety of flavors) emerged as the most popular brand in the US. Conclusions: Flavor restrictions on cartridge-based e-cigarettes in the US had little or no impact on the usual flavors used by youth vapers. Youth appear to have circumvented the US flavor restrictions by using brands and devices exempt from the restrictions.

SYM4-4

THE ILLEGAL EXPERIMENTAL TOBACCO MARKETPLACE III: EFFECTS OF VAPING PRODUCT BANS: FINDINGS FROM THE 2020 ITC SMOKING AND VAPING SURVEY

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Significance: Restrictive regulatory tobacco control policies can result in unintended consequences such as users seeking banned products from illegal sources. To further advance research in this context, we developed an experimental paradigm, the Illegal Experimental Tobacco Marketplace (iETM). The iETM permits us to verify the impact of actual or proposed restrictions on the likelihood of illegal tobacco purchases. The present study has two aims. First, we examined the effect of a vaping ban, a total flavor vaping ban, and a partial flavor vaping ban on the probability of purchasing illegal vaping products among different local regulatory conditions (US, CA, and EN) and among different user types (cigarette smokers, e-cigarette users, and dual users). Second, we examined the relationship of prior support for bans on illegal purchases. Methods: Participants (N=459) from the International Tobacco Control (ITC) Four Country Survey completed hypothetical purchasing trials under the four aforementioned conditions. In each trial, participants chose to purchase in a legal experimental tobacco marketplace (LETM) or an iETM. Availability of vaping products in the LETM depended on the ban in place. Results: Within-country comparisons showed that e-cigarette users and dual users were more likely to purchase from the iETM compared to cigarette smokers when product availability in the LETM was more restricted, with e-cigarette users being most affected (US-OR:22725.3, CA-OR:6125.0, EN-OR:1722.6). Cross-country comparisons depicted that dual users from CA (OR:19.8) and e-cigarette users from the US (OR:12.9) exhibited higher odds of illegal purchases compared to the same user type in other countries. Moreover, increased opposition towards partial or total flavor ban, as reported in the ITC 4CV survey, was associated with increased purchasing from the iETM in the corresponding condition. Conclusions: This study suggests that restricting vaping products may shift tobacco users' preference to the illegal marketplace. Finally, this study provides evidence of the generalizability of the iETM in a large and diverse sample and enhances its utility in tobacco regulatory science.

SYM4-5

THE PUBLIC HEALTH IMPACT OF A BAN ON FLAVORS IN NICOTINE VAPING PRODUCTS

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Significance: The US FDA is currently considering whether to restrict flavors in nicotine vaping products (NVPs). These flavor restrictions are intended to reduce NVP use among youth, but there may also be unintended negative public health impacts, such as reducing smoking cessation. We developed a model that considers these potential transitions to estimate the net public health impact of proposed restrictions on NVP flavors. Methods:

We estimate the public health impact of US NVP flavor restrictions using the Smoking and Vaping Model. The modeling analysis incorporates information from systematic reviews and empirical data analyses (PATH, ITC and other data) on toxicity, flavor use patterns, and the impact of NVP flavors on NVP and smoking initiation, cessation and product switching. We consider restrictions on specific flavors (e.g., menthol vs. sweet flavors) as applied to specific devices (e.g., pod vs. tank). Due to the difficulties in implementing restrictions on flavors in tank-type devices and because cartridge/pod-based NVPs are the primary type of flavored product used by youth, we focus primarily on restrictions on the sales of flavors in cartridge/pod-based devices. We model the impact of NVP flavor restrictions alone and in conjunction with a ban on menthol in combustibles. The model projects the potential impact of flavors restrictions on NVP use, cigarette smoking and related mortality. Results: The results show the public health trade-off of NVP flavor restrictions on youth and adult NVP use. The impacts depend primarily on NVP relative to cigarette risks, the degree to which the use of specific flavors impact cigarette use and on whether vapers substitute to other devices in order to obtain restricted flavors. Sensitivity analyses conducted on the plausible range of input parameters show wide variation in the potential public health impacts. Conclusions: Public health impacts of different types of flavor bans are highly sensitive to key underlying parameters. Based on these results, we identify the information most needed to improve the ability to gauge the impact of flavor restrictions on public health.

SYM4-6

SUBSTITUTION PROFILES OF MENTHOL SMOKERS IN SIMULATED FLAVOR BANS

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Background: The addition of flavor to tobacco products increases the appeal and abuse liability of the product. Regulations that remove characterizing flavors in tobacco products may benefit public health by leading to cessation or use of an alternative and potentially less harmful product, also called product substitution. Determining the level of substitutability of both flavored and tobacco flavored e-cigarettes when menthol cigarettes are available and unavailable will help determine if a flavor ban (of either menthol cigarettes and/or flavored e-cigarettes) will lead to cessation and/or harm reduction among current smokers. Methods: This current study evaluated flavored and unflavored tobacco product abuse liability and measures of visual attention in a 2 (menthol cigarette availability) X 2 (e-cigarette flavor availability) within-subjects laboratory experiment using the Experimental Tobacco Marketplace with simultaneous eye-tracking measurements of visual attention. Adult menthol smokers of name brand cigarettes (n=41) purchased tobacco products across various cigarette prices when presented with nicotine replacement therapy, smokeless tobacco, and only: 1) menthol cigarettes and five flavored JUULs, 2) menthol cigarettes and tobacco-flavored JUUL, 3) non-menthol cigarettes and five flavored JUULs, and 4) non-menthol cigarettes and tobacco-flavored JUUL. Results: Non-linear regression results show that demand intensity and elasticity were significantly different among flavor availability conditions. For brand name smokers, demand intensity is greater in the menthol available conditions (Q_0=146.5; 137.0) compared to the non-menthol available conditions (Q_0=85.86; 109.1; p <.001). Demand was less elastic in the menthol available conditions (α=.0013; .0013) than in the non-menthol available conditions (α=.0028; .0024; p<.001). Within substitution profiles, menthol JUUL functioned as a substitute when available in the marketplace. Contrary, tobacco-flavored JUUL functioned as a substitute only when menthol cigarettes and other JUUL flavors were unavailable. Qualitative eye-tracking results demonstrate a great amount of attention paid to price of cigarettes and to other product prices at a lesser extent. Dwell time on the alternative products is consistent with the substitutability profiles and is increased when menthol cigarettes are unavailable. Conclusions: Demand intensity and elasticity for cigarettes is greater for own brand flavor and the strength of product substitution is dependent upon cigarette flavor availability. Qualitative eye tracking results show synergy between dwell time and product choice.

SYM4-7

MENTHOL PREFERENCE MODERATES THE RELATIONSHIP BETWEEN CIGARETTE NICOTINE CONTENT AND UNPLEASANT REACTIONS IN YOUNG ADULTS WHO REPORT LOW-FREQUENCY SMOKING

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Significance: Half of young adults who smoke use menthol cigarettes, which is associated with increased risk of continued smoking and greater nicotine dependence. Additionally, early subjective reactions to cigarettes predict future use. Research shows that menthol may blunt the sensory effects of nicotine among adult smokers. This study thus investigates the potential moderating role of menthol on subjective reactions to cigarette nicotine content among young adults who report low-frequency smoking. **Methods**: In three counterbalanced, double-blinded sessions, young adults who use tobacco products <15 days/month smoked fixed doses from very low (VLNC) and normal (NNC) nicotine content cigarettes, which were menthol or non-menthol depending on participant preference. Pleasant and unpleasant subjective reactions were measured in each session. ANOVA tests investigated whether menthol preference moderated the effect of nicotine content on subjective reactions. **Results**: Participants (N=87) were 18-25 years old and 49% female. They reported smoking M=15.2 cigarettes per month (SD=11.9) on M=8 days (SD=3.6); 35% smoked menthol cigarettes. There were no significant demographic differences between the menthol versus non-menthol groups. Menthol preference moderated the relation between nicotine content and unpleasant subjective reactions (F(1, 85)=4.42, p=.038): non-menthol participants showed an increase in unpleasant reactions with greater nicotine content (t(56)=4.570, p<.001), whereas this effect was not observed for menthol participants (t(29)=.681, p=.50). There was an effect of menthol preference on pleasant reactions (F(1, 85)=4.036, p=.048) such that menthol participants experienced greater pleasant reactions regardless of nicotine dose. **Conclusions**: Young adults who report low-frequency smoking of menthol cigarettes did not experience as much of a difference in unpleasant reactions between NNCs and VLNCs as did those who smoke non-menthols. Future studies should continue to investigate the interactive effects of menthol and nicotine content in this population, especially considering the potential for an FDA-mandated menthol ban or nicotine reduction policy.

SYM5-1

TARGETING ALPHA-2A NORADRENERGIC RECEPTORS FOR SEX-DEPENDENT MECHANISMS IN SMOKING CESSATION

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Evidence suggests that women are more likely to smoke to regulate negative affect, whereas men are more likely to smoke for positive reinforcement. For smoking cessation treatment to be effective for women and men, these sex-sensitive systems need to be targeted. Preclinical studies of noradrenergic targets demonstrate that they attenuate stress-induced relapse to nicotine, decrease nicotine-related reinforcement, and improve attention and inhibitory control. Using both preclinical and clinical strategies, our interdisciplinary team probed the noradrenergic system's effects on stress reactivity and nicotine reinforcement - hypothesizing that (a) different brain systems modulated by noradrenergic activity are activated by smoking in women and men and (b) guanfacine, an alpha2a noradrenergic agonist, can preferentially target these sex-dependent systems to improve smoking cessation outcomes. In this presentation, we will review preclinical, human laboratory, neuroimaging, and Phase 2 clinical trial results generated within our Yale-SCOR center. Across our investigations, we demonstrate that guanfacine attenuates stress-precipitated smoking in women and nicotine-related reinforcement in men. Further, our preclinical and neuroimaging findings identify that mechanisms of guanfacine are centralized in the amygdala, particularly for females. Finally, our clinical trial findings document that guanfacine demonstrates efficacy for smoking cessation for both women and men, with potentially larger effects in women. Overall, our center has highlighted the critical importance of developing sex-appropriate treatments for tobacco use disorder which are responsive to factors which maintain addiction in women.

SYM5-2

PSILOCYBIN-FACILITATED SMOKING CESSATION: COMPARATIVE EFFICACY VS. NICOTINE PATCH

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We conducted an open-label pilot study testing psilocybin in combination with manualized cognitive behavioral therapy (CBT) in 15 treatment-resistant smokers. Data showed no serious adverse events attributable to psilocybin, and a very promising cotinine-verified point-prevalence abstinence rate of 80% at 6-month follow-up. A 2.5-year follow-up showed a cotinine-verified abstinence rate of 60%. We are currently conducting a comparative efficacy trial randomizing treatment-resistant smokers to a single psilocybin session (on their target quit date) or the transdermal nicotine patch (using FDA guidelines, beginning 24 hours after their target quit date), both in combination with a 13-week program of manualized CBT. We report data for the 56 participants who have completed their 12 month follow up (27 psilocybin; 29 patch). Interim results show substantially higher cotinine-verified 7-day point-prevalence abstinence rates at 12-months with psilocybin (59%) vs. nicotine patch (28%). Continuous abstinence data also show substantially higher 12-month abstinence rates for psilocybin (36%) vs. nicotine patch (9%). Continuous abstinence rates show relatively little decline over time with psilocybin (41% at 3 months and 37% at 12 months) compared to nicotine patch (28% at 3 months and 10% at 12 months). Nicotine patch point-prevalence data show typical decline over time (41% at 3 months and 28% at 12 months), while point-prevalence abstinence increases slightly over time with psilocybin (52% at 3 months and 59% at 12 months). Interim smoking cessation efficacy analyses suggest promising results for psilocybin in comparison to transdermal nicotine patch when both are delivered in combination with CBT. Similar to results with psilocybin in treating affective disorders, psilocybin results for smoking cessation may be notable for their sustainability over time.

SYM5-3

CYTISINICLINE AS A PROMISING NEW NICOTINE CESSATION TREATMENT

Cindy A. Jacobs, PhD, MD. Achieve Life Sciences.

Cytisinicline is a well-established smoking cessation treatment marketed for decades in Central and Eastern Europe. Historically, 1.5 mg Cytisinicline has been administered as a 25-day dose titration regimen. Achieve Life Sciences has redeveloped Cytisinicline into a more convenient, longer duration treatment that may have greater benefit while retaining its excellent safety profile. Cytisinicline functions, like varenicline, as a partial agonist at the alpha4beta2 nicotinic acetylcholine receptors and competes with nicotine to interfere with nicotine-induced reward and satisfaction. Other receptor binding effects at 5-HT3 receptors, resulting in nausea and vomiting, have also been identified. Differences between varenicline and Cytisinicline binding have shown Cytisinicline to be far less potent in activating 5-HT3 receptors, explaining the significantly less incidence of nausea/vomiting observed with Cytisinicline compared to varenicline. Several Phase 1 and Phase 2 clinical trials have been completed for Cytisinicline.A Phase 1 study (N=72) determined that 30mg was the maximum tolerated dose (MTD) for Cytisinicline based on incidence of nausea/vomiting. MTD level for Cytisinicline is 10-fold higher than varenicline's MTD. Non-inferior efficacy with significantly less adverse events, including nausea, were observed for Cytisinicline compared to varenicline in the RAUORA head-to-head trial (N=679). The ORCA-1 Phase 2b Study (N=254) demonstrated a 50% quit rate for 3mg cytisinicline administered 3 times daily (TID) compared to 10% for placebo (P<0.001). The ORCA-1 subpopulation, who previously failed to quit on varenicline (N=92), had a 51% quit rate when treated with Cytisinicline TID compared to 16% for placebo (P=0.009). A Phase 3 ORCA-2 trial recently completing enrollment at 810 participants. ORCA-2 Phase 3 results, expected in H1 2022, will evaluate the benefit and safety of the simplified 3mg TID Cytisinicline regimen for 6-week or 12-week treatment duration as a promising new smoking cessation treatment.

SYM5-4

A PILOT TRIAL OF EXENATIDE ONCE-WEEKLY ADJUNCT TO NICOTINE PATCH FOR SMOKING CESSATION AND MITIGATION OF POST-CESSATION WEIGHT GAIN

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Smoking and obesity are the two leading causes of preventable morbidity and mortality. Unfortunately, the majority of people who quit smoking experience unhealthy and rapid weight gain which could attenuate some of the beneficial effects of smoking cessation and trigger smoking relapse. Glucagon-like peptide 1 receptor agonists (GLP-1RAs), used clinically for the treatment of diabetes and obesity, can potentially attenuate this weight gain and the rewarding effects of nicotine, as shown preclinically. Since first line smoking cessation therapies do not impact post-cessation weight gain and have modest effects on abstinence, GLP-1RAs can make effective adjunct treatments.In this double-blinded trial, 84 prediabetic and/or overweight treatment-seeking smokers were randomized (1:1) to once-weekly placebo or exenatide, 2 mg, subcutaneously. All participants received nicotine patches (21 mg) and brief smoking cessation counseling. Seven-day point prevalence abstinence (expired CO level =5 ppm) and post-cessation weight were assessed following 6 weeks of treatment. Bayesian analysis of generalized linear models yielded posterior probabilities (PP) to quantify the evidence favoring hypothesized effects of treatment on primary outcomes. Potential moderators of treatment effects on abstinence outcomes were explored.Exenatide increased the probability of smoking abstinence compared to placebo (46.3% and 26.8%, respectively), (RR = 1.70; 95% credible interval = [0.96, 3.27]; PP = 96.5%). Post-cessation body weight was 5.6 pounds lower in the exenatide group compared to placebo (PP=97.4%). The impact of exenatide on abstinence was not moderated by sex, race, age, number of years smoked or nicotine dependence. Baseline blood glucose and body mass index moderated the impact of exenatide on abstinence, such that the effects of exenatide were greatest among overweight, obese, and normoglycemic participants. Exenatide, in combination with nicotine patch, improved smoking abstinence and decreased post-cessation weight gain, suggesting that GLP-1RA strategy is worthy of further research in larger, longer duration studies.

SYM6-1

SCOPING REVIEW OF STUDIES EVALUATING THE IMPACT OF LOCAL US LAWS RESTRICTING THE SALE OF FLAVORED AND MENTHOL TOBACCO PRODUCTS: WHAT IS KNOWN ABOUT EQUITY IMPACTS?

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In the absence of comprehensive national action, more than 336 US state and local governments have enacted sales restrictions on flavored and/or menthol tobacco products to protect vulnerable populations from tobacco-related harms. Our scoping review of published research evaluating the effectiveness of local US laws restricting the sale of flavored and/or menthol tobacco products found moderate to high quality of evidence associating policy implementation and reduced availability, marketing, and sales of policy-restricted products, and decreased youth and adult tobacco use of these products; however, policy exclusions and exemptions, implementation challenges, tobacco industry actions (e.g., marketing of concept-named products; exploitation of policy loopholes), and consumer responses (e.g., cross-border or illicit purchasing) could mitigate intended policy effects. Moreover, few studies have specifically assessed the health equity impacts of sales restrictions among population groups who disproportionately suffer from tobacco-related disease and death, such as Black Americans, persons identifying as LGBTQ, and youth/young adults. Studies that have investigated health equity impacts reveal for example, that: (a) the rationale for menthol tobacco sales restrictions was not well-understood or universally supported by African American smokers in Minneapolis and St. Paul, MN; (b) compared to White, non-Hispanic youth, Black, Hispanic, Asian, and LGBTQ youth in various California localities with flavor policies reported greater difficulty in accessing policy-restricted flavored tobacco products; and (c) Black young adults in San Francisco were more likely than other young adults to continue using flavored cigars after implementation of the flavored and menthol sales restriction in that city. Our review highlights the need for rigorously designed process and outcome evaluation studies of flavor policies that could inform improvements in policy scope and implementation and address persistent health inequities exacerbated by the ubiquitous availability and target marketing of flavored and menthol tobacco products.

SYM6-2

WHAT DOES IT TAKE TO EMBED AN ANTI-RACISM LENS INTO LOCAL POLICY RESTRICTING MENTHOL CIGARETTE SALES IN LOS ANGELES COUNTY'S UNINCORPORATED COMMUNITIES?

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Background: Menthol as a characterizing flavor in cigarettes is a challenge to health equity and racial justice. On 9/24/2019, the County of Los Angeles Board of Supervisors approved a county ordinance restricting sales of menthol cigarettes and other flavored tobacco products in unincorporated areas, effective 5/1/2020. The Black community must be engaged in tobacco control policies to promote health equity and anti-racism. Methods: In 12/2020, a virtual community forum was held with approximately 100 stakeholders in Los Angeles County's Black community. This forum, part of an academic-community partnership, was a first step at connecting tobacco-related disparities, present-day inequities, and structural racism, to implications for support of the menthol cigarette restriction ordinance. Results: We found stakeholders perceived the ordinance through a historical and cultural lens incorporating knowledge of past and present structural racism. This knowledge included awareness of Los Angeles County's history of anti-Blackness. Further, these understandings were linked to the history of redlining and racialized segregation in Los Angeles County, driving present-day inequities, including a high density of tobacco and alcohol stores, and gentrification. Aspects of structural racism influenced perceptions of the ordinance in five main ways: 1) via the extent to which menthol cigarette smoking was experienced as institutionalized, and normative; 2) distrust of public institutions to protect community health; 3) perceptions that retailers in predominantly Black neighborhoods are excluded from the community engagement process; 4) an over-emphasis on menthol cigarettes compared to other structural issues facing Black Angelenos; and 5) counteracting the tobacco industry's race-based marketing. Conclusion: Community buy-in is critical to effective policymaking. Engaging stakeholders in Los Angeles County's Black community in tobacco control policies to promote health equity, can start to change the conversation from one about racial difference, to one about differential impact because of structural racism and solutions that target these structural drivers.

SYM6-3

SUPPORT FOR AND BARRIERS TO PASSING AND IMPLEMENTING COMPREHENSIVE BANS ON THE SALE OF FLAVORED TOBACCO PRODUCTS (INCLUDING MENTHOL CIGARETTES)

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In April 2021, the FDA announced its intention to ban menthol tobacco products, including menthol cigarettes. Before the FDA can enact this ban, it must navigate a lengthy process of soliciting public comments and extensive rule development. The tobacco industry is already replicating its historically aggressive efforts to oppose the federal menthol ban, and frame bans on menthol tobacco as discriminatory. Thus, it is important to understand public opinion, including support for, and barriers to passing and implementing, comprehensive bans on the sale of menthol tobacco. It is particularly important to gain insight into whether there are differences in support or opposition to such policies by race/ethnicity, in light of the anticipated industry opposition, which may be particularly resonant to the public in the context of the growing prominence of social justice movements in the United States and related concerns around racism, policing and white supremacy. In early 2021, we conducted nationally representative surveys of 1,227 youth and 2,642 young adults, over-sampling for respondents who were African-American, LatinX, and tobacco users. The surveys asked questions about opinions of bans on flavored tobacco products and menthol cigarettes. Over 70% of youth and young adults supported a comprehensive ban on the sale of flavored tobacco, with no difference by race/ethnicity. A minority of youth and young adults reported concern about increased policing of users related to flavored vape product or bans of menthol tobacco products. Fewer than 20% of youth or young adults agreed with the statement that tobacco use is a social justice issue, with no differences by race/ethnicity. Findings suggest that prior to FDA's policy announcement, there was broad support for comprehensive flavored tobacco product bans, including menthol cigarettes. It will be important to monitor public support for these bans as the tobacco industry intensifies its public campaign to oppose them. The relatively low percentage of respondents who recognized tobacco use as a social justice issue suggests an opportunity for message framing to bolster support for a ban on menthol products.

SYM6-4

EXAMINING THE RELATIONSHIP OF FLAVORED TOBACCO PRODUCT POLICY RESTRICTIONS AND TOBACCO PRODUCT USE, AMONG A NATIONALLY REPRESENTATIVE SAMPLE OF US ADOLESCENTS AND YOUNG ADULTS

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Background: Flavored tobacco products (FTPs) are related to youth initiation and progression to regular use and are disproportionately used and marketed in Black communities. Federal regulation of FTPs is lacking and local action has created a heterogeneous policy landscape of varying comprehensiveness. This study examines the relationship between exposure to local flavor policies and any tobacco product (ATP) use or FTP use among youth and young adults in the U.S. Little is known about equity implications of such policies.Methods: Participants aged 15-36 (n=10,893) were surveyed from Sept-Dec 2019 using a national, address- and probability-based sampling method. Participants reported tobacco use, demographics, and psychosocial measures. Local flavor policies enacted as of 12/31/2019 were coded for comprehensiveness, geocoded, and linked to participant address. Estimates from 2016 5-year American Community Survey characterized county demographics. State-level policies, including smoke-free air, Tobacco 21, and cigarette tax were included. Weighted cross-sectional multivariable logistic regression examined residence in an area covered by a comprehensive, non-comprehensive, or no flavor policy with current ATP or FTP use, controlling for individual and county-level demographics, individual psychosocial variables, and state policies.Results: Those covered by a comprehensive flavor policy vs. no policy had lower odds of ATP use (aOR=0.48, 95% CI=0.37-0.63) and FTP use (aOR=0.58, CI=0.37-0.93). Participants covered by non-comprehensive policies vs. no policy had lower odds of ATP use (aOR=0.64, CI=0.44,0.92), but not FTP use. Individuals living in counties with more Black residents had higher odds of FTP use.Conclusion: Exposure to a comprehensive flavor restriction policy among youth and young adults is associated with lower odds of FTP use and ATP use, and non-comprehensive policies are associated with lower odds of ATP use. Findings support the continued need to expand local flavor policies and examine their comprehensiveness to best reduce youth tobacco use. Comprehensive policies restricting FTPs may be most beneficial in areas with more Black residents.

SYM7-1

DEVELOPMENTAL AND SEX DIFFERENCES IN THE EFFECTS OF JUUL E-CIGARETTES ON PLACE CONDITIONING AND PRECIPITATED WITHDRAWAL

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Aim: Adolescent nicotine exposure is a continued concern due to the growing use of electronic cigarettes. Thus, the aim of the following research is to assess age- and sex-differences in nicotine vapour-associated reward and withdrawal. Methods: Experiment 1 - adult and adolescent rats (n = 5-7/group) were exposed to either nicotine (JUUL, 5% nicotine) or vehicle (30:70 PG:VG) vapour using OpenVape for 10 minutes at 3 doses (2, 4, or 8 minutes of active vapour puffs) in a biased conditioned place preference task. Experiment 2 - adult and adolescent rats of both sexes (n = 7-8/group) were exposed to either JUUL or vehicle vapour for 10 minutes 3 times a day for 2 weeks. Rats received 1.5 mg/kg mecamylamine and were scored for somatic signs of withdrawal 20 minutes later. Results: Experiment 1 - A significant effect of age, dose, and sex, as well as a significant dose by sex interaction were observed. Both adult and adolescent male rats showed significant increases in place preference for the nicotine-paired side, with adolescents displaying significant increases at lower doses than adults. Adult, but not adolescent, females showed significant place conditioning similar to adult males. Experiment 2 - A significant effect of treatment and sex on locomotion was also seen, with males also showing increased locomotion and females showing no effect. There was also a significant effect of treatment and sex but not age on somatic withdrawal, with

only males showing significant precipitated nicotine withdrawal. Conclusions: Our results support the notion that adolescence is a period that is more sensitive to the rewarding effects of, but not withdrawal from, nicotine, and that these effects are sex dependent.

SYM7-2

SEX-SPECIFIC EFFECTS OF TOBACCO/ENDS FLAVORANTS ON REINFORCEMENT-RELATED BEHAVIOR IN A RODENT MODEL OF VAPOR SELF-ADMINISTRATION

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SignificanceAn estimated 12 million Americans use ENDS, with ~5 million users between the ages of 12 and 18. Adolescent ENDS use continues to rise likely due to the 15,000+ unique flavor options available as opposed to the lone flavor in combustible cigarettes (menthol). Given the dramatic rise in vaping, it is critical we determine the impact of ENDS flavorants on nAChRs in addiction-related brain circuitry. MethodsWe utilized vapor self-administration assays with male and female mice (genetically modified to contain fluorescent a4 and a6 nAChRs) to study how green apple flavor (composed of hexyl acetate, ethyl acetate, and methylbutyl acetate) alters vaping-related behaviors. Mice were trained to self-administer on fixed-ratio 1 (FR1) and FR3 schedules to measure acquisition and reinforcement-related behaviors. Alongside self-administration assays, an additional cohort of mice were subjected to 10-day passive exposure of the green apple mix and brains were extracted to determine changes in nAChR density using confocal microscopy. Statistical differences were determined using one- and two-way ANOVAs with post hoc Tukey means comparisons. ResultsWe observed that male mice were selective in their preference for their preference of green apple flavorants while female mice exhibited reward-related behavior to all green apple flavorants. We also observed that green apple-induced nAChR upregulation occurs in a region-specific manner dependent upon sex. ConclusionsThese data support continued investigations into sex-specific effects of vaping-related behaviors. These data also exemplify that there may be neurobiological underpinnings that determine sex/gender-specific effects of chemical flavorants on reward- and reinforcement-related behaviors.

SYM7-3

DEVELOPMENTAL EXPOSURE TO E-CIGARETTE NICOTINE OR THC VAPE ALTERS CESSATION THERAPEUTIC EFFECTIVENESS IN RATS

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Significance: Developmental exposure to substances of abuse may alter brain neuro-maturation into adulthood. Further, given that individuals often co-use nicotine and THC, these substances may interact independently or synergistically on neurodevelopmental processes. Thus, these studies sought to investigate whether adolescent vape drug exposure alters nicotine self-administration in adulthood, and the effectiveness of the first-line therapeutics, varenicline and bupropion.Methods: Male and female rats were exposed to vaporized vehicle, nicotine, and/or THC during adolescence (postnatal days 38-49). In adulthood, subjects were trained to operantly respond on an active lever to receive food pellets. Subsequently, catheters were intravenously implanted in the right jugular vein, and following a recovery period, rats were given access to self-administer nicotine. Following acquisition of intravenous nicotine self-administration across 10 days, subjects were pretreated with varenicline (0, 1 or 3 mg/kg) in a within-subject Latin square design, with >2 baseline days in between each dose. After re-baselining again, rats were then treated chronically with the low dose of varenicline, followed by a low dose of both varenicline and bupropion. Results: We found that all treatment groups acquired operant food training similarly, and subjects self-administered intravenous nicotine during adulthood. The acute, low dose of varenicline was largely ineffective in attenuating nicotine intake, whereas the higher dose was more effective. Interestingly, the level of varenicline's effectiveness varied based on adolescent drug exposure and sex. Furthermore, chronic treatment with varenicline or varenicline/bupropion was effective in decreasing nicotine intake in the control group, whereas subjects with adolescent nicotine, THC or nicotine/THC vape exposure did not exhibit such pronounced benefits from chronic administration.Conclusions: Taken together, these findings suggest that adolescent nicotine and/or THC exposure induces long-lasting neurodevelopmental effects, which leads to individual differences in the effectiveness of therapeutics in adulthood.

SYM7-4

NICOTINE SELF-ADMINISTRATION ACTIVATES ACCUMBENS MICROGLIA IN A SEX-SPECIFIC FASHION

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Clinical literature indicates that women have more difficulty maintaining smoking cessation than men. Further, drugs of abuse can elicit neuroimmune responses including activation of microglia, and neuroimmune processes can be sexually dimorphic. We have previously found evidence that nucleus accumbens core (NAcore) microglia may be activated following chronic nicotine self-administration, as we found elevations in the microglial marker CD40. However, NAcore microglial morphology has not yet been characterized after nicotine, and sex-specific neuroimmune mechanisms of nicotine consumption have not yet been examined. Methods: In the current study, male and female Long-Evans rats underwent nicotine (0.06 mg/kg/infusion) or saline self-administration at a fixed-ratio (FR)-1 schedule of reinforcement. Following a minimum of 20 sessions (or until acquisition criteria were met for nicotine animals), NAcore brain tissue was then extracted and prepared for Iba1 immunohistochemistry and confocal microscopy. NAcore microglia morphology was then quantified using fully automated analyses from 3-D images (3D Morph) following nicotine self-administration in both sexes.Results: We found that while both sexes acquired nicotine self-administration, males consumed significantly higher amounts of nicotine across sessions as compared to females (p<0.05). In females, we found that the percent of brain volume surveyed by microglia, number of endpoints, and territorial volume were all decreased following nicotine self-administration as compared to saline (p's<0.05). Further, sex-specific patterns of microglia activation emerged whereby females displayed greater activation of NAcore microglia as compared to males (p<0.05). Conclusions: These results indicate that despite lower total nicotine consumption in females as compared to males, females are more susceptible to microglial activation within the NAcore following chronic nicotine consumption. Ongoing studies are utilizing CX3CR1-cre transgenic rats to determine if chemogenetic activation or inhibition of microglia controls nicotine seeking and accumbens glutamate plasticity.

SYM8-1

"TOBACCO FREE NICOTINE" E-CIGARETTE PRODUCTS SOLD ONLINE

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Introduction: E-cigarette products that claim that they contain "tobacco free nicotine (TFN)" or "synthetic nicotine" have entered the U.S. market and they pose a unique regulatory challenge for the U.S. FDA because the manufacturers claim that TFN nicotine is not derived from tobacco, and therefore not under the FDA's jurisdiction. We aimed to develop a better understanding of the characteristics of these products that are sold on popular e-cigarette online retailers. Methods: To identify popular online e-cigarette retailers, we searched for terms related to e-cigarette online shops (e.g., "online vape store," "buy vape online") on Google and obtained a list of URLs on the first 5 pages of each search term. We then used Alexa.com to confirm their online popularity and visited each website to determine that the online retailers were based in the U.S., did not have a physical shop, and were not limited to only selling e-liquids. On each of the included websites, we searched for "tobacco free nicotine" and "synthetic nicotine" and assessed the type of TFN e-cigarette products, flavors, nicotine concentration, and marketing claims.Results: All 22 online retailers sold e-cigarette products that they claimed contained TFN. We identified 12 brands that sold TFN e-liquids, 11 brands that sold TFN disposable devices, 1 brand that sold TFN e-liquids and disposable devices, 1 brand that sold TFN e-liquids and closed cartridge pod devices, and 1 brand that sold TFN closed cartridge pod device. TFN nicotine was available in both freebase and nicotine salt with a range of nicotine concentrations (0-50mg/ml) and flavors (fruit, candy, dessert, coffee, vanilla, menthol, "ice," and tobacco). The TFN brand/retailer websites claimed TFN was cleaner, purer, higher quality, tastier, and represented a "sophisticated vaping experience." Discussion: Our results indicate that popular online retail websites are marketing and selling a variety of TFN e-cigarette products from different e-cigarette manufacturers, and using marketing claims that suggest that they are superior to other brands. The FDA must exert its regulatory authority on TFN to protect public health.

SYM8-2

SYNTHETIC NICOTINE: EMERGENCE, CHEMISTRY AND HEALTH RISK

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Objective: Naturally extracted nicotine has been used throughout the world for many centuries. The psychoactive effects of nicotine are largely attributable to (S)-nicotine, the predominant form that occurs in tobacco plants. Recently, synthetic nicotine, often containing equal parts (S)-nicotine and (R)-nicotine, has emerged as an alternative nicotine source, raising potential health and regulatory concerns. Several published patents describe processes to derive synthetic nicotine that have been adopted to produce nicotine in bulk industrial settings. This presentation will provide an overview of nicotine chemistry and discuss currently available processes for (a) producing synthetic nicotine and (b) testing products to determine whether nicotine is synthetic or tobacco-derived. Method: Databases of filed and active patents (Google Patents, Espacenet, Patentscope, Freepatentsonline.com, and USPTO Web Patent Databases) were searched using keywords relating to synthetic nicotine. Separately, Web of Science and Scopus databases were searched for published articles on methodologies for distinguishing synthetic and tobacco-derived nicotine.Findings: Technical knowledge as expressed by patent filings is developing rapidly, with companies around the world having filed patents for nearly two dozen methods of producing, preparing, and/or refining synthetic nicotine. Additionally, scientific publications (n=8 as of July 2021) describe several available methodologies for analysing and quantifying the different forms of nicotine, including chromatographic and mass spectrometric techniques.Conclusion: There is an urgent need to better understand the pharmacology and toxicology of synthetic nicotine and how it affects human health. Particularly if the use of synthetic nicotine can be used to evade tobacco control laws, the production of synthetic nicotine will continue to rise as technology improves and costs decline. Methodologies for testing for the presence of synthetic nicotine (or the absence of tobacco-derived nicotine) have been developed, but there is currently no internationally validated method to test whether nicotine is synthetic or tobacco-derived.

SYM8-3

EFFECTS OF A "TOBACCO-FREE NICOTINE" CLAIM ON PERCEPTIONS OF PUFF BAR E-CIGARETTE USE AMONG YOUNG ADULTS

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Introduction. Puff Bar disposable e-cigarettes are now marketed with a "tobacco-free nicotine"claim. We assessed the effect of this claim on non-tobacco-using young adults' perceptions ofand intentions of using Puff Bar.Methods. We embedded a randomized between-subjects experiment into a web-based survey administered among young adults (n=1,390; ages 18-29) who were never tobacco users or infrequent tobacco experimenters. Participants viewed depictions of Puff Bar products with the claims that the products contain "tobacco-free nicotine" (experimental group; n=697) or simply "nicotine" (control group; n=693). Multivariable regressions were used to assess the associations between experimental conditions and Puff Bar use intentions, harm perceptions, use expectancies, and perceived relative use of Puff Bar vs. other e-cigarettes, controlling for participant characteristics. Results. Compared to the control group, the experimental group who saw the "tobacco-freenicotine" claim reported higher intentions of using Puff Bar (adjusted relative risk=1.19, p<0.001). The experimental group had a lower likelihood of perceiving Puff Bar use as "extremely or very harmful" (adjusted odds ratio=0.63, p<0.001) and "strongly or somewhat" agreeing with the negative expectancy of using Puff Bar (adjusted odds ratio=0.67, p<0.001). Additionally, the experimental group reported being "much more or more likely" to use Puff Bar over other e-cigarettes (adjusted odds ratio =1.67, p<0.001).Discussion. Among young adult never tobacco users and infrequent experimenters, Puff Bar's "tobacco-free nicotine" claim may increase positive expectancy and reduce negative expectancy and harm perceptions towards using Puff Bars. The claim may also increase the likelihood for this group to initiate or use e-cigarettes with Puff Bar products rather than other brands or types of e-cigarettes. These findings are concerning given little is known about the population health effects of tobacco-free nicotine. This study can inform regulators about the potential effect of "tobacco-free nicotine" claims on tobacco product perceptions.

SYM8-4

SYNTHETIC NICOTINE: LEGAL AND REGULATORY CONSIDERATIONS

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Background: Puff Bar, a disposable e-cigarette company, withdrew from the US market in July 2020 after receiving a warning letter from the FDA. It then restarted its US marketing in early 2021, claiming it was using synthetic nicotine and was therefore exempt from FDA regulation. Puff Bar is one of several recent examples of companies seeking to profit from a lack of (or uncertainty about) synthetic nicotine regulation. This presentation will examine the regulatory status of synthetic nicotine in countries around the world and discuss key regulatory challenges.Methods: In June 2021, national laws contained in the Tobacco Control Law database (tobaccocontrollaws.org) were examined to determine whether the operative definitions included in the laws covered synthetic nicotine products. Based on this review, countries were categorized based on whether synthetic nicotine was (a) subject to regulation under some or all tobacco control laws, (b) not subject to regulation, or (c) prohibited from sale. Separately, the Tobacco Watcher tool (tobaccowatcher.globaltobaccocontrol.org) was used to search for news articles indicating public discussion of synthetic nicotine.Results: Existing national laws differ substantially in their treatment of synthetic nicotine. Some countries have recently amended their tobacco control laws to extend their reach to synthetic nicotine products (e.g., Russia, Kazakhstan). Other countries already had broad definitions within their tobacco control laws that appear to cover synthetic nicotine products or ban their sale (e.g., Estonia, Brazil). In countries with tobacco control laws that do not currently cover synthetic nicotine (e.g., Kenya, South Korea, United States), there is active public discussion about tax evasion and other regulatory challenges.Conclusion: Problems stemming from allowing synthetic nicotine products to remain unregulated might include false and misleading health claims, consumer confusion, tax avoidance, and marketing to youth. In countries where a regulatory gap for synthetic nicotine exists, governments may consider amending tobacco control laws to ensure that synthetic nicotine products fall within their scope.

SYM9-1

CONVENIENCE STORE, PHARMACY, OR VAPE SHOP? HOW THE DISTRIBUTION OF TOBACCO RETAILER TYPE VARIES BY COMMUNITY CHARACTERISTICS

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Significance: There is substantial research indicating tobacco retailer density is greater in vulnerable neighborhoods (ie, those with high poverty, rurality, or a high prevalence of racial/ethnic minorities). Despite sound research on tobacco retailers overall, however, little is known about how specific types of tobacco retailers vary by community characteristics.Methods: We first obtained data on all tobacco retailers (N=11,392) for the state of Ohio, a large state with diverse communities. We then geocoded retailer addresses and used spatial statistical methods to establish current disparities in retailer density. We next coded all tobacco retailers for store type category (convenience store, grocery store, pharmacy, etc.). In addition, all Ohio neighborhoods were coded at the census tract level for 3 characteristics: poverty (high or low), prevalence of racial/ethnic minorities (high or low), and urban, suburban, or rural status. Finally, to assess whether tobacco retailer type varied by community characteristics, we ran a series of analyses (controlling for false discovery rate) to determine whether the prevalence of a particular retailer type varied by a particular neighborhood type.Results: For all neighborhoods, convenience stores were the most common type of retailer selling tobacco. Yet the prevalence of convenience stores was higher in high-poverty urban neighborhoods than in low-poverty urban neighborhoods. For the second-most common type of tobacco retailer overall, discount stores, rural neighborhoods and high-minority urban neighborhoods had among the highest prevalence. Grocery stores, pharmacies, and vape/hookah shops generally had the highest prevalence in low-risk neighborhoods.Conclusion: Our findings demonstrate that the distribution of specific retailer types varies by community. This presentation will discuss how the distribution of retailer types has implications for product availability and price, which may subsequently impact tobacco use and cessation. Novel tobacco control policies that target retailer type will also be discussed in terms of their impact for the population overall and vulnerable populations in particular.

SYM9-2

PATTERNS OF TOBACCO RETAILER ATTRITION BY STORE TYPE AND NEIGHBORHOOD CHARACTERISTICS IN NEW YORK CITY

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SIGNIFICANCE: In 2018, New York City enacted a policy intervention to gradually reduce the number of tobacco retailers by half across city districts. No new tobacco retail licenses will be granted until the number falls below the 50% cap via license attrition. This study examines patterns of and reasons for license loss in the borough of Manhattan 2 years after policy enactment. METHODS: A longitudinal, geocoded database of active tobacco retail licenses in Manhattan was merged with municipal data on license surrenders, suspensions, and revocations to identify retailers that lost their tobacco license between 2018-2019. Descriptive statistics highlighted differences in attrition patterns by store type (categorized using historical Google Street View imagery) and neighborhood demographic characteristics.RESULTS: Among retailers active after policy enactment (n=2,051), 12.4% (n=254) lost their tobacco license by the end of 2019. The vast majority of these retailers were independent convenience stores (64.2%), followed by grocery stores (7.1%), newsstands (7.1%), and smoke/vape shops (5.1%). License loss was more common among retailers in neighborhoods with greater proportions of Hispanic/Latinx residents and lower median household income. The most common reasons for attrition were license expiration/non-renewal (54.7%), revocation (28%), surrender (8.7%), and suspension (8.7%). "Punitive" reasons for license loss (i.e., revocation, suspension) were more common in neighborhoods with greater proportions of non-Hispanic Black and Hispanic/Latinx residents, as well as lower median household income.CONCLUSION: NYC's tobacco retailer density reduction initiative will likely help minimize persistent disparities in the tobacco retail environment, although its mechanisms may reflect economic and social inequities faced by certain communities. This presentation will discuss how differences in attrition patterns by store type and neighborhood characteristics may ultimately shape the tobacco marketplace and consumer behavior.

SYM9-3

DOCUMENTING THE IMPACT POTENTIAL OF A MENTHOL CIGARETTE BAN AT POINT-OF-SALE: A PHOTOGRAPH-BASED ANALYSIS OF THE PRESENCE AND PLACEMENT OF MENTHOL VERSUS REGULAR CIGARETTE PACKS ON THE SHELVES OF TOBACCO RETAIL OUTLETS IN NEW YORK CITY

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Significance: This project investigated the use of novel methods for monitoring power-walls and other promotional shelf-spaces within tobacco retail outlets (TROs) across New York City (NYC). Results provide a baseline against which comparisons can be made in the future if and when a ban on menthol cigarettes is implemented and enforced within NYC. Methods: Photographic surveillance methods were employed to capture the presence and proportionate amount of all visible cigarette packs on the shelves inside N=160 TROs. A cluster-randomized TRO selection process produced an average of 40.0 TROs per NYC borough (Range 38-45), with an average of 4.7 TROs in each zip-code (N=34 zip-codes; Range: 4.5 – 4.9 TROs). Statistical analyses examined the absolute and proportionate number of menthol packs in each TRO as a function of NYC borough and zip-code boundaries, as well as population smoking rates derived from the NYC Community Health Survey, and other demographic indicators from the American Community Survey.Results: The total number of cigarette packs on the shelves of each TRO and the proportion of menthol packs varied significantly across TROs, averaging about one quarter of all packs displayed (M=0.274; SD=0.15), or about 16.5 +/- 17.8 menthol packs per TRO (Range 13.4 – 20.2). Modeling results indicate that the proportion of menthol packs displayed was significantly greater in areas with elevated population smoking rates (OR=1.03, CI:1.01-1.06) and density of TROs per 1,000 residents (OR=1.23; CI:1.01-1.49), although these associations varied in complex ways with the proportion living under the federal poverty level and the proportion under age 18 residing within each zip code. Conclusions: Results of this study demonstrate the utility of photograph-based TRO audit methods for objective, reliable documentation of the presence and proportionate amount of menthol versus other cigarette pack types on TRO shelves, and highlight the need to account for sources of variation between small areas when examining the TRO product landscape and evaluating the effectiveness of regulatory actions against menthol.

SYM9-4

RETAIL MARKETING OF MENTHOL CIGARETTES IN LOS ANGELES, CALIFORNIA: A CHALLENGE TO HEALTH EQUITY

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Significance: Menthol cigarette sales continue to increase, accounting for a third of the US cigarette market. Retail marketing of menthol cigarettes is a contributing factor to tobacco-related health disparities. To inform regulation to address associated disparities, we examined retail marketing strategies for menthol cigarettes and their features and characteristics in relation to neighborhood racial/ethnic composition.Methods: We used multilevel regression models to examine associations of neighborhood racial/ethnic composition and store type with menthol cigarette sales outcomes, including availability, exterior advertising, price promotions, and price in a sample of tobacco retailers (N=673) in Los Angeles County neighborhoods with a median or below-median household income. We also recorded the prices of Newport (the highest selling menthol cigarette brand in the US) and blu disposable menthol e-cigarettes.Results: Overall, 94.5% of retailers sold menthol cigarettes, 31.2% displayed menthol price promotions, and 30.2% displayed at least one exterior menthol advertisement. Adjusting for racial/ethnic zip code cluster and store type, stores located in predominantly African American neighborhoods showed significantly higher odds in the availability of Newport cigarettes than stores in Hispanic neighborhoods (OR=0.21; 95% CI, 0.09–0.53; P=.001) or non-Hispanic White (OR=0.12; 95% CI, 0.05–0.31; P<.001) neighborhoods. Stores located in predominantly African American neighborhoods displayed significantly higher odds of having menthol price promotions and storefront advertisements than those in Hispanic neighborhoods (OR=0.51; 95% CI, 0.30–0.88; P=.02 and OR=0.25; 95% CI, 0.13–0.48; P<.001, respectively).Conclusion: In 2016 and 2017, menthol cigarettes were widely available in Los Angeles County across racial/ethnic neighborhoods. We found a disproportionate number of storefront advertisements and price promotions for menthol in stores located in predominantly African American neighborhoods along with the lowest advertised pack price. This evidence supports tobacco control policies that restrict menthol cigarette sales in the retail environment.

SYM10-1

LIFETIME BURDEN OF SMOKELESS TOBACCO IN INDIA, PAKISTAN AND BANGLADESH

Kathryn Coyle, PhD, Subhash Pokhrel. Brunel University.

The large majority (85 percent) of the over 300 million users of smokeless tobacco (ST) globally are in South and South-East Asia. ST has been associated with increased risk of oral cancers, cardiovascular and cerebrovascular diseases and mortality. As the evidence base for effective interventions is built, policymakers will be faced with decisions regarding where the most impactful investments can be made. This is part of a larger study investigating the return on investment (ROI) of ST interventions.To facilitate assessment of ROI, the objective of this component is to estimate the lifetime economic burden of ST use with respect to healthcare costs and health impacts in India, Pakistan and Bangladesh.The study uses population data on ST use, disease prevalence, mortality and the effects of ST combined with costs and disability impacts of disease. A Markov model was developed to project uptake, quitting and relapse to ST over the life course of 5 year sex-specific cohorts ranging from 15 to 19 up to 70 to 74 years, assuming no change in current ST policies, versus a scenario in which no ST is consumed. Disability attributable life years (DALYs) and healthcare costs attributable to ST were estimated with costs and effects discounted at 3 percent per annum.The ST attributable costs are higher in the younger cohorts (under 50 years) as compared with older cohorts, with peak costs generally occurring in middle age. For illustration, costs for males aged 35 to 39 in India are US dollars 1.467 billion, versus 1.143 billion for 20 to 24 year olds and US dollars 117 million for 45 to 49 year females, versus 347 million for 20 to 24 year olds. When disease burden is measured in DALYs, a similar age cohort pattern is observed, with higher burden in younger ages and the peak burden occurring in middle age cohorts.This study demonstrates the substantial reduction in disease burden and reduction in healthcare costs that could be made through reducing the use of ST in South-East Asia. There is a clear need for investment in efficacious interventions aimed at reducing both ST uptake and improving quitting success.

SYM10-2

SMOKELESS TOBACCO USE DURING PREGNANCY IN SOUTH-EAST ASIA

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Introduction: Smokeless tobacco (ST) use among women is common in the South-East Asia Region (SEAR), possibly due to easy availability and socially acceptable behaviour. However, very little is known about its use among pregnant women. We attempted to understand the prevalence, relative risk ratios (RRR) of ST use among pregnant women in SEAR, and further understand the influence of family on ST use during pregnancy. Methods: We used the Demographic and Health Surveys (2012-2016) data from 5 SEAR countries (India, Indonesia, Myanmar, Nepal and Timor-Leste) to estimate the prevalence of ST use and compared its use among pregnant and non-pregnant women, adjusted for education, socio-economic status, place of residence and age. We further conducted in-depth qualitative interviews among pregnant women in India, who used ST at any point during their pregnancy, to understand familial and community influence on ST use during pregnancy. Results: Based on the data of 34,762 pregnant women, the prevalence of ST use was 0.45% (95%CI of 0.002-2.29), with highest prevalence of 3.2% (95%CI of 2.94-3.5) in India and lowest of 0% in Myanmar and Timor-Leste. The regression analysis had 783,588 observations, based on which pregnant women were 7% more likely to use ST than non-pregnant women when compared to no tobacco use (RRR 1.07, 95% CI of 1.02-1.12). The interviews revealed that ST use within the household had influenced women from a very young age. However, the study also suggested a secret behaviour of women's ST use within the family. Furthermore, while some women increased their ST use in pregnancy, a few also attempted to reduce it, orquit, based on the advice from family and lady health workers. Discussion: Addressing ST use among women in SEAR is warranted and pregnancy is possibly an opportunity for this. The secrecy within the family is contradictory to the perceived norms and hence the normality towards a common and acceptable behaviour of ST use among family members is possibly changing. Familial support, combined with cessation help from lady health workers during pregnancy might help to reduce smokeless tobacco use in pregnant women.

SYM10-3

THE FEASIBILITY OF CONDUCTING A COHORT STUDY AMONG SECONDARY SCHOOLCHILDREN IN BANGLADESH, INDIA AND PAKISTAN

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ObjectivesTo assess the feasibility of conducting a cohort study among secondary schoolchildren (aged 12-16 years) in urban and rural schools in Bangladesh, India and Pakistan, to evaluate existing tobacco control policies on smokeless and smoked tobacco uptake and use. Here we assess:1. the feasibility of selection, recruitment and retention of schools and participants2. the feasibility, acceptability and comprehensibility of the study procedure/questionnaireMethods In 2019/2020, a multi-stage stratified random sampling strategy was used to select 8 urban/rural schools within each country and informed consent of headteachers, parents and students in relevant schools/classes sought. Eligible students completed a written survey.Feasibility was assessed using mixed methods comprising qualitative interviews and focus groups with school staff and students in participating classes (objs 1-2), quantitative records and qualitative field notes from researchers (objs 1-2) and quantitative survey data (obj 3). Qualitative data analysed thematically using a modified Framework approach. We assessed numbers approached, recruitment rates/timescales, reasons for ineligibility and suggestions for improvement.ResultsOn average, it took 5 months to secure approvals from authorities to approach schools and then ~38 days to secure school consent. 80% of schools approached agreed to participate. Exclusions included insufficient students or exam clashes. One school felt study inappropriate, given SLT use was not socially acceptable for girls. Parental consent was achieved from 65.4% of consent forms given out. Seeking parental consent (via students) was time consuming and staff suggested holding a parents' briefing, taking their consent simultaneously.Student assent was 95.1% of those with parental consent. Questionnaires were typically completed in lessons taking ~70 minutes (SD: 32.5). Staff and students felt this was too long with many unfamiliar terms used.Interviewees perceived study raised awareness of tobacco health risks.DiscussionStudy was feasible, with suggestions for improving recruitment and consent processes.

SYM10-4

COMPLIANCE OF SMOKELESS TOBACCO PRODUCTS WITH TOBACCO CONTROL REGULATIONS IN BANGLADESH, INDIA AND PAKISTAN

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IntroductionOver 350 million people in South Asia use smokeless tobacco (ST) products, yet there is very little evidence on illicit ST trade in the region. The primary objective of our study was to assess the compliance of ST products collected from local markets in Bangladesh, India, and Pakistan with the relevant national regulations in these countries, rendering them illicit or otherwise.MethodsWe collected unique ST packs from local sellers in two purposively selected districts in each of Bangladesh, India, and Pakistan using established tobacco packs sample collection methods. Based on the relevant national laws and guidance from the World Health Organization's Framework Convention on Tobacco Control, definitions of illicit ST products were agreed upon by the research teams apriori. The parameters on which the packaging was assessed included "Market Retail Price Disclosure", "Pictorial Health Warning (PHW)", "Textual Health Warning" and "Use of Misleading Descriptors (MD)". ResultsAlmost all ST products that were collected in the three countries were illicit. The most common non-compliant feature of illicit ST packs was the lack of appropriate health warnings. Around 84% of packs in Bangladesh, 93% of that in India, and 100% in Pakistan had no PHW or the size of PHW was not in compliance with national requirements. 61% of the packs carried MD in Bangladesh. In India and Pakistan the proportion of such packs was 32% and 42%, respectively. ConclusionPoor enforcement and in some cases, a virtual absence of ST control policies, are slowing the progress of and weakening the impact of ST control in South Asia. Improving compliance and reducing the sale of cheap and illicit products require formalising the market through business licensing and operational market monitoring.

SYM11-1

INCREASING CANNABIS USE AND CANNABIS USE DISORDER AMONG US INDIVIDUALS WHO SMOKE CIGARETTES, 2004-2017: IMPACT OF CANNABIS LEGALIZATION

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Cannabis legalization and increases in use are occurring rapidly in the US. Cannabis use and cannabis use disorder (CUD) are two to three times more common among those who smoke cigarettes, compared with those who do not. It is not clear whether legalization of cannabis will differentially affect cannabis use and CUD by cigarette smoking status. As CUD among smokers is associated with lower quit rates, understanding the degree to which legalization may be differentially increasing among those who use cigarettes is critical to inform tobacco control efforts. The goal of this study was to estimate changes in the prevalence of cannabis use, daily use and CUD among individuals who use cigarettes, relative to those who do not, to examine whether state-level cannabis policy modifies these trends from 2004 to 2017.Public and restricted-use data from the 2004 to 2017 National Survey on Drug Use and Health, an annual cross-sectional, nationally representative survey of US individuals, were analyzed. The prevalence of past-30-day cannabis use, daily cannabis use and cannabis use disorder by cigarette use status in 2017 was estimated among respondents ages =12 by sociodemographic characteristics and state-level cannabis policy. Weighted logistic regressions with continuous year as the predictor for the linear time trend were used to examine the time trends in cannabis use, daily use and CUD by cigarette use and cannabis law status from 2004 to 2017.Cannabis use, daily use and CUD are substantially more common among those who use cigarettes, and even greater in states where cannabis is legal for medical or recreational use. Cannabis use and daily use increased significantly over this 13-year period, overall, and among all groups. Cannabis use, daily use and CUD were consistently 2-10x more common among those who use cigarettes, compared with those who do not smoke. Cannabis use and CUD are increasing among daily and non-daily cigarette smokers, particularly among those living in states where recreational use of cannabis is legal. Given that CUD may impede successful smoking cessation, tobacco control efforts should address this disproportionate increase among smokers.

SYM11-2

ASSOCIATIONS BETWEEN INTENSITY AND TYPES OF TOBACCO AND CANNABIS CO-USE ON THE SAME DAY AMONG YOUNG ADULT SMOKERS

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Background: Co-use of tobacco and cannabis is common among young adults, but little is known about associations between use of both substances within a day, which may result in greater extent of co-use and addiction.Objectives: We examined the associations between intensity and types of tobacco and cannabis co-use on the same day. Methods: A smartphone-based study collected 2,891 daily assessments on substance use among 147 young adult smokers (aged 18-26; 51.7% female) during a 30-day period. Mixed models examined day-level associations between the intensity (i.e., number of times) and types (i.e., combustible, vaporized, and edible cannabis) of cannabis use and the outcomes (i.e., number of cigarettes or cigars smoked, and number of times vaping e-cigarettes), controlling for demographics, alcohol use, and time effects.Results: Same-day co-use of tobacco and cannabis was reported in 989 daily assessments (34.2%). Participants reported a greater intensity of cigarette (ß=0.09; 95%CI=0.05, 0.13), e-cigarette (ß=0.03, 95%CI=0.00, 0.06), and cigarillo use (ß=0.08, 95%CI=0.06, 0.09) on days they used more cannabis. Participants reported a greater intensity of e-cigarette use on days they vaped cannabis compared to days they did not (ß=0.35; 95%CI=0.24, 0.46). Older participants reported a greater intensity of cigarette smoking (ß=0.10; 95%CI=0.03, 0.16), while LGBTQ+ participants reported a greater intensity of e-cigarette vaping (ß=0.34; 95%CI=0.05, 0.62).Conclusion: Findings indicated positive associations between intensity of tobacco and cannabis co-use within a day, particularly e-cigarettes and vaporized cannabis. Impact of same day co-use on addiction and preventive interventions should be addressed in future research.

SYM11-3

DAYS OF CANNABIS USE AND SMOKING CESSATION TREATMENT OUTCOMES: NONE IS BETTER, MORE IS WORSE

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As the prevalence of cannabis use increases, evidence is accumulating about the impact of cannabis use on cigarette smoking cessation. Quitlines comprise the largest and most accessible network of smoking cessation treatment services in the US, but little is known about how cannabis use impacts tobacco treatment outcomes among quitline participants. This study examined the dose-response relation between days of cannabis use and the probability of long-term abstinence after smoking cessation treatment provided by New York State Smokers' Quitline. Past 30 day cannabis use and desire to reduce or stop cannabis use was assessed during routine intake assessment from May 2018-June 2020. Participants received coaching and nicotine replacement and provided 7-day point prevalence abstinence outcomes 7 months after intake. Significance testing examined characteristic differences between cannabis users and non-users. Generalized linear modeling (GLM) was used to examine the effect of days of cannabis use on abstinence outcomes. Probit analysis was used to examine the relation between days of cannabis use (dose) and abstinence outcomes (response). Cannabis users comprised 7% (n=284) of the sample (n=4,225); were about 6 yrs younger than non-cannabis users (51 (SD 14) vs 57 (SD 13), p<.01); were more likely to be male (55% vs 49%, p=.03) and to live with other cigarette smokers (37% vs 27%, p<.01); 51.4% of cannabis users expressed no desire to reduce or stop cannabis use. GLM found that the more days participants used cannabis, the lower the probability of abstinence, Wald ??2=5.6, p=.02, OR =.98, 95% CI (.966;.997). Probit analysis found that the probability of abstinence decreased steadily from .31 for 0 days to .22 for 30 days of use, z=-2.064, p=.04. Every added day of use decreased the probability of abstinence by a small amount. Cannabis use appears to negatively impact smoking cessation among quitline participants. Even 1 day of use per month is associated with a small decrease in the probability of abstinence. Understanding how cannabis use impacts smoking cessation will inform cessation treatment for co-users.

SYM11-4

INTEGRATING A MOTIVATIONAL CANNABIS INTERVENTION INTO STATE QUITLINE COACHING TO INCREASE TOBACCO CESSATION AMONG CO-USERS

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About 25% of those calling state tobacco quitlines (QLs) report past 30 day cannabis use. Frequent cannabis use may contribute to failure to quit smoking. The present study describes the design and Phase IIa Proof-of-Concept test of a novel QL intervention for frequent cannabis users with the goal of increasing smoking cessation rates. The Check-Up-QL intervention was developed and tested in the QL setting by experts in QL coaching, cannabis treatment & cannabis use characteristics. Elements of the Marijuana Check-Up, a brief Motivational Enhancement Therapy intervention, were integrated into standard QL coaching to bring awareness to co-use habits that may impact quitting tobacco. The Check-Up-QL intervention includes 5 coaching calls and a personalized feedback report reviewed during call 2.Proof-of-Concept testing included coach training, recruitment of 10 participants, treatment engagement, fidelity monitoring and collection of outcome data. Following development of the treatment manual, 4 QL coaches were trained in intervention delivery, motivational strategies, and cannabis education. Incoming callers to the Washington or Alaska state QLs March - June 2021 who were aged >21 and who smoked > 5 cigarettes/day (CPD, n = 250) were offered a study for co-users of cannabis and tobacco. One third agreed to be screened (n = 81), 20 (24%) were eligible, 10 were enrolled.The sample was primarily white (70%) and male (80%), used cannabis M = 28 of past 30 days and smoked M = 12 CPD. Treatment engagement was high: 90% had > 3 calls (M = 3.7, SD 1.25). Regarding coach fidelity, 100% of treatment calls 1 & 2 and 60% of calls 3-5 were coded. Individualized, written feedback was provided on all coded calls identifying strengths and skills to improve. Two of 4 coaches achieved high fidelity ratings early on; 2 improved with specific feedback. Outcomes were collected at 8 weeks from 70% of participants: 57% reported being quit from tobacco (40% if missing = smoking); 20% quit cannabis; and 100% were satisfied or highly satisfied with the program. Challenges encountered during implementation of this innovative treatment in the real world QL setting will be discussed.

SYM11-5

DISCUSSANT

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SYM11-6

KNOWLEDGE, ATTITUDES AND PRACTICES OF UK STOP SMOKING PRACTITIONERS WHEN ADVISING CO-USERS OF TOBACCO AND CANNABIS TO QUIT SMOKING

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Significance The UK rate of co-use of cannabis and tobacco is high with 81% of cannabis users mixing cannabis with tobacco. However, both substances are rarely co-treated in clinical interventions despite cannabis use being associated with poorer cessation outcomes. The aim of the study is to identify the knowledge, attitudes and practices of stop smoking practitioners when supporting tobacco cessation among cannabis users. **Methods** UK stop smoking practitioners were recruited via the *National Centre for Smoking Cessation and Training* (June 2021). Respondents completed an online survey about their knowledge, confidence and training relating to smoking cessation and cannabis use, and to what extent they ask, advise and refer to specialist cannabis services. Logistic regression was conducted to estimate odds ratios (ORs) of asking, advising and referring. **Results** A total of 693 practitioners were recruited, 53% from the community and 20% specialists. The average age was 43 and 78% were female. A large proportion (77%) considered extremely/very important to support co-users to quit smoking. However only 27% always/often asked clients about their cannabis use, 22% advised and 34% referred to cannabis specialised service. 17% said they prefer not to ask because they lack the knowledge and skills to advise co-users. Practitioners' confidence significantly increased likelihood of asking (OR=2.1 (1.65-2.7)), advising (OR=1.46 (1.06-2.00)) and referring (OR=3.70 (2.85-4.78)). Moreover, having a system in place to record cannabis use significantly increased the likelihood of asking (OR=1.61 (1.15-2.24)). Almost all practitioners (95%) wanted more training on how to support co-users

to quit smoking as only 37% of practitioners had received some form of training on cannabis use. **Conclusions** Practitioners acknowledge the importance of asking about co-use and offering cessation support for both substances. However, the rate of asking, advising and referring remains low. Practitioners report limited knowledge of supporting co-users but wish to receive further training. Adequate recording systems within smoking cessation treatment settings might facilitate the provision of such support.**Funding** This work was supported by Cancer Research UK (grant number: C68935/A29849).

SYM12-1

CHEMICAL CHARACTERIZATION OF NOVEL TOBACCO-FREE NICOTINE-CONTAINING ORAL PRODUCTS

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Introduction: Nicotine-containing flavored pouches and lozenges are newer products available for tobacco users. Resembling pharmaceutical nicotine therapies, which do not contain tobacco, these products are sold by the tobacco industry without therapeutic claims. Little is known about the various chemical additives used in these novel nicotine-containing products. This study aimed to provide preliminary characteristics of those new products, including pH and chemical content, as well as nicotine and flavoring concentrations.Methods: Nicotine pouches (n=25) and lozenges (n=3) in a variety of flavors were purchased online from on!, NIC-S, Revel (now Velo), Velo and ZYN. pH was measured by sonicating pouches and dissolving lozenges in artificial saliva. All products were extracted using methanol and chemical constituents were identified using GC-MS and mass spectral analysis. Quantitation of nicotine and 20 selected flavoring chemicals was performed with GC-MS and GC-Q/TOF, respectively. Results: pH in nicotine pouches varied from 7.0 to 9.3, while the lozenges ranged from 5.7 to 6.9. Over 250 unique chemicals were identified in the products, including humectants: propylene glycol (PG) and vegetable glycerin (VG) in 23 and 5 pouches, respectively. Nearly 170 different flavoring chemicals were found and vanillin, hydroxyacetone, and methyl salicylate were among several frequently detected across various products. Likewise, these chemicals were commonly found in similarly flavored candy products. Synthetic cooling compounds WS-3 and WS-23 were detected among mint- and tobacco-flavored products and several PG acetal compounds were identified in 3 tested pouches. In lozenges, nicotine concentrations ranged from 0.8 to 1.0mg/lozenge and flavoring chemicals menthol, ethyl vanillin and vanillin were found at concentrations of 0.18mg, 0.75mg and 0.09mg/lozenge, respectively.Conclusions: This study provides qualitative and quantitative information about the chemical constituents of novel oral nicotine-containing products. Findings provided here will help guide future studies in understanding the potential health effects associated with product usage.

SYM12-2

NICOTINE POUCH USE PATTERNS, PERCEPTIONS, AND MARKETING EXPOSURE AMONG CIGARETTE SMOKERS, SMOKELESS TOBACCO USERS, AND NONUSERS

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Significance: Nicotine pouches are novel oral nicotine products that are available in a variety of brands, flavors, and nicotine strengths, marketed as tobacco-free substitutes for cigarettes, and gaining in popularity. There is limited research on nicotine pouch use, appeal, and factors contributing to appeal.Methods: 416 cigarette and/or smokeless tobacco users and nonusers aged = 21 years were recruited in Ohio. Participants completed an online survey assessing tobacco use history, sociodemographics, and nicotine pouch use history, perceptions, and marketing exposure. Given the limited evidence on nicotine pouches, we analyzed data descriptively and using bivariate tests.Results: Participants averaged 35.2 years of age (SD 11.8), 76% were male, 91% white race, and 56% had less than a college education. Overall, 20% were cigarette smokers, 36% were smokeless tobacco (SLT) users, 18% were dual cigarette/SLT users, and 26% were non-users. In total, 68% had heard of nicotine pouches, 42% had tried them, and 23% reported current use (every day or some days). Current use was highest among SLT users (53%) followed by dual users (36%), non-tobacco users (13%), and smokers (5.9%, p <.001). Among nicotine pouch users, the most commonly used brand used was Zyn (15%) and commonly used flavors included wintergreen/spearmint/frost (36%), menthol/mint (23%), and fruit (17%). SLT users (M 2.2, SE .06), dual users (M 2.4, SE .09), and smokers (M 2.5, SE .09) endorsed lower perceived risks of health harm than nonusers (M 3.1, SE .08, possible range 1-4, p's <.001). Perceived substitutability for

cigarettes (M 5.2, SD 1.7) and SLT (M 5.9, SD 1.5) were moderate overall (possible range 1-7) and did not differ significantly by user groups. The majority (80%) reported nicotine pouch advertising exposure in the past year, most commonly at point of sale (30%), online (19%), and on television (11%). Conclusions: Nicotine pouch use was relatively common in this convenience sample, especially among SLT users and dual users. Perceived substitutability, variation in perceived risks, and high exposure to nicotine pouch advertising may be contributing to increasing use.

SYM12-3

PERCEPTIONS OF ORAL NICOTINE POUCHES ON REDDIT

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Background: Oral nicotine pouches are a new form of tobacco-free nicotine products launched in recent years with a variety of flavors available in the market. This study examined the public perceptions of oral nicotine pouches on Reddit, a popular social media platform for sharing user experiences.Methods: Between February 15, 2019 and February 12, 2021, 2410 Reddit posts related to oral nicotine pouches were collected. After the removal of unrelated or commercial posts, 653 Reddit posts related to oral nicotine pouches remained. Topics and sentiments related to oral nicotine pouches on Reddit were manually coded.Results: The number of Reddit posts related to oral nicotine pouches increased during the study period. Content analysis showed that the most common topic related to oral nicotine pouches is "sharing" (56.0%), in which sharing oral nicotine pouches products and user experiences were dominant. The next popular topic is "asking questions" related to oral nicotine pouches (product properties and recommendation) (17.6%), following by "quitting" vaping or smoking through use of oral nicotine pouches or quitting the oral nicotine pouches themselves (12.7%), and "health" symptoms or concerns related to oral nicotine pouches (11.3%). The least popular topic was "legality/permissions" related to oral nicotine pouches (2.3%). In addition, a greater number of Reddit posts described positive attitudes towards oral nicotine pouches than negative attitudes toward the products, 54.2% vs. 15.5% (P-value < .0001). Conclusions: There was an increasing trend in oral nicotine pouches discussions on Reddit. Reddit users overall had a positive attitude towards oral nicotine pouches and were actively sharing products and user experiences.

SYM12-4

CELLULAR AND METABOLIC TOXICITY OF ORAL NICOTINE POUCH PRODUCTS IN ORAL EPITHELIAL CELLS

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Significance: Nicotine pouches are a new smokeless tobacco product category, whose sales rapidly increased (>300%) in the last 2 years. Nicotine pouches are tobacco- or tobacco-leaf free, consisting of filler, nicotine or nicotine salts, sweeteners and a variety of characteristic flavors, including mint, menthol, wintergreen and sweet-associated flavors (fruity and candy flavors). Though nicotine pouches are marketed with claims of reduced risk, it is currently unknown whether the use of flavored nicotine pouch products has adverse effects on oral tissues, and, if so, what the product characteristics are that contribute to the toxicological effects.Methods: The potential cytotoxic effects from exposure to flavored nicotine pouch extracts were assessed using LDH and fluorescence Live/Dead cell assays in UM-SCC-1 cells, an oral squamous cell carcinoma cell line. Live-cell metabolic assays were carried out in UM-SCC-1 cells to determine the effects of these flavored pouch extracts on key bioenergetic parameters of mitochondrial function. Results: Exposure to several flavored nicotine pouch extracts (on! mint, wintergreen; Zyn coffee, spearmint, cinnamon) for 18-24 hours increased LDH release in UM-SCC-1 cells by ~1.5-2.0 fold. Cells exposed to either nicotine (3 mM) or the active flavor chemical present in these products (menthol, carvone or methyl salicylate at 3 mM), produced no significant LDH activity over untreated control. Extracts of VELO products (Citrus and Mint) did not increase LDH activity. In the Live/Dead assay, significant dose-dependent cytotoxicity was observed upon exposure to various dilutions of Zyn and VELO Cinnamon extracts. In metabolic assays, compared with their individual constituents (nicotine, active flavor chemical), several extracts of flavored Zyn, VELO and on! products diminished key parameters of cellular energy metabolic functions, including basal respiration, ATP

production, and spare respiratory capacity.Conclusion: Nicotine pouch extracts have differential toxicological and metabolic effects, with several extracts increasing LDH release, cell death and reducing mitochondrial function.

SYM13-1

INDUCING THE POSITIVE EMOTION OF GRATITUDE IN THE CONTEXT OF ANTI-TOBACCO COMMUNICATIONS REDUCES MOTIVATION TO SMOKE

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Significance: Public service announcements (PSAs) constitute a cornerstone in tobacco control, but gaps exist in understanding how emotionally-evocative PSAs impact smoking. Certain emotion-imbued communications can trigger unintended "boomerang" effects, and our recent research has shown that sadness, one of the most frequent emotions in PSAs, may paradoxically increase smokers' craving, impatience to smoke and actual smoking behavior. Guided by the Appraisal Tendency Framework of emotion and decision making, we predicted that gratitude, a positive emotion rarely evoked in PSAs, would reduce motivation to smoke. Methods: In two studies, we experimentally induced emotions by videos and writing and measured craving to smoke. In Study 1 (N=174 smokers from Mturk), participants were randomized to gratitude or neutral conditions, without viewing any PSA. In Study 2 (N=175 smokers from Prolific), we tested the specificity of the gratitude effect by adding a comparison positive emotion, amusement. We also tested variations in presenting a PSA before or after the emotion induction using a 3 emotion (gratitude, amusement or neutral) by 2 PSA location (before or after emotion induction) between-subjects design. We measured craving to smoke in both studies using 3 items from the brief Questionnaire on Smoking Urges.Results: Study 1 found that without any PSA, gratitude (vs. neutral) significantly reduced cigarette craving (d=-.45, p=.004). Study 2 replicated the finding that gratitude (vs. neutral) significantly reduced cigarette craving (d=-.49, p=.010) and found amusement (vs. neutral) did not (d=-.22, p=.237), regardless of the PSA location (interaction p=.742). Conclusions: These findings build upon evidence showing that target emotions yield specific effects on motivation to smoke. Unlike sadness, the positive emotion gratitude reduces craving in smokers. The findings were consistent across 2 studies (with and without viewing a PSA) and regardless of whether participants viewed a PSA before or after emotion induction. These findings have theoretical and practical relevance for informing the design of anti-tobacco communications.

SYM13-2

POPULATION-LEVEL ASSOCIATIONS SUGGEST A PROTECTIVE INFLUENCE OF GRATITUDE ON CURRENT SMOKING STATUS

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Significance: Anti-tobacco communications frequently use negative emotional content, including sadness, fear and disgust, to enhance the persuasiveness and recall of message. However, recent research has shown that sadness may paradoxically increase motivation to smoke, whereas the positive emotion gratitude may yield the desired outcome of decreasing craving. We conducted three studies to assess the ecological validity of previous lab-based findings regarding gratitude and smoking.Methods: In Study 1, we assessed smokers' (N=204) emotional responses to 81 segments of CDC's Tips from Former Smokers. In Study 2, we used data from the MacArthur Midlife in the United States survey (N=8,540) to assess associations between self-reported positive emotions pride, compassion and gratitude, and smoking status over five survey waves from 1995 to 2014. In Study 3, we assessed the association between positive emotions and tobacco use using data from 86 countries (N=20,338) collected during the COVID-19 pandemic with the support of the Psychological Science Accelerator.Results: Study 1 found that gratitude ranked 8th among 26 positive emotions and 25th among all 43 emotions on both frequency and intensity by smokers. Study 2 found that gratitude, but not pride or compassion, was significantly associated with a lower likelihood of current smoking across all five survey waves (standardized bs range from -.21 to -.37, ps<.05), after adjusting for socioeconomic status, age, and gender (standardized bs range from -.13 to -.32, ps<.05 in 4 out of 5 waves). In Study 3, gratitude was significantly correlated with lower intentions to excessively use tobacco during COVID-19 (b= -.14, p<.001). In contrast, other positive emotions (love, hope, serenity & inspiration) showed inconsistent or weaker correlations. Conclusions: Gratitude is underutilized in current anti-smoking PSAs, yet evidence from diverse countries and years suggests a potential protective effect of gratitude on smoking status. These findings suggest that anti-smoking public service announcements, which predominantly induce negative emotions, could consider inducing gratitude to motivate smoking reduction.

SYM13-3

THE ROLE OF DISCRETE EMOTION IN THE REASONED ACTION MODEL OF BEHAVIORAL INTENTION: THREE EMPIRICAL TESTS

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The Reasoned Action Model of behavioral intention has been an extremely influence approach in predicting behavior and behavior change as well as guiding the selection of beliefs to be addressed in communication campaigns targeting behavioral change. The role of discrete emotional response in accounting for behavioral change has held a controversial position in the model with some arguing that emotional considerations are built into the measurement procedures or transmitted through attitudes, norms, and efficacy while others maintain an independent path for discrete emotional response is necessary. Data are presented from three large scale, national studies are presented: two studies of quitting intentions involving young adult smokers 18-25 (study 1, N=450), adult smokers (study 2, N=1100), and adults volunteering to participate in genetics research (study 3, N=3700). Two of the studies involve longitudinal, behavioral outcomes as well as behavioral intention allowing inference from discrete emotional states to behavioral response. The robust conclusion across all three studies is that there is a unique, independent predictive path from discrete emotional states to behavioral intention over and above the standard reasoned action predictors (attitude, norm, and efficacy). Study 3 is not about tobacco-related behaviors but is included to show that the role of discrete emotions in RAM is not unique to tobacco-related behaviors. Analyses employ Structural Equation Modeling as well as multiple regression to show best fitting models as well as the role of specific emotional states in the three contexts. Implications for campaign design are explored.

SYM13-4

SMOKERS' CURIOSITY FACILITATES RECALL OF TOBACCO-RELATED HEALTH INFORMATION

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Curiosity is an epistemic emotion characterized by a desire to fill the knowledge gap between what one knows and what one wants to know. States of curiosity promote learning. Two open questions concern the extent to which tobacco smokers exhibit curiosity about smoking-related health information and whether this curiosity can facilitate recall of this information. Participants (n=324 smokers; n=280 non-smokers) performed a Trivia Guessing Task wherein participants guessed the answers to general trivia and smoking-related trivia questions and provided ratings of their curiosity prior to viewing the answers to the questions. A subset of participants (n=121 smokers; n=97 non-smokers) completed a surprise Trivia Memory Task one-week later and answered the previously-viewed questions. Results indicate that smokers are no less curious about smoking-related trivia than they are about general trivia and that curiosity about the answer to smoking-related trivia is associated with more accurate recall of smoking-related trivia answers one week later. Findings suggest that engendering states of curiosity for smoking-related information may facilitate retention of that information in smokers.

SYM14-1

A DIFFERENCE-IN-DIFFERENCE APPROACH TO EXAMINING DISPARITIES IN THE IMPACT OF CANNABIS LEGALIZATION ON THE CO-USE OF CIGARETTES AND CANNABIS IN THE UNITED STATES, 2004-2017

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Despite the overlap in cannabis and cigarette use, the potential harms associated with co-use, and rising cannabis use alongside rapidly expanding cannabis legalization, little is known about how legalization might impact the co-use of cigarettes and cannabis, or whether legalization impacts co-use differently among demographic subgroups (e.g., women versus men, minoritized versus majority racial/ethnic groups, lower versus higher socioeconomic status). This study estimated the impact of recreational and medical marijuana laws (RML, MML) on past-month cigarette and cannabis co-use and cigarette-only use (i.e., no cannabis use) in the United States across all individuals and among demographic subgroups by age, gender, race/ethnicity, income, and education. A difference-in-difference approach was applied to public and restricted-use data from the 2004-2017 National Survey on Drug Use and Health (NSDUH), an annual, nationally representative cross-sectional survey of Americans ages 12 and older (analytic sample of n=56,276 for 2017; a total combined analytic sample for 2004-2017 of n=783,663). In 2017, 4.4% respondents reported cigarettes and cannabis co-use and 13.5% reported cigarette-only use. Difference-in-difference analyses showed that MML were associated with an increase in cigarette-cannabis co-use, but not with any change in the prevalence of cigarette-only use. Conversely, RML were not associated with a change in the prevalence of cigarette and cannabis co-use, and were associated with a decline in cigarette-only use. Differences in the association of RML and MML and cigarette-cannabis co-use and cigarette only use by age, gender, race/ethnicity, income and education groups will be presented along with implications of these results in relation to tobacco disparities and health equity. Given the degree to which tobacco and cannabis use are intertwined, understanding the impact of cannabis policy on cigarettes and cannabis co-use and cigarette use is critical to mitigate potential unintended consequences of cannabis legalization for tobacco control especially for key demographic groups that demonstrate disparities in tobacco use and consequences.

SYM14-2

TRAJECTORY ANALYSIS OF PATTERNS OF YOUNG ADULT CANNABIS AND TOBACCO USE AND CO-USE FROM 28 DAYS OF ECOLOGICAL MOMENTARY ASSESSMENT: AN EXAMINATION OF VULNERABILITY FACTORS

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Background: Cannabis and tobacco co-use is common in young adults, and is prevalent among some vulnerable groups who have worse cannabis and tobacco health outcomes. This study characterized daily time-varying patterns of cannabis and tobacco single use and co-use using Interactive Voice Response (IVR) assessments, and examined trajectory membership by race/ethnicity, gender, and socioeconomic status. Methods: Ninety-four young adult co-users (50% White, M age = 21.3 years, 57.4% male) completed thrice daily IVR surveys of cannabis and tobacco use and co-use over 28 days (1,481 observations), corresponding to four epochs (Morning, Afternoon, Evening, Late Night). Latent class modeling was used to identify latent classes using model fit statistics. Latent transition analysis was used to investigate the probability of transitioning from one class to another over time. The influence of demographics (gender, race/ethnicity, income), baseline mental health (depression, anxiety), and epoch on class transition were studied. Results: Five latent classes emerged resulting in groups with primary use of 1) no substances, 2) cannabis and tobacco co-use, 3) cannabis, 4) nicotine/tobacco, and 5) with mixed no use and any form of substance use. The probability of transitioning from one class to another over time was low. Participants in the mixed group, if they were to transit, were most likely to transit to the primary "no use" group. After adding covariates to the model, the latent classes became more distinct, with the mixed substance use and primary cannabis use classes no longer emerging. Females were more likely than males to transit from the primary nicotine/tobacco use group to the primary co-use group. Those with poverty level income ($20,000/year) and higher self-reported depression were significantly more likely to report substance use across all latent classes; except poverty did not influence class membership for the primary

nicotine/tobacco use group. Conclusions: Distinct classes of users emerged based on daily patterns. Certain vulnerability factors were linked to class membership and increased substance use. Results have implications for disparities in co-use.

SYM14-3

SUICIDE IDEATION AND DEPRESSION SYMPTOMS AMONG RACIAL/ETHNIC MINORITY YOUTH WHO USE/CO-USE CANNABIS AND ELECTRONIC VAPOR PRODUCTS: AN ANALYSIS OF 2015-2019 YRBS DATA

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While evidence suggests an adverse impact of cannabis on mental health, the mental health impact of use of electronic vapor products (EVP) have been largely overshadowed by its physical impact, particularly among racial/ethnic minority youth. We examined the trends in prevalence and odds of reporting mental health issues among racial/ethnic minority youth who use EVP and cannabis. Data from the 2015, 2017, and 2019 Youth Risk Behavior Survey (YRBS) was analyzed (N=44,066). Participants reported their past 30-day EVP and cannabis use and their race/ethnicity. The data were used to categorize participants as single, dual, and never users, and participants that reported non-white race were categorized as ethnic minority. Participants also reported their past 12-month depression symptoms, suicide ideation, and suicide attempt. Multivariate analyses were conducted and adjusted for sex, race/ethnicity, grade level, use of other tobacco products, and survey year. Compared to non-ethnic minority youth who used EVP or cannabis, ethnic minority youth who used EVP or cannabis were more likely to attempt suicide (adjusted odds ratio [aOR]=1.46, 95% Confidence Interval [CI]=1.17-1.82) and experience injury, poisoning or overdose following a suicide attempt (aOR=1.59, 95%CI=1.16-2.17). Compared to non-ethnic minority youth who co-used EVP and cannabis, ethnic minority youth who co-used EVP and cannabis were also more likely to attempt suicide (aOR=1.37, 95%CI=1.05-1.81) and report injury, poisoning, or overdose following a suicide attempt (aOR=1.53, 95%CI=1.04-2.26). Female ethnic minority youth who used/co-used EVP and cannabis were also at increased risk for suicide ideation, suicide attempt, and injury, poisoning or overdose from a suicide attempt. Ethnic minority youth who use EVP and cannabis are at increased risk for depression and suicide. Given increasing prevalence of EVP, cannabis, and cannabis vaping among youth, efforts are needed to target the divergent trends of depressive symptoms and suicidality among racial/ethnic minorities.

SYM14-4

EXAMINING PREDICTORS OF QUITTING BEHAVIOURS AMONGST UK VOCATIONAL COLLEGE STUDENTS WHO CO-USE TOBACCO AND CANNABIS

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Background: Tobacco and cannabis are commonly co-used. Co-use may be concurrent or co-administered; the latter is most common in Europe. Co-use may negatively influence quit attempts of both substances, but few studies have explored the quitting process in detail. The aim of this study is to examine predictors of 'quitting behaviours' of tobacco and/or cannabis and other aspects of quitting behaviours amongst a sample of UK young adults attending vocational college. Methods: An online questionnaire was distributed by three colleges in SE England. Respondents were included if they reported current or recent use of both substances. All eligible participants provided detailed demographic data and patterns of tobacco and cannabis use. A four level ordinal variable, 'quitting behaviour' was created for each substance: quit/quit attempt made/reduction or attempt made/no behaviour change. Regression analyses were performed to assess the impact of individual variables on quitting behaviour for both substances. Independent variables included level of dependence, frequency of use, gender, ethnicity, disability, sexual orientation, experience of mental health problem, and socio-economic status. Results: 141 eligible participants responded. 90% of the sample were aged 16-20, 58% were female, 58% of Black or minority ethnicity and 31.2% identified as not heterosexual. For both tobacco and cannabis, 20% (n=29) reported having quit in the past 6 months, the remainder continued to use. Logistic regression analysis suggests that being non heterosexual was significantly associated with not making a change in tobacco use (OR 2.37 (1.20-4.68), p=0.013), as was living in an area of high deprivation (OR 1.23 (1.06-1.43), p=0.007). For cannabis use, no individual characteristics were associated with quitting behaviour. Conclusions: The likelihood of making a change in tobacco use may be lower for LGBT+ people and those living in more deprived areas,

who co-use. When addressing tobacco and cannabis co-use, it is important to consider personal characteristics, in order to better understand who may be at greater risk from persistent or problematic use of tobacco and cannabis.

SYM15-1

USING INTERSECTIONALITY AND QUALITATIVE RESEARCH TO BETTER INFORM RESEARCH, CLINICAL WORK, AND POLICY RELATED TO ENDS USE DURING PREGNANCY AND POSTPARTUM

Philip Smith, PhD. Miami University.

Philip Smith will present a synthesis of qualitative work on ENDS use during pregnancy and postpartum, using intersectionality as an underlying paradigm. Research has a powerful impact on the social narrative surrounding addictive behaviors during pregnancy and post-partum, and as a consequence research helps to direct the focus of clinical work, public health intervention, and policy. Too much focus on risks of behaviors in research can contribute to stigma and ostracization, to the determinant of well-being. This stigma and ostracization falls to the greatest degree upon individuals identifying with multiply marginalized groups, contributing to staggering disparities in maternal and birth outcomes in the United States. This talk will aim to humanize the experiences of individuals using, and attempting to stop using, ENDS and other tobacco products during pregnancy and postpartum. This talk will focus on how being attune to the lived experiences of pregnant and postpartum individuals can lead to more authentically supporting pregnant and post-partum people's autonomy, self-determination, and well-being, ultimately leading to greater success with stopping tobacco use. The talk will focus on how conceptualizing research participants as experts rather than passive sources of data can lead to better and more equitable outcomes. Using intersectionality as a guiding paradigm, this talk will center qualitative work conducted among pregnant and postpartum people identifying with marginalized and oppressed groups, and will seek to identify inequitable structural forces contributing to ENDS and other tobacco use during pregnancy and postpartum, through lived experiences. The presentation will provide a humanizing context for, and dialectic contrast to, quantitative research presented during the symposium.

SYM15-2

ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS) USE DURING PREGNANCY: COURSE OF USE AND PERINATAL OUTCOMES

Elise E. DeVito, PhD. Elise DeVito.

The range of electronic nicotine delivery system (ENDS) products and prevalence of use has increased substantially since their initial introduction to the US market over a decade ago. This raises important questions about patterns of and motivations for use of ENDS during the perinatal period, and the impact of ENDS use on perinatal outcomes. This talk will present findings from two recent literature reviews which synthesized findings in pregnant persons from population-based or cohort-based samples related to a) ENDS use behavior during pregnancy; and b) adverse perinatal outcomes following ENDS use during pregnancy. A minority of pregnant persons use ENDS during pregnancy and most who do report dual use alongside combustible cigarettes (CC). Self-reported motivations for use and perceptions of relative harm suggest that the perception of ENDS as a lower-risk alternative to CC may contribute to ENDS use in pregnancy, despite insufficient evidence that ENDS facilitates cessation of tobacco product use during pregnancy. Although the clinical literature is limited, evidence suggests ENDS use (ENDS only or dual use) increases risk for some adverse perinatal outcomes (e.g., small for gestational age) relative to no tobacco use. Very limited data has directly measured whether ENDS reduce risk of adverse perinatal outcomes relative to CC smoking alone. Findings underscore the need for continued caution regarding ENDS use during pregnancy. Clinical and tobacco regulatory implications are discussed.

SYM15-3

IMPACT OF E-VAPOUR EXPOSURE DURING PREGNANCY ON HEALTH OUTCOMES IN OFFSPRING

Hui Chen, MD, PhD. University of Technology Sydney.

It is well accepted that combustible cigarette smoking during pregnancy harms foetal development, predisposing the offspring to develop several chronic diseases. We have found that oxidative stress is the common underlying mechanism. While it remains a challenge for pregnant women to quit smoking cigarettes due to altered nicotine metabolism and the addictive properties of nicotine, electronic nicotine delivery systems (ENDS) initially appeared to provide a viable alternative. Rather than becoming a means to quit cigarette smoking, ENDS emerged as a new nicotine delivery device, used by never smokers, and used in combination with cigarettes, and used by pregnant women. However, we don't have a good understanding of how ENDS use during pregnancy affects the unborn child, especially the long-term health outcomes. Animal modelling provides a unique advantage to predict the possible health sequelae in humans within a relatively short time frame and with greater experimental precision. Using a mouse model, we found that continuous exposure to e-vapour is harmful to the lung, liver, and glycaemic control of the mothers. It was also detrimental to foetal development, associated with respiratory, renal and metabolic disorders. In both mothers and offspring, the effects were not nicotine dependent. However, we did find a slight reduction in some disorders in the offspring if dams switched from cigarette smoke to e-vapour during pregnancy, such as normalized brain metabolic regulators, improved lipid metabolism, as well as some reduction in liver and kidney pathology. Nevertheless, our data do not support the use of e-cigarettes during pregnancy. Overall, this body of work highlights the dangers of the use of ENDS, with or without nicotine, during pregnancy.

SYM16-1

CHANGES IN INHIBITORY SIGNALING IN CORTICOTROPIN-RELEASING FACTOR RECEPTOR 1 (CRF1) NEURONS IN MOUSE VENTRAL TEGMENTAL AREA FOLLOWING ELECTRONIC NICOTINE VAPOR EXPOSURE

ManHua Zhu, Bachelor of Science, ManHua Zhu, Jasmine Jahad, Neil Rogers, Melissa Herman. University of North Carolina Chapel Hill.

Rationale: One of the primary brain regions in the mesolimbic reward circuitry is the ventral tegmental area (VTA). Various cell types within the VTA can modulate reward signaling. One VTA population that is understudied is the corticotropin-releasing factor receptor 1 (CRF1)-expressing neurons that are activated by the stress peptide CRF. Extensive work has examined the effects of nicotine on VTA dopamine neurons, however, much less is known about the actions of nicotine on VTA CRF1 neurons. Objectives: Investigate the effects of electronic nicotine vapor exposure on CRF1 neurons in the VTA.Methods: Male and female CRF1-GFP mice were used to target CRF1-expressing neurons in the VTA. Mice were exposed to a 3-hour session of intermittent vapor delivery (3-sec vape every 10-minutes) of either propylene glycol/vegetable glycerol (PG/VG) control vapor or 120 mg/ml nicotine in PG/VG. Immediately following vapor exposure, mice were sacrificed for immunohistochemical (IHC) or in vitro electrophysiological experiments. Tyrosine hydroxylase (dopamine neuron marker) and cFos (neuronal activity marker) were labeled with IHC to examine neuronal activity in the dopamine and CRF1 populations within the VTA. Neuronal activity and inhibitory signaling in VTA CRF1 neurons were examined using slice electrophysiology. Results: We found that VTA CRF1 neurons are mainly dopaminergic (~80%) and that slice application of 1uM nicotine increases cell firing but does not alter inhibitory signaling. Following acute nicotine vapor exposure, we found increases in cFos expression in the VTA and in TH neurons but not in CRF1 neurons. Our electrophysiology data also show no increase in baseline firing following in vivo nicotine vapor exposure and the 1uM nicotine-induced increase in cell firing is dampened. Interestingly, baseline phasic inhibitory signaling was heightened and 1uM nicotine induced tonic inhibition, likely contributing to the diminished firing observed. Conclusions: VTA CRF1 neurons are mainly dopaminergic and show acute nicotine-induced increases in activity. However, following nicotine vapor exposure, we observe heightened inhibition and thus dampened activity.

SYM16-2

EXAMINING THE ROLE OF NICOTINE-INDUCED VENTRAL TEGMENTAL AREA KCC2 DOWNREGULATION IN DOPAMINE SIGNALING AND ADDICTIVE BEHAVIORS

Alexey Ostroumov. Georgetown University.

Nicotine is a major component of tobacco and electronic cigarettes contributing to the initiation and persistence of the addiction in humans. The development of nicotine addiction likely arises from pathological usurpation of neuronal mechanisms that under normal conditions mediate reward-related associative learning. The gap in our knowledge, however, is the neuronal mechanisms underlying nicotine-induced aberrant learning. Drug-associated maladaptive learning results in part from long-lasting changes in the synaptic connectivity within the mesolimbic reward circuitry, which is primarily comprised of the ventral tegmental area (VTA) and the nucleus accumbens. In animal models, restoring basal synaptic transmission repairs neural circuitry and alleviates some addictive behaviors, indicating that targeting drug-induced synaptic plasticity may be a promising therapeutic tool for nicotine addiction. Here, we characterize a novel form of nicotine-induced inhibitory synaptic plasticity in VTA GABA neurons, a currently understudied cell type in the mesolimbic circuit. In rats, experimenter-induced nicotine injections and volitional nicotine self-administration enhance VTA GABA neuron activity via long-lasting downregulation of chloride transporter KCC2, which maintains low intracellular chloride concentrations in neurons. Given that low intracellular chloride underlies the inhibitory action of GABAA receptor activation, KCC2 hypofunction decreases GABAergic synaptic inhibition or even paradoxically causes excitation of VTA GABA neurons. VTA GABA neurons are among the major sources of GABAergic input onto dopamine neurons, yet optogenetic excitation of VTA GABA neurons can potentiate reward-related dopamine activity and associative learning. Accordingly, nicotine-induced KCC2 downregulation in VTA GABA neurons facilitates the formation of addictive and reward-related behaviors. Overall, our studies suggest that KCC2 downregulation in VTA GABA neurons represents a novel mechanism by which nicotine hijacks neuronal circuitry underlying reward-related associative learning.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

SYM16-3

TOBACCO/ENDS FLAVORANTS ALTER MIDBRAIN DOPAMINE AND GABA NEURON FUNCTION AND CONTRIBUTE TO ADDICTION-RELATED BEHAVIORS

Brandon J. Henderson, PhD, Pharmacology, Brandon J. Henderson, Skylar Y. Cooper. Marshall University.

Introduction: While nicotine is the primary addictive component in tobacco products, additional flavors have become a concern with the growing popularity of electronic nicotine delivery systems (ENDS). For this reason, we have begun to investigate popular tobacco and ENDS flavors. Here, we examined green apple flavor mixture (hexyl acetate, methylbutyl acetate, and ethyl acetate) used in many green apple ENDS e-liquids, for its ability to produce reward-related behavior. Methods: Using male and female 3 – 5 month old C57BL/6J mice genetically modified to contain GFP-labeled a6 nAChR subunits (a6-GFP mice) we examined how brain neurophysiology was altered by exposure to green apple flavor. To do this, mice were trained to self-administer e-liquids in a contingent vaporized (e-Vape®) self-administration system. Following this, brains were acutely dissected for investigation via patch-clamp electrophysiology and fast-scan cyclic voltammetry (FSCV). Results: Male and female mice self-administer green-apple e-liquids in the absence of nicotine. Our electrophysiological assays revealed that green-apple exposure increases ventral tegmental area (VTA) dopamine neuron firing frequency and this may be due to a decrease in inhibitory tone from GABA neurons. In parallel, our FSCV assays determined that nucleus accumbens core dopamine release is enhanced, compared to control, following both tonic and phasic stimulation protocols. Conclusions: Green apple flavor in mice is rewarding and reinforcing. Based on our results, the mechanism behind this is likely due to changes in VTA dopamine and GABA tone that results in an enhancement in nucleus accumbens dopamine release.

FUNDING: Federal; Pharmaceutical Industry; Academic Institution

SYM16-4

SEX-DEPENDENT PATTERNS IN NICOTINE SEEKING AND EFFECTS OF NICOTINE ON THE VTA PROTEOME

Marina Picciotto, Charles B. G. Murphy Professor of Psychiatry, Angela Lee, Marina Picciotto, Shahid Mansuri, Rashaun Wilson, Sherry McKee, TuKiet Lam, Angus Nairn. Yale University School of Medicine.

Significance: Women relapse to smoking at higher rates than men, especially in response to stress. Many studies suggest underlying sex differences in mesolimbic dopamine signaling pathways contribute.Methods: We tested stress-induced reinstatement of nicotine CPP in male and female mice and effects of nicotine on the VTA and NAc proteome. C3H mice were evaluated for nicotine CPP, extinction and stress-induced reinstatement. Groups of C3H and C57 mice were treated with a CPP or chronic regimen of nicotine. VTA and NAc shell were processed with TMT10-plex tandem mass spectrometry. Fold change and q-values were used to identify significantly altered proteins and the STRING database was used for bioinformatic analysis.Results: Nicotine induced significant CPP acquisition and stress-induced reinstatement in male and female mice, but to different doses. Nicotine pairing with the initially preferred or non-preferred chamber differentially affected stress-induced reinstatement in male and female mice. In C3H mice, similar numbers of proteins were differentially regulated between sexes at baseline compared with within each sex after sub-chronic nicotine administration. In C57 mice, more proteins were regulated between sexes at baseline compared with within each sex after chronic nicotine administration and withdrawal. GFAP and DARPP-32 were repeatedly identified as significantly altered proteins, especially in VTA. Network analyses showed sex- and nicotine-dependent regulation of a number of signaling pathways, including DA signaling. Nicotine CPP increased proteins related to DA signaling in NAc shell but decreased them in the VTA in female mice, whereas the opposite was observed in male mice. In contrast, DA pathways were similarly upregulated in both male and female VTA after chronic nicotine and withdrawal.Conclusions: This study supports the hypothesis that males are more responsive to rewarding effects of nicotine, whereas females are more likely to seek nicotine to alleviate effects of stress or anxiety, and identifies sex differences in the mesolimbic proteome that may help explain differential susceptibility to nicotine addiction in males and females.

FUNDING: Federal

SYM17-1

THE SYNTHESISED EVIDENCE ON TOBACCO ENDGAME INTERVENTIONS

Coral E. Gartner, PhD[1], Cheneal Puljevic[1], Kylie Morphett[1], Marita Hefler[2], Billie Bonevski[3], Richard Edwards[4], Andrew Perusco[5], David Sellars[6], Georgia Carstensen[1], Md Arifuzzaman Khan[7], Ron Borland[8]. [1]The University of Queensland, [2]Menzies School of Health Research, [3]Flinders University, [4]University of Otago, [5]Australian National University, [6]James Cook University/The University of Queensland, [7]University of Queensland, [8]The University of Melbourne.

Using the JBI methodological approach for scoping reviews, we searched PubMed, CINAHL, Scopus, Web of Science and Embase for evidence syntheses (reviews, meta-analyses, simulation modelling studies, expert consensus studies, commentaries) related to tobacco endgame interventions that were published since 1 January 1990. Key grey literature were also included. Reviewers independently screened titles and abstracts and then full texts of relevant articles. The protocol for this review was registered with Open Science Framework (doi:10.17605/OSF.IO/H85AT). A total of 195 articles, reports or report chapters were included across one or more of following ten topics: denicotinised cigarette standard (n=26); tobacco product standards (n=2); substitution with lower risk nicotine products (n=150); license or prescription requirement (n=2); tobacco-free generation (n=5); ending tobacco sales (n=1); sinking lid (n=3); reducing industry viability (n=1); tax increases (n=7); and retail density reduction (n=13). Study types included narrative (traditional) reviews (n=101), systematic reviews (n=47), systematic reviews including meta-analyses (n=10) simulation modelling studies (n=26), purpose-specific reviews (scoping; n=3), expert consensus studies (n=2), and a rapid review (n=1). Of these, 58 (30%) articles included at least one mention of the endgame intervention's potential impact on populations with higher smoking prevalence than the general population. 84 (43%) articles did not include a methods sections detailing search strategies and/or inclusion criteria, suggesting possible bias in these reviews' findings. Only two articles focused on populations from low-income countries.

FUNDING: Federal

SYM17-2

COULD DENICOTINISATION OF TOBACCO PRODUCTS IN NZ ACHIEVE LESS THAN 5% BY 2025

Tony Blakely, PhD[1], Driss Ait Ouakrim[1], Nick Wilson[2], Jennifer Summers[2]. [1]The University of Melbourne, [2]University of Otago.

The NZ Government is developing an Action Plan in 2021 to achieve the Government's stated 2025 Smokefree goal – usually interpreted as less than 5% smoking prevalence in all demographic groups (sex by age by ethnic group), requiring overall population prevalence to be 2% or less. The currently favoured mechanism to achieve this is a 'backbone' of denicotinising all tobacco, rapidly, accompanied by retail outlet reduction, a smokefree generation and media campaigns. Our modelling assesses the feasibility and outcomes of various packages of these interventions. The modelling is in two steps. First, a Markov model with transitions between smoking and vaping states over each sex by age by ethnic group cohort's remaining lifespan. Interventions are then laid over this business-as-usual model to generate trajectories and smoking/vaping state prevalences by year into the future. Second, the differences between BAU and intervention scenario prevalences are combined with relative risks of 16-tobacco-related diseases as population impact fractions, that feed into a proportional multistate lifetable model to estimate future changes in mortality, morbidity, health adjusted life years, health expenditure and income (the latter a measure of productivity gains of tobacco control). This presentation will present the findings reported to the NZ Government in 2021 (currently under embargo), and consider how they were received (scientifically and politically), any impact, and implications for tobacco endgame strategies.

FUNDING: Federal

SYM17-3

FUTURE NICOTINE USE PREFERENCES OF CURRENT CIGARETTE SMOKERS: FINDINGS FROM THE 2020 ITC FOUR COUNTRY SMOKING AND VAPING SURVEY

Ron Borland, PhD[1], Lin Li[1], Michael Le Grande[1], Coral Gartner[2]. [1]The University of Melbourne, [2]The University of Queensland.

Aim: Successful elimination of tobacco smoking will need to consider consumer preferences and quit intentions. We examined prevalence of, and factors associated with, smoking and quitting preferences one to two years in the future. Method: Participants in the 2020 wave of the International Tobacco Control (ITC) 4-country smoking and vaping (USA, Canada, England and Australia) who currently smoke (N=9128) were asked if they preferred to continue to smoke or to quit with or without an alternative nicotine product (ANP). We also explored preferences for ANPs over nicotine abstinence.Results: Country-specific weighted data showed 21.3% preferred to continue smoking and 8.1% were uncertain, leaving 70.6% preferring to quit: 14.0% using an ANP and 56.7% completely quitting nicotine. Apart from low interest in quitting, main associates of not preferring to quit were being a current vaper, aged 25-39 and smoking daily, while preferring to quit was most associated with worry that smoking will damage their health, and believing that vaping is a lot less harmful than smoking. Among those preferring to quit, preferring to use ANPs was very strongly associated with being a vaper (especially daily), younger, English, reporting strong urges to smoke, believing vaping is much less harmful than smoking, and not strongly regretting starting or wanting to quit.Conclusions: Achieving a tobacco endgame will need to account for a significant minority of smokers who prefer not to quit, at least in the medium term, although our findings suggest that increased acceptance of ANPS might sway more to prefer quitting using ANPs as a substitute.

FUNDING: Federal

SYM17-4

DO NICOTINE VAPING PRODUCTS INCREASE QUITTING AMONG PRIORITY POPULATION GROUPS OVER STANDARD SMOKING CESSATION THERAPY? A PRAGMATIC RANDOMISED PARTIAL CROSS-OVER TRIAL

Kylie Morphett, PhD[1], Mark Boyd[2], Cheneal Puljevic[1], Charles Gilks[1], Billie Bonevski[3], Ron Borland[4], Ryan Courtney[5], Hayden McRobbie[5], Coral Gartner[1]. [1]The University of Queensland, [2]The University of Adelaide, [3]Flinders University, [4]The University of Melbourne, [5]The University of New South Wales.

Introduction: Smoking cessation interventions that are acceptable to, and efficacious for populations with a higher smoking prevalence and lower quit rates than the general population are needed as part of a tobacco endgame strategy. We examined if adding a nicotine vaping intervention to standard smoking cessation treatment (SSCT) could improve quit rates among three populations with high smoking prevalence (people living with HIV, HCV and/or opiate dependence).Methods: A pragmatic, randomised, partial crossover design was employed. Eligibility criteria included diagnosis with/treatment for HIV or Hepatitis C (HCV) or receiving opioid substitution therapy (OST). Participants were recruited in 2018-2019 and randomised to one of two arms. Arm A participants received NVPs, nicotine patches, and referral to Quitline (NVPs as part of firstline therapy). Arm B participants received combination NRT (patch and choice of gum or lozenge) and referral to Quitline. Arm B participants who were smoking at 6 months were offered the NVP intervention (NVPs as secondline therapy). Results: Of the 173 participants allocated to Arm B, 123 crossed into Arm C at 6-9 months post baseline, to make a second quit attempt with the nicotine vaping product. At 12 months from baseline, 35 (19.2%) in Arm A, 11 of the 50 who continued in Arm B (22.0%), and 24 (19.5%) in Arm C had not smoked a puff in the past 3 months. The result for Arm C was similar to the 6 month cigarette quit rate (not a puff in last 3 months) in Arm A (19.9%) and greater than that of Arm B at 6 months (5.2%). Overall, the approach of offering participants the NVP with SSCT as firstline therapy produced similar results for 3 months abstinence from smoking at 12 months as offering the NVP as secondline therapy only to those who were unsuccessful in quitting with SSCT.Conclusion: Offering NVPs either as part of firstline or as secondline therapy among these populations with traditionally low quit rates appears to produce higher quit rates than only offering SSCT, demonstrating potential use as part of a tobacco endgame.

FUNDING: Federal

SYM17-5

DISCUSSANT

Ruth Malone. University of CA San Francisco.

Professor Malone will provide a critical discussion of the implications of these four studies for the tobacco endgame.

SYM18-1

USING GENOMIC AND EPIGENOMIC VARIATION ASSOCIATED WITH NICOTINE METABOLISM TO TAILOR TOBACCO CESSATION TREATMENT IN AMERICAN INDIAN AND ALASKA NATIVE PEOPLE

Katrina Claw, PhD. University of Colorado Anschutz Medical Campus.

American Indian and Alaska Native (AIAN) people have the highest tobacco use rates in the United States, with 48.4% of AIAN adults vs. 29.2% of white adults reporting smoking in 2012. Smoking is associated with a wide range of chronic disease, including cancer, respiratory, and cardiovascular diseases (CVD). AIAN have higher rates of tobacco-related disease and death compared to other populations. Nicotine, the primary addictive substance in cigarettes, is metabolized predominantly by the enzyme cytochrome P450 2A6 (CYP2A6). Differences in CYP2A6 genotype have been associated with variation in nicotine metabolism, smoking cessation, and lung cancer risk in various populations, with the highest nicotine metabolite ratio (NMR), a biomarker of nicotine metabolism comparing 3-hydroxycotinine to cotinine metabolites, found in AIAN people. Previously, we have shown that CYP2A6 genotype is associated with the biomarker NMR in AIAN smokers, and have identified novel and varied frequencies of common CYP2A6 functional variants. However, inter-ethnic variability of nicotine metabolism exists and may be related to novel genetic/epigenetic loci that contribute to variation in nicotine metabolism. Associations between genome/epigenome-wide variation, nicotine metabolism, and tobacco-related morbidity and mortality in AIAN remain understudied. We identify novel genetic and epigenetic influences on nicotine metabolism in AIAN smokers using a genome-wide approach, and examine the associations with the nicotine metabolite ratio in AIAN people. Our central hypothesis is that novel genetic/epigenetic loci and variants associated with NMR in AIAN smokers. We predict that rapid metabolizers of nicotine will have unique genotypes and epigenetic markers and that this will correlate with more difficulty quitting smoking and increased tobacco-related disease risk. Our long-term goal is to use a personalized medicine approach prior to the selection of pharmacotherapy for smoking cessation in order to improve long-term smoking quit rates in AIAN people who smoke.

FUNDING: Federal

SYM18-2

ALCOHOL AND TOBACCO POLYGENIC RISK SCORE PREDICTION WITHIN AND ACROSS DIVERSE ANCESTRIES

Gretchen Saunders, PhD. Psychology, University of Minnesota.

Most genome-wide association studies have been restricted to European only samples. While polygenic risk scores (PRSs) derived from these GWAS summary statistics can be applied to non-European ancestral groups, bias is introduced due to divergence from European ancestries, making their accuracy and utility unclear within diverse groups. We use summary statistics from the GWAS & Sequencing Consortium on Alcohol and Nicotine use (GSCAN) of up to 3.4 million individuals from four ancestral groups: African (AFR), American (AMR), East Asian (EAS), and European (EUR) to generate PRSs for smoking initiation, cigarettes per day, smoking cessation, age of smoking initiation, and drinks per week. PRSs were validated in an independent sample of individuals from the National Longitudinal Study of Adolescent to Adult Health (Add Health; N=2,095 AFR, N=1,305 Hispanic, N=5,994 EUR, N=414 EAS, corresponding roughly to GSCAN ancestral groups). Predictive accuracy of each PRS was estimated by the change in R2 between base and full models, where base models included sex, age, and the first 10 principal components, and full models additionally include the PRS. Using EUR-based summary statistics to predict alcohol and tobacco use in EUR results in incremental R2 values ranging from 1.2-7.2%. Using summary statistics and validation samples from the same, matched non-EUR ancestry results in incremental R2 values ranging from 0.02-0.7% for AFR, 0.1-3.1% for EAS, and 0.3-2.6% for AMR ancestries. The predictive accuracy of own ancestry PRS in non-EUR groups is similar to, or lower, than EUR ancestry-based scores. Polygenic prediction in EUR remains higher than in non-EUR ancestries, likely for several reasons, including large differences in discovery and validation sample sizes, lower imputation accuracy, differences in LD structure, and phenotypic heterogeneity. Our results highlight the increased prediction accuracy from the use of multiple ancestry GWAS summary statistics over single ancestry polygenic scores. We discuss the potential bias of using EUR based scores for prediction in non-EUR cohorts, as this has implications for disparity in the utility of polygenic scores.

SYM18-3

GENETIC SCORES AND BIOMARKERS INFORM PRECISION PREVENTION AND PRECISION TREATMENT

Li-Shiun Chen, MD, MPH, ScD[1], Timothy Baker[2], Laura Bierut[1]. [1]Washington University School of Medicine, [2]University of Wisconsin-Madison School of Medicine and Public Health.

Introduction: This study aims to evaluate the potential of polygenic scores and biomarkers to enhance the precision in predicting the benefit of smoking cessation in reducing lung cancer risk and the precision of smoking cessation treatment outcomes. Methods: For precision prevention, we meta-analyze 18 case-control studies of lung cancer of European ancestry (n = 18,861 ever smokers, 11,621 cases, 7,240 controls). For precision treatment, we evaluated bio-verified end-of-treatment abstinence among smokers in two randomized control trials (N=1,898 including 807 in the Genetically Informed Smoking Cessation Trial (GISC) and 1,091 in the University of Wisconsin Trial). Results: a) Precision prevention: The polygenic risk score of lung cancer, polygenic risk score of smoking behaviors, and CHRNA5 rs16969968 were independently associated with the hazard of lung cancer (HR 1.06 95%CI 1.04-1.08, p=1.71×10-7; HR 1.16, 95% CI 1.11-1.21, p=3.73×10-10; HR 1.16, 95% CI 1.12-1.2, p=2.93×10-16). Individuals having high combined genetic risk had a six-year earlier median age of lung cancer compared with those with low risk. Smoking cessation (former vs. current smokers) was associated with a lower likelihood of lung cancer (HR = 0.49, 95%CI 0.43-0.55, p = 1.57×10-33), and an 8-year delay in lung cancer diagnosis. The beneficial effects of smoking cessation were very similar in those at high or low genetic risks. b) Precision treatment: Polygenic risk scores for delayed age of smoking initiation predict end-of-treatment abstinence in both trials (meta-analysis OR=1.2, 95%CI=1.04-1.37, p=0.0097, N=1,592 smokers of European Ancestry). In the GISC trial smokers of both European and non-European Ancestry, slow nicotine metabolizers respond better to nicotine replacement vs. placebo (OR=4.7, 95%CI=1.7, 14.9, p=0.0040), but not varenicline vs. placebo. In contrast, varenicline produces significantly higher end-of-treatment abstinence than does nicotine replacement in normal metabolizers (OR=2.0, 95%CI=1.2-3.3, p=0.0050). Conclusion: Genetic scores and biomarkers may inform the promise of precision prevention and precision treatment to reduce the profound health impact of smoking.

SYM18-4

PREDICTED NICOTINE BIOMARKERS AND TRANSLATIONAL RESEARCH IN MULTIETHNIC POPULATIONS

Andrew Bergen, PhD[1], Carolyn Ervin[1], Christopher McMahan[2], James Baurley[1]. [1]BioRealm, LLC, [2]School of Mathematical and Statistical Sciences, Clemson University.

Background: Smoking remains the largest modifiable risk factor for morbidity and mortality, including populations with social and health disparities. Researchers have identified genetic contributions to epidemiologic measures of smoking behavior and to biomarkers of nicotine metabolism and consumption. Measures related to social and health disparities and smoking outcomes exhibit multiple associations with each other. Genomics research in multiethnic populations presents opportunities and challenges in characterizing biological and environmental sources of variation in clinical translational research. Methods: We developed prediction models of nicotine biomarkers from genotypes in cigarette smokers using statistical learning. We applied these models in cessation trial participants to explore the relationships between predicted nicotine biomarkers and demographics with smoking measures. Results: We identified robust internal correlations for model ensembles for the urinary total 3-hydroxycotinine and cotinine ratio (67 percent) and for total nicotine equivalents (65 percent) in cigarette smokers of multiple ethnicities. Nicotine biomarker model ensemble external validation demonstrates significant associations with smoking measures. We designed multiple models to characterize contributions of demographics and ancestry proportions to associations with smoking measures and nicotine biomarkers, and associations of smoking measures and nicotine biomarlers to abstinence. Conclusion: Smoking measures and nicotine biomarkers associated with CYP2A6 activity and total nicotine consumption differ between smokers of different races/ethnicities and are associated with smoking related disparities. Progress in improving smoking outcomes through translational research will benefit from collection, sharing and integrated analyses of diverse genomic and non-genomic data to characterize biological and environmental contributors to disparities.

SYM18-5

USE OF GENOMIC RISK TO MOTIVATE BEHAVIORAL CHANGE AMONG PEOPLE WHO SMOKE

Laura Bierut, MD, Alex Ramsey, Li-Shiun Chen. Washington University School of Medicine.

Recent scientific advances have revealed how genomic risk information can be used to predict important health outcomes. Returning genomic susceptibility results to motivate positive behavior change is an area of potential growth, and the treatment of cigarette smoking and tobacco use disorder represents a prime area for genomics implementation. Two genes, CHRNA5 and CYP2A6, are the strongest genomic contributors that alter the risk of heaviness of smoking, successful smoking cessation, and smoking-related diseases in humans. These genomic biomarkers have proven analytic and clinical validity, and evidence for their clinical utility continues to grow. We propose that these biomarkers can enable the identification of elevated disease risk in smokers, guide the personalization of smoking cessation treatments, and provide motivation for behavioral changes.We examined the acceptability and behavior change associated with a personalized genomically-informed risk tool (RiskProfile) among current smokers. Current smokers (n=108) were enrolled. At Visit 1, participants completed a baseline assessment and genomic testing. At Visit 2, participants received a tailored RiskProfile that communicated personalized risks of smoking-related diseases and evidence-based recommendations to promote smoking cessation generated from participants' genomic data and smoking heaviness. At Visit 3, a follow-up assessment 30 days after intervention measured participants acceptability and understanding of the RiskProfile and their smoking behaviors. Of enrolled participants, 83% were retained across the three study visits. Acceptability of RiskProfile was high; at 30-day follow-up, 89% of participants demonstrated accurate recall of key intervention messages. At follow-up, cigarettes smoked per day decreased [11.3 vs. 9.8, difference=1.5, 95% CI (0.6—2.4), p=.001]. This study demonstrates proof of concept for translating key basic science findings into a genomically-informed risk tool that can be implemented to promote progress toward smoking cessation. Implementing genomic risk in the healthcare setting with patients and providers has the potential of accelerating smoking cessation.

SYM19-1

CHARACTERIZING E-CIGARETTE USE, FLAVORS, AND REASONS FOR USE BY MENTHOL CIGARETTE STATUS AND RACE/ETHNICITY AMONG US ADULTS (PATH DATA 2016-2018)

Krysten W. Bold, PhD[1], Eugenia Buta[2], Asti Jackson[3], Sakinah Suttiratana[4], Patricia Simon[3], Ralitza Gueorguieva[4], Stephanie O'Malley[1], Suchitra Krishnan-Sarin[3]. [1]Department of Psychiatry, Yale University, [2]Yale Center for Analytical Sciences, Yale University, [3]Department of Psychiatry, Yale University School of Medicine, [4]Yale School of Public Health.

Background: Menthol cigarette use remains a large public health problem and contributes to tobacco-related health disparities among Black and Hispanic populations. E-cigarettes are available in a variety of different flavors, including menthol, and may be a less harmful substitute for cigarettes among adults who smoke. Yet little is known about whether e-cigarette flavor preference and reasons for use differ by race/ethnicity among adults who smoke menthol cigarettes. Methods: We used nationally representative PATH wave 4 adult data (2016-2018) to examine associations between past-month e-cigarette and menthol cigarette use, overall and by race/ethnicity. We also examined regular e-cigarette flavor used and reasons for e-cigarette use by menthol cigarette use and race/ethnicity. Results: Overall, rates of current (i.e., past month) e-cigarette use were higher among adults who smoked menthol cigarettes (22.4%) compared to non-menthol cigarettes (16.7%), p<.0001. When examined by race/ethnicity, a similar association was observed for those identifying as Hispanic (p=.004) and non-Hispanic (NH) White (p<.001), but NH Black adults used e-cigarettes at similar rates regardless of menthol (14.6%) or non-menthol (14.1%) cigarette use (p=.81). In terms of regular e-cigarette flavor used, NH Black adults reported significantly higher rates of menthol or mint e-cigarette use compared to NH whites regardless of menthol cigarette status. Among those who smoke menthol cigarettes, there were significant differences in reasons for e-cigarette use by race/ethnicity. For example, compared to NH White, Hispanic individuals were less likely to endorse using e-cigarettes as a way to cut down on smoking while Black individuals were less likely to endorse liking e-cigarette flavors. Conclusions: E-cigarette use patterns differ by race/ethnicity and menthol cigarette use. Results can inform e-cigarette regulations by advancing the understanding of the preferences and use of e-cigarettes among adults who smoke cigarettes.

SYM19-2

IMPACT OF E-LIQUID FLAVOR ON ABUSE LIABILITY AMONG NON-HISPANIC BLACK AND WHITE MENTHOL SMOKERS

Eleanor Ladd Schneider Leavens, PhD, Leah Lambert, Nikki Nollen. University of Kansas Medical Center.

Introduction: As a result of tobacco industry marketing, most non-Hispanic Black (Black) smokers smoke menthol cigarettes and bear a disproportionate burden of tobacco-related morbidity and mortality. The recently proposed combustible menthol ban has the propensity to significantly reduce tobacco-related disparities. However, it remains unknown whether inclusion of menthol-flavored e-liquid would improve or hinder public health. No research has directly examined the impact of menthol vs. tobacco flavored e-liquid on acute puff patterns, subjective experience, behavioral intentions, and craving and withdrawal among diverse menthol smokers. Methods: Black and White nicotine-deprived menthol smokers (current N = 8; final N = 10) completed two in-laboratory 30-minute ad libitum vaping sessions (menthol vs. tobacco flavor) in a double-blind randomized crossover design. Questionnaires assessed reductions in craving and withdrawal and post-session subjective experience and behavior intentions. Puff topography was measured continuously throughout each vaping session. Results: Participants showed comparable reductions in craving (tobacco M change = -42.8, menthol M change = -48.0; p = .283) and withdrawal (tobacco M change = -1.8; menthol M change = -4.6; p = .111) from pre- and post-session regardless of e-liquid flavor. Similarly, menthol and tobacco flavored ECs were rated positively in terms of subjective effects and intentions for future use (all p > .10). In fact, a majority (63%) of participants reported a preference for the tobacco-flavored e-liquid. Finally, measures of puff topography did not differ significantly by e-liquid flavor (all p > .40).Discussion: Among diverse menthol smokers in a lab-based setting, findings suggest that menthol vs tobacco e-liquid flavor has little impact on puff patterns, subjective experience, intentions for future use, or craving and withdrawal. Findings have implications for tobacco control policies and provide initial evidence for implementation of a comprehensive menthol ban, inclusive of e-cigarettes.

SYM19-3

DOES MENTHOL FLAVORING HELP BLACK AND LATINX ADULT MENTHOL COMBUSTIBLE CIGARETTE SMOKERS SWITCH TO E-CIGARETTES?: SECONDARY ANALYSES FROM A RANDOMIZED CLINICAL TRIAL

Nikki Nollen, MA, PhD[1], Leah Lambert[1], Eleanor Leavens[1], Jasjit Ahluwalia[2], Myra Rice[3], Kim Pulvers[3]. [1]University of Kansas School of Medicine, [2]Brown University School of Public Health, [3]California State University-San Marcos.

SIGNIFICANCE: A ban on menthol cigarettes in the US could have a significant impact on public health, but debate continues about whether enforcement priorities inclusive of menthol flavored e-liquids should be enacted. While a ban on menthol flavored e-cigarettes (EC) may reduce youth and young adult initiation, it may also discourage adult menthol smokers, the majority of whom are racial/ethnic minorities, to switch from tobacco cigarettes to EC. This could slow harm reduction and widen disparities among populations already disproportionately burdened by tobacco. METHODS: This study is a secondary analysis of African American (AA) and Latinx adult menthol smokers enrolled in the EC arm of a 6-week randomized clinical switching trial (n=68). We compare those who chose JUUL menthol EC (n=41) to those who chose JUUL non-menthol EC (i.e., mint, mango, Virginia tobacco) (n=27) on EC and cigarette use and subjective effects of vaping to examine whether menthol flavoring helps AA and Latinx adult menthol smokers switch to EC. RESULTS: No statistically significant differences were found between menthol versus non-menthol EC on any of the variables of interest. Specifically, 88.0% of participants who used a non-menthol flavored EC fully or partially switched to EC at week 6 compared to 82.1% of participants who used menthol-flavored EC (p=0.75). Further, both groups demonstrated substantial reductions in CPD from baseline to week 6 (menthol EC: -8.5 + 10.4 versus non-menthol EC: -8.8 + 5.8, p=0.87), comparable grams of e-liquid consumed, objectively measured via pod weights (menthol EC: 9.2 + 9.8 grams versus non-menthol EC: 11.0 + 11.0 grams, p=.47), and positive subjective effects, including 'just right' throat hit (menthol EC: 70.7% versus non-menthol EC: 66.7%, p=.93) and 'just right' flavor liking (menthol EC: 75.6% versus non-menthol EC: 66.7%, p=.32). CONCLUSIONS: Findings provide preliminary evidence to inform regulatory action for menthol EC that could slow youth initiation with no resulting negative impact on switching in adult smokers transitioning to EC and no unintended consequences in a priority population of AA and Latinx menthol smokers.

SYM19-4

DISCUSSANT

Suchitra Krishnan-Sarin, PhD. Yale University School of Medicine.

The discussant will synthesize the evidence presented along with new and emerging data on the impact of e-cigarette flavoring on cigarette and e-cigarette use in racial/ethnic minority smokers. Policy implications and future directions will be discussed.

SYM20-1

DUAL USE OF CIGARETTES AND ENDS IN THE PATH STUDY: TRANSITIONS IN DUAL USE PATTERNS, NICOTINE DEPENDENCE, USE TRAJECTORIES, AND CESSATION (2013-2020)

Nicolette Borek, PhD[1], Heather Kimmel, PhD[2], and Andrew Hyland, PhD[3] on behalf of the entire PATH Study team. [1]FDA Center for Tobacco Products, [2]National Institute of Drug Abuse, [3]Roswell Park Comprehensive Cancer Center.

The Population Assessment of Tobacco and Health (PATH) Study collects information on tobacco-use patterns, risk perceptions, health outcomes, attitudes towards tobacco products, and tobacco initiation, cessation, and relapse behaviors. This nationally representative, longitudinal cohort study of approximately 46,000 youth and adults in the United States began in 2013 with data collection occurring annually or biennially. This symposium will present findings on cigarette and electronic nicotine delivery system (ENDS) dual use research from the PATH Study using data across Waves 1 to 5 (2013-2019). With the wealth of data collected by this longitudinal study, it is possible to show how people change their tobacco use over time. The work presented in this symposium addresses key transitions between cigarette smoking and ENDS across different age groups that adds to our understanding of the public health implications of these products.This symposium will 1) provide a brief overview and update on the PATH Study focusing on the timeline, current data collection efforts, and available data;

2) describe overall use patterns and transitions among adult cigarette and ENDS users; 3) describe nicotine dependence among youth cigarette and ENDS users; 4) describe cigarette and ENDS susceptibility and use trajectories in both youth and young adults; and 5) describe the role of ENDS in quitting cigarettes among adult smokers. Dr. Ann McNeill will serve as Symposium Discussant to summarize the PATH Study research presented within the context of similar research conducted internationally.

FUNDING: Federal

SYM20-2

TRANSITIONS IN CIGARETTE/ENDS DUAL USE PATTERNS AMONG ADULTS IN THE UNITED STATES, 2016 – 2019

Eva Sharma, PhD, MPH. Westat.

The Population Assessment of Tobacco and Health (PATH) Study collects information on tobacco-use patterns, risk perceptions, health outcomes, attitudes towards tobacco products, and tobacco initiation, cessation, and relapse behaviors. This nationally representative, longitudinal cohort study of approximately 46,000 youth and adults in the United States began in 2013 with data collection occurring annually or biennially. This symposium will present findings on cigarette and electronic nicotine delivery system (ENDS) dual use research from the PATH Study using data across Waves 1 to 5 (2013-2019). With the wealth of data collected by this longitudinal study, it is possible to show how people change their tobacco use over time. The work presented in this symposium addresses key transitions between cigarette smoking and ENDS across different age groups that adds to our understanding of the public health implications of these products.This symposium will 1) provide a brief overview and update on the PATH Study focusing on the timeline, current data collection efforts, and available data; 2) describe overall use patterns and transitions among adult cigarette and ENDS users; 3) describe nicotine dependence among youth cigarette and ENDS users; 4) describe cigarette and ENDS susceptibility and use trajectories in both youth and young adults; and 5) describe the role of ENDS in quitting cigarettes among adult smokers. Dr. Ann McNeill will serve as Symposium Discussant to summarize the PATH Study research presented within the context of similar research conducted internationally.

FUNDING: Federal

SYM20-3

INDICATORS OF TOBACCO DEPENDENCE AMONG YOUTH IN THE UNITED STATES, 2013

David R. Strong, PhD. University of California, San Diego.

The Population Assessment of Tobacco and Health (PATH) Study collects information on tobacco-use patterns, risk perceptions, health outcomes, attitudes towards tobacco products, and tobacco initiation, cessation, and relapse behaviors. This nationally representative, longitudinal cohort study of approximately 46,000 youth and adults in the United States began in 2013 with data collection occurring annually or biennially. This symposium will present findings on cigarette and electronic nicotine delivery system (ENDS) dual use research from the PATH Study using data across Waves 1 to 5 (2013-2019). With the wealth of data collected by this longitudinal study, it is possible to show how people change their tobacco use over time. The work presented in this symposium addresses key transitions between cigarette smoking and ENDS across different age groups that adds to our understanding of the public health implications of these products.This symposium will 1) provide a brief overview and update on the PATH Study focusing on the timeline, current data collection efforts, and available data; 2) describe overall use patterns and transitions among adult cigarette and ENDS users; 3) describe nicotine dependence among youth cigarette and ENDS users; 4) describe cigarette and ENDS susceptibility and use trajectories in both youth and young adults; and 5) describe the role of ENDS in quitting cigarettes among adult smokers. Dr. Ann McNeill will serve as Symposium Discussant to summarize the PATH Study research presented within the context of similar research conducted internationally.

FUNDING: Federal

SYM20-4

ADOLESCENT TO YOUNG ADULT E-CIGARETTE AND CIGARETTE USE TRAJECTORIES IN THE UNITED STATES, 2013 – 2020

Cassandra A. Stanton, PhD. Westat.

The Population Assessment of Tobacco and Health (PATH) Study collects information on tobacco-use patterns, risk perceptions, health outcomes, attitudes towards tobacco products, and tobacco initiation, cessation, and relapse behaviors. This nationally representative, longitudinal cohort study of approximately 46,000 youth and adults in the United States began in 2013 with data collection occurring annually or biennially. This symposium will present findings on cigarette and electronic nicotine delivery system (ENDS) dual use research from the PATH Study using data across Waves 1 to 5 (2013-2019). With the wealth of data collected by this longitudinal study, it is possible to show how people change their tobacco use over time. The work presented in this symposium addresses key transitions between cigarette smoking and ENDS across different age groups that adds to our understanding of the public health implications of these products.This symposium will 1) provide a brief overview and update on the PATH Study focusing on the timeline, current data collection efforts, and available data; 2) describe overall use patterns and transitions among adult cigarette and ENDS users; 3) describe nicotine dependence among youth cigarette and ENDS users; 4) describe cigarette and ENDS susceptibility and use trajectories in both youth and young adults; and 5) describe the role of ENDS in quitting cigarettes among adult smokers. Dr. Ann McNeill will serve as Symposium Discussant to summarize the PATH Study research presented within the context of similar research conducted internationally.

FUNDING: Federal

SYM20-5

ENDS USE AMONG ADULT CIGARETTE SMOKERS WITH NO PLANS TO EVER QUIT SMOKING IN THE UNITED STATES, 2014 – 2019

Karin Kasza, PhD. Roswell Park Comprehensive Cancer Center.

The Population Assessment of Tobacco and Health (PATH) Study collects information on tobacco-use patterns, risk perceptions, health outcomes, attitudes towards tobacco products, and tobacco initiation, cessation, and relapse behaviors. This nationally representative, longitudinal cohort study of approximately 46,000 youth and adults in the United States began in 2013 with data collection occurring annually or biennially. This symposium will present findings on cigarette and electronic nicotine delivery system (ENDS) dual use research from the PATH Study using data across Waves 1 to 5 (2013-2019). With the wealth of data collected by this longitudinal study, it is possible to show how people change their tobacco use over time. The work presented in this symposium addresses key transitions between cigarette smoking and ENDS across different age groups that adds to our understanding of the public health implications of these products.This symposium will 1) provide a brief overview and update on the PATH Study focusing on the timeline, current data collection efforts, and available data; 2) describe overall use patterns and transitions among adult cigarette and ENDS users; 3) describe nicotine dependence among youth cigarette and ENDS users; 4) describe cigarette and ENDS susceptibility and use trajectories in both youth and young adults; and 5) describe the role of ENDS in quitting cigarettes among adult smokers. Dr. Ann McNeill will serve as Symposium Discussant to summarize the PATH Study research presented within the context of similar research conducted internationally.

FUNDING: Federal

SYM21-1

EXPERIENCE IN IMPLEMENTING AN OPT-OUT SMOKING CESSATION SERVICES AT THE MEDICAL UNIVERSITY OF SOUTH CAROLINA

K. Michael Cummings, PhD, MPH, Benjamin Toll, Graham Warren. Medical University of South Carolina.

Significance: In 2014, the Medical University of South Carolina (MUSC) adopted a policy that required all adults seen in MUSC health care facilities to be screened for tobacco use with referral to an evidence-based treatment for patients who currently smoke cigarettes. This presentation describes the services we've implemented for hospitalized patients, oncology outpatients, and home discharged emergency department (ED) patients.Methods: Electronic health records are utilized across MUSC health care system to define the prevalence of smoking in the following groups: 1) hospitalized

patients seen in MUSC's five hospitals; 2) patients seen in MUSC inpatient psychiatric hospital; 3) patients seen in 44 MUSC affiliated oncology clinics, and 4) home discharged ED patients. Response to the offer of evidence-based treatment is tracked for people who currently smoke cigarettes in each patient group. Follow-up data collected to assess receipt of smoking cessation treatments, smoking status, and clinical outcomes (unplanned hospital admissions, and downstream health care costs) are presented. Results: Cigarette smoking prevalence rates the four patient groups were as follows: 1) hospitalized patients – 18% (range 12% to 30%); 2) psychiatric inpatients – 45%; 3) oncology outpatients – 9%; and 4) ED patients – 21%. Acceptance of the offer of smoking cessation treatment were as follows: 1) hospitalized patients – 82% (range: 70%-100%); 2) psychiatric inpatients – 49%; 3) oncology outpatients – 53%; and 4) ED patients – 22%. Most hospitalized patients relapse back to smoking after discharge, although exposure to the treatment service doubled quit rates at 1-month. About 20% of oncology outpatients-report not smoking at 6-months. A retrospective records study of showed that exposure to inpatient hospital service was associated with a 9% reduction in unplanned hospital readmissions and lower health care expenditures 12-months after discharge from the hospital. Conclusions: Using electronic health records and an automated process for tracking and in some cases delivering treatment options to people who smoke is feasible to do and appears to be cost-effective.

SYM21-2

SCALING OF OPT-OUT APPROACHES TO SMOKING CESSATION IN CANCER CARE: EXAMPLES AT THE INSTITUTIONAL, REGIONAL, AND NATIONAL LEVELS

Graham Warren, MD, PhD. Medical University of SC.

Smoking cessation in cancer care can improve survival, but evidence-based support is not routinely provided. "Opt-out" could improve cancer treatment outcomes by increasing access to evidence-based support, but resources, partnerships, expectations, and outcomes can vary according to scale. Institutional implementation of 'opt-out' smoking cessation was successfully achieved through consensus of design by an institutional panel, designing annotated structured assessments, identifying key clinical partnerships, securing medical need and institutional financial commitment, obtaining dedicated information technology support, and maintaining regular communication between clinical staff and cessation counselors. Regional implementation for community cancer centers statewide required advancing approaches to obtain buy-in and commitment from statewide health programs, insurers, the state quitline, and academic partners. Organization and logistical support was provided to develop centralized common information and materials, short-term financial incentives to support implementation, regular regional network meetings, and coordination of site specific needs to identify tobacco use and provide common referral mechanisms within each clinical setting. National implementation required further advancement including a national vision statement, structured long-term financial support, centralized expertise to assist in program design, well-defined performance objectives within each province, financial and experiential support for national network meetings, assistance identifying and utilizing existing provincial resources, centralized assistance for definitions of reach and effectiveness, and coordinating achievable province-level performance objectives. Institutional implementation occurred with >90% assessment and referral over 1-2 years. Regional implementation occurred with over 80% referral over 2-3 years. National implementation occurred over 5 years increasing access to care to 87%. Sustainability across all levels remains challenged by common elements of sustained clinical buy-in, financial support, and concerns for reimbursement vs. cost savings in cancer care.

SYM21-3

THE IMPACT OF CHANGING THE DEFAULT FOR HOSPITAL TOBACCO TREATMENT ON PATIENT PERCEPTIONS, TREATMENT UTILIZATION, AND ABSTINENCE

Kimber P. Richter, PhD, MPH[1], Delwyn Catley[2], Byron J. Gajewski[1], Edward F. Ellerbeck[1], Babalola Faseru[1], Taneisha Scheuermann[1], Laura M. Mussulman[1], Niaman Nazir[1], Chauanwu Zhang[3], Laura E. Martin[1], Elena Shergina[1]. [1]University of Kansas Medical Center, [2]Children's Mercy Kansas City, [3]Sanofi, Waltham, Massachusetts.

The current treatment default requires tobacco users to "opt in" to care by affirming they are willing to quit. This population-based Bayesian adaptive trial compared the effects of opt-out care—presumptively providing medications/quit support to all—versus opt-in care for smokers in a hospital setting. To minimize selection bias the study randomly selected hospital smokers for inclusion, randomized/treated all eligible smokers, and

conducted delayed consent at 1-month follow up. The primary outcome was cessation at 1-month post-discharge (dc). At hospital bedside, counselors screened for eligibility, conducted baseline assessment, randomized patients to study arm, and provided opt-out or opt-in care as randomized. Counselors/medical staff provided opt-out patients with inpatient NRT, scripts for post-dc medications, a 2-week medication starter kit, inpatient counseling/treatment planning, and 4 outpatient counseling calls. Patients could opt out of any or all elements of care. Opt-in patients willing to quit were offered each element of treatment described above. Opt-in patients unwilling to quit received brief "5R" based counseling. Most (74%) of 1,000 randomized patients consented and enrolled at 1-month follow up. Adaptive randomization assigned 64% to Opt-out and 36% to Opt-in. Verified quit rates for Opt-out vs Opt-in were 22% vs 16% at month 1 and 19% vs 18% at 6 months. The Bayesian posterior probability (BPP) that Opt-out outperformed Opt-in was .97 at 1 month and .59 at 6 months. ITT analysis of all randomized yielded similar BPPs. Treatment utilization for Opt-out vs Opt-in was 60% vs 34% for post-dc cessation medication (Cohen's d=0.59), and 89% vs 37% for completing >1 post-dc counseling call (Cohen's d=1.44). Opt-out patients reported stronger therapeutic alliance with providers (3.4 vs 3.2, 4-pt scale, Cohen's d=0.31). Opt-out care achieved better 1-month quit rates and increased the reach of evidence-based treatment by providing more cessation-oriented care to more smokers. Rather than alienating smokers, Opt-out care strengthened therapeutic alliance. Future trials should examine the impact of periodic follow-up to improve long-term cessation.

SYM21-4

A BEHAVIORAL ECONOMIC INTERVENTION TO INCREASE PSYCHIATRIST ADHERENCE TO TOBACCO TREATMENT GUIDELINES: A PROVIDER-RANDOMIZED TRIAL

Erin S. Rogers, BS, MPH, DrPH[1], Christina Wysota[1], Judith J. Prochaska[2], Craig Tenner[3], Joanna Dognin[3], Binhuan Wang[1], Scott E. Sherman[4]. [1]New York University School of Medicine, [2]Stanford University, [3]VA NY Harbor Health Care System, [4]New York University School of Medicine, VA NY Harbor Healthcare System.

Background: People with psychiatric diagnoses are rarely treated for tobacco use. Health care systems often use a "no treatment" default for tobacco, such that providers/patients must actively choose (opt-in) to treat. Behavioral economics suggests that opt-in systems may reinforce the status quo of not treating tobacco use in marginalized populations, including those with psychiatric conditions. We conducted a pilot type III hybrid effectiveness-implementation study to assess the feasibility and impact of an opt-out system at increasing tobacco treatment rates and quitting in outpatient mental health clinics.Methods: We used a cluster-randomized study design and implemented a tobacco use clinical reminder in the electronic health record (EHR) at two Veterans Health Administration mental health clinics. Psychiatrists (N = 21) were randomized to: (1) Opt-In System: Psychiatrists received a reminder that encouraged them to offer cessation medications and referral to counseling or (2) Opt-Out System: Psychiatrists received a reminder that automated a nicotine replacement therapy (NRT) order and a referral to counseling that could be cancelled. Psychiatrists in both arms received tobacco treatment training. We used EHR data to calculate the percent of smokers seen by a participating psychiatrist who were provided cessation treatment. We conducted surveys with 140 patients who saw a participating psychiatrist within 48 hours of their visit and 6 months later to assess use of treatment and self-reported 7-day abstinence. Results: During the 1-year intervention, psychiatrists in the Opt-Out group were 3 times more likely to refer patients to counseling (17.5% vs. 5.9%, P < 0.001) and 1.8 times more likely to order NRT for patients (26.7% vs. 16.7%, P = 0.01). Patient-level outcomes were promising, with 80% of patients who saw a psychiatrist in the Opt-Out group making a quit attempt (versus 61% in the Opt-In group) and 15% of patients reported abstinence at 6-months (versus 6% in the Opt-In group).Discussion: The opt-out system was feasible and effective at increasing the rates at which psychiatrists treat their patients for smoking.

SYM21-5

EXPANSION OF TOBACCO CESSATION TREATMENT WITHIN THE STANFORD CANCER INSTITUTE

Judith J. Prochaska, PhD MPH[1], Amy Chieng[1], Maura Chandler[2], Cindy Tran[2], Brittany Pike[2]. [1]Stanford University, [2]Stanford Health Care.

Background: In 2018 and 2020, Stanford Cancer Insitute received Moonshot P30 Supplements to integrate, evaluate, and expand evidence-based tobacco cessation treatment into cancer care. The funding and technical and peer support from the C3I

collaboration has been instrumental in extending Stanford's tobacco treatment service into 20+ clinics across 3 cancer centers. Patient outcomes are being evaluated at 6- and 24-months follow-up. Aims: The Stanford tobacco treatment service aims to 1) sustain a 100% identification and referral rate of patients who use tobacco, 2) engage at least 30% of referred patients into tobacco treatment, 3) support patients' long-term abstinence, and 4) serve as a national model. Methods: All patients identified as currently using tobacco by the oncology care team are automatically referred for tobacco treatment (i.e., opt-out model). Providers briefly advise cessation and inform patients that a tobacco treatment specialist (TTS) will call within a week. The TTS offers patients a menu of telehealth services including: a) cessation medication consultation with home-delivery; b) behavioral counseling; c) virtual reality mindful exposure therapy; and d) e-referrals (state quitline, smokefree.gov). Group and individualized counseling are provided by supervised clinical psychology doctoral students in a clerkship model.Results: From January 2019 – July 2021, 3,002 patients who use tobacco have been referred (100%), 2214 patients (74%) were reached by phone, and 704 patients (32%) have engaged in cessation treatment. Patient outcomes, obtained on > 70% of patients engaged in treatment, indicate 30% are tobacco-free at 6-months and 25% at 24-months; 70% of patients would recommend the program to others. Conclusion: As part of the C3I collaboration, the Stanford Cancer Institute's integrated tobacco treatment service is meeting its aims with high patient satisfaction. Weekly team huddles monitor process and progress; a dedicated TTS and student training model enable personalized outreach for engagement. New initiatives are piloting telehealth group-based care and novel treatment technologies.

PODIUM PRESENTATION 1

PAPER SESSION 1: ENGAGING IN SYSTEMS SCIENCE TO REDUCE TOBACCO-RELATED HEALTH DISPARITIES AND PROMOTE EQUITY

POD1-1

REDUCING RURAL TOBACCO DISPARITY: A LOW BURDEN POINT OF CARE MODEL

Li-Shiun Chen[1], Justin Yu[2], Nina Smock[2], Giang Pham[2], Jingling Chen[2], Alex Ramsey[1], Patricia Cavazos-Rehg[2], Aimee James[2]. [1]WA University School of Medicine, St. Louis, MO, USA, [2]Washington University School of Medicine, St. Louis, MO, USA.

Significance: There are few trained providers, high rates of poverty, and remote locations in rural communities resulting in health inequalities and limited healthcare. To address high unmet needs and health costs from tobacco use in rural populations with resource constraints, this study provides data on the effect of a low-burden point of care treatment model for tobacco use treatment in rural health centers. **Methods**: We compared tobacco use and treatment in urban vs. rural healthcare systems. To design and implement Electronic Health Record-Enabled Evidence-Based Smoking Cessation Treatment (ELEVATE), a point-of-care model, we conducted needs assessment with patient (N=186) and provider surveys (N=37 doctors, nurse practitioners, nurses, and medical assistants). Pre/post and Quasi-experimental comparisons assessed reach of the smoking cessation program in two rural primary care clinics, implemented in November of 2020. **Results**: (a) Rural disparity: We found a higher smoking prevalence in the rural healthcare system than the urban healthcare system (21.1% vs. 14.6%, z=42.5, N=78,792 vs. 562,272 patients, p<0.0001). (b) Survey results in rural healthcare: Patient survey showed a great need for tobacco treatment during point of care in rural health centers. Most patients (80%) expressed high interest in receiving tobacco treatment during their regular primary care visits. In provider survey, most providers (92%) desired EHR tools to support their efficient offering of tobacco treatment. (C) Pre-Post comparison: Six-month pre- and post-implementation data were compared. The percentage of smokers receiving medications increased from 6.4% to 9.4% (N=2,044 vs. 1,967 patient smokers, z=3.52, p=0.00043). The percentage of smokers offered referral to additional counseling increased from 0% to 5.6% (N=2,044 vs. 1,967 patient smokers, z=10.8, p<0.0001). **Conclusion**: These results on a low-burden point of care treatment model suggest the use of a new care paradigm to reduce the rural disparity related to limited resources. This work may inform pragmatic strategies for many rural health clinics where tobacco treatment is currently sub-optimal.

POD1-2

RECIPROCAL BENEFITS OF LUNG CANCER SCREENING AND TOBACCO TREATMENT ON UPTAKE AND EQUITY OF PRIMARY AND SECONDARY PREVENTION

Alex Ramsey[1], Christine Doroshenko[1], David Gierada[1], Ruben Nava[1], Anne Stilinovic[2], Foluso Ademuyiwa[1], Li-Shiun Chen[1], Laura Bierut[1]. [1]Washington University School of Medicine, St. Louis, MO, USA, [2]BJC HealthCare, St. Louis, MO, USA.

Significance: There has been increased focus on the importance of integrating lung cancer screening (LCS) and tobacco treatment (TT), yet research has not examined the potential synergistic effects of this integration on uptake and equity of primary and secondary prevention efforts. This study investigates two scientific gaps: (1) the extent to which LCS settings can extend the reach of TT, both overall and among Black patients who smoke, and (2) the extent to which engagement in TT via LCS programs predict patient adherence to repeat follow-up LCS visits, both overall and among Black patients who smoke. **Methods:** We accessed data from our comprehensive cancer center's Lung Cancer Screening Program dataset between 09/2016-02/2021. To address the first gap, we analyzed cross-sectional data on TT at initial LCS visits among patients who smoke (N=1444). To address the second gap, we analyzed longitudinal data on adherence to the next repeat LCS visit among patients who were ordered a follow-up screening that was due more than 3 months prior to analysis (N=1090). **Results:** *Role of LCS on TT reach*: We observed large unmet need and demand for TT, particularly among Black

patients; although 72% were interested in quitting smoking and 61% desired treatment, only 20% were receiving treatment. At the initial LCS visit, 22% received TT counseling or referral, substantially extending the reach of TT among LCS patients. *Role of TT on LCS adherence*: Only 43% of patients who received a 12-month follow-up LCS order attended that repeat screening, and Black patients were less likely than White patients to attend this follow-up screening. Among all patients who smoke, adherence to 12-month follow-up was only 38% when no TT was provided but increased to 53% when TT was provided. Among Black patients who smoke, adherence to 12-month follow-up was only 35% when no TT was provided but increased to 50% when TT was provided. **Conclusion:** LCS and TT may have synergistic effects on reducing current gaps in uptake and equity associated with both services. These findings document the importance of LCS to boost the reach of TT and the potential role of TT in increasing adherence to annual LCS.

POD1-3

EVALUATING THE EFFICIENCY OF TOBACCO TREATMENT PROGRAMS IN THE CANCER MOONSHOT CANCER CENTER CESSATION INITIATIVE: DATA ENVELOPMENT ANALYSIS

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Significance: The Cancer Center Cessation Initiative (C3I) is an NCI Cancer Moonshot Program that supports cancer centers in developing tobacco treatment programs for oncology patients who smoke. C3I-funded centers have implemented evidence-based programs that fit their institutional resources and needs, offering a variety of components including cessation counseling, quitline referrals, interactive voice response systems, web- and text-based services, and medications. While evaluation of implementation outcomes in the C3I is guided by RE-AIM, little is known about technical efficiency - i.e., how inputs (e.g., program costs, staff time) influence implementation outcomes (e.g., reach, effectiveness). This study demonstrates the application of data envelopment analysis (DEA) as an implementation science tool to evaluate the technical efficiency of C3I programs. Such information will advance understanding about where and how to prioritize implementation resources. **Methods:** DEA is a linear programming technique widely-used in economics and engineering for measuring the relative performance of production units. Output-oriented DEA was applied to model technical efficiency, measured as the proportion of observed output to benchmarked output for given input levels. The models used the variable returns-to-scale specification and featured cost-per-participant, total full-time equivalent (FTE) effort and tobacco treatment specialist effort as model inputs, and reach and effectiveness (quit rates) as outputs, using data from 15 C3I-funded centers reported in 2020. **Results:** In the DEA model featuring cost-per-participant (input) and reach/effectiveness (outputs), programs providing treatment to ≥200 patients in a 6-month reporting period had higher efficiency scores (range, 0.26-0.60), compared to programs serving <200 patients (range, 0.05-0.21). A similar pattern was observed in the FTE/TTS (inputs) and reach/effectiveness (outputs) models. Thus, patterns in efficiency were associated with economies of scale - i.e., as programs grow and engage more patients who smoke, they become more efficient. **Conclusion:** This study suggests DEA is a novel implementation science tool for measuring efficiency by demonstrating its appropriateness and feasibility to evaluate the relative performance

of C3I programs. DEA makes it possible to evaluate programs on the levels of outputs they achieve relative to their input levels by defining a program's relative efficiency status compared with the benchmarked group.

POD1-4

PROJECT SUN A CULTURALLY ADAPTED SMOKING CESSATION CURRICULUM FOR AMERICAN INDIAN YOUTH

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Significance: American Indian Alaska Native (AIAN) youth have the highest prevalence of cigarette and other commercial tobacco product use compared to other ethnic/racial groups in the U.S. Because tobacco use can lead to premature morbidity and mortality, effective and culturally informed commercial tobacco product cessation programs for AIAN youth are needed. **Methods:** This project studied the development, implementation, and impact of a culturally adapted version of Project EX, an evidence-based intervention for teen smoking cessation. University and community agency partnerships were established to coordinate the implementation of the program. Implementation challenges resulted in a change from a three-arm to a single-arm trial. These challenges related to mistrust of research institutions and research processes (e.g., collecting specimens), competing work demands among agency staff who were also part of the implementation process, and limited AIAN leadership support. **Results:** AIAN youth (N = 37) participated in an eight-week curriculum, and intent-to-treat analysis with biochemical validation results indicated that 32% of youth quit smoking at the three-month follow-up. **Conclusion:** Participants reported being satisfied with the program overall and enjoying the culturally adapted activities. This study also detailed the program's adaptation process and lessons learned during the implementation process. The lessons learned include: incentivizing individuals who assist with implementation (even if they agree to volunteer), limit the number of assessments utilized, and present an alternative to a randomized controlled trial design (e.g., waitlist control) given that AIAN practices tend to oppose exclusionary practices (as attributed to the use of control groups).

POD1-5

CAN INPATIENT PHARMACISTS MOVE THE NEEDLE ON SMOKING CESSATION? EVALUATING REACH AND REPRESENTATIVENESS OF A PHARMACIST-LED OPT-OUT SMOKING CESSATION INTERVENTION PROTOCOL FOR HOSPITAL SETTINGS

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Objective: Hospitalization affords an opportunity to reduce smoking, but fewer than half of patients who smoke receive evidence-based cessation treatment during inpatient stays. This study evaluates a pharmacist-led, electronic health record (EHR)-facilitated, opt-out smoking cessation intervention designed to address this need. **Methods:** Analyses of EHR records of adult patients who smoked in the past 30 days admitted to an academic medical center in the upper Midwest were conducted using the Reach Effectiveness Adoption Implementation Maintenance (RE-AIM) framework. The reach of a pharmacist-led, EHR-facilitated protocol for smoking cessation treatment was assessed by comparing patients' receipt of nicotine replacement therapy (NRT) and tobacco quitline referral pre- and post-implementation. Chi-square tests, t-tests, and multiple logistic regression models compared reach across patient demographic groups to assess treatment disparities and representativeness of reach. Adoption of the program by hospital services was also assessed. **Results:** Of the 70 hospital services invited to implement the program, 88.6% adopted it and 78.6% had eligible admissions. Treatment reach increased as rates of delivering NRT rose from 43.6% of eligible patients pre-implementation to 50.4% post-implementation (p<0.0001) and quitline referral rates rose from 0.9% to 11.9% (p<0.0001). Representativeness of reach by sex and ethnicity improved post-implementation, although disparities by race and age persisted after adjustment for demographics, insurance, and primary diagnosis. Pharmacists addressed tobacco use for eligible patients in 62.5% of cases post-implementation.

Conclusions: Smoking cessation treatment reach and representativeness of reach improved after implementation of a proactive, pharmacist-led, EHR-facilitated opt-out smoking cessation treatment protocol in adult inpatient services.

POD1-6

SUSTAINING INPATIENT TOBACCO TREATMENT MEASURES OUTCOMES DURING COVID-19 VIA EVIDENCE-BASED TREATMENTS, ELECTRONIC HEALTH RECORD SOLUTIONS, AND HIGH RELIABILITY ORGANIZATION PRINCIPLES

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SIGNIFICANCE: Research has shown that most people attempting to quit tobacco do not utilize evidence-based treatments (EBTs) which leads to low rates of cessation and multiple quit attempts. To address barriers to evidence-based tobacco cessation care, The Joint Commission implemented inpatient tobacco treatment measures (TTMs) in 2012 to ensure integration of EBTs for tobacco users in the inpatient setting and coordination of care with outpatient tobacco cessation experts. In 2016, James A. Haley Veterans' Hospital (JAHVH) was underperforming in the inpatient TTMs outcomes and an interdisciplinary quality improvement (QI) team was given the task to address. The team focused on development of a tobacco cessation care delivery program which included standardized pathways within the Veterans Health Administrative electronic health record (EHR) system to improve nicotine replacement therapy ordering, EBT counseling, and improved care coordination. There was a 300% improvement in tob20 and tob40 (also known as TOB-2 and TOB-3 within The Joint Commission's ORYX inpatient TTM subset) from FY 2016 through FY 2019. The 2020 COVID-19 pandemic led to an unprecedented shift in organizational resources within the facility and resulted in a loss of progress in the measures in particular tob40 declining to as low as 65.71% FY 2020, Quarter 3. METHODS/RESULTS: After interdisciplinary QI team assessment, staff reassignments during the pandemic were felt to be a primary contributor to a decline in the inpatient TTMs outcomes. The integration of High Reliability Organization (HRO) principles led to process modifications which resulted in tob40 improvement to pre-pandemic levels at 94.69% FY 2021 year to date. In addition, tob20 efforts have been sustained at 97.95% FY 2021 year to date. CONCLUSIONS: The implementation of a tobacco cessation care delivery program in 2016 consisting of EBTs, EHR solutions, and care coordination allowed JAHVH to adapt to the unparalleled challenges of the COVID-19 pandemic via the integration of HRO principles resulting in sustained improvement in the inpatient TTMs. This model may be an effective approach for delivery of tobacco cessation care at other hospital systems.

PAPER SESSION 2: RAPID FIRE: DEVELOPING AND EVALUATING RISK MESSAGES

POD2-1

DEVELOPING GRAPHIC MESSAGES FOR VAPING PREVENTION AMONG BLACK AND LATINO ADOLESCENTS

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Background: As an important transition stage in human development, adolescence is a critical window for vaping prevention. There is a substantial gap in communication research for vaping prevention among racial and ethnic minority groups. Their representation is essential to develop, implement, and disseminate innovative and effective interventions for vaping prevention.**Objective:** Describe the participatory research (PR) procedures with Black and Latino adolescents to develop culturally and linguistically appropriate graphic messages for vaping prevention.**Methods:** This PR study utilized a user-centered design method. We conducted a series of focus groups with sixteen Black and Latino adolescents to develop culturally and linguistically appropriate graphic messages for vaping prevention. The Biobehavioral Model of Nicotine Addiction provided a framework for the development of the graphic messages. Participants met four times each to provide iterative feedback on the graphic messages until reaching a consensus on overall quality and content. **Results:** At baseline, participants' mean age was 15.4 years old (SD 1.4), 50% were female, 87.5% were heterosexual, 56.3% were Black or African American, and 43.8% were Hispanic or Latino. Twelve participants (75%) chose to participate in the English sessions. Participants decided to create four types of graphic messages: 1) financial reward, 2) health reward, 3) social norms, and 4) self-efficacy. Meeting four times with the four groups provided sufficient opportunities for iterative feedback on the graphic messages for reaching a consensus on overall quality and content.**Conclusions:** It is feasible and practical to build PR among Black and Latino adolescents focused on vaping prevention. Adolescents added innovation and creativity to the development of culturally and linguistically appropriate graphic messages for vaping prevention. Appropriate staffing, funding, and approaches are key efforts to PR among Black and Latino adolescents. Future research is needed to evaluate the impact of the graphic messages for vaping prevention.

POD2-2

COGNITIVE RESPONSES TO PICTORIAL WARNING LABELS AND THEIR ASSOCIATION WITH QUITTING MEASURES AFTER CONTINUED EXPOSURE

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Objective: Previous research has highlighted the role of cognitive and affective mediators in facilitating the effectiveness of tobacco pictorial warning labels (PWLs). This study examines smokers' cognitive responses towards PWLs after 10 days of use on their packs, and their associations with changes in quitting attitudes, beliefs, and intentions during this period. **Methods:** Non-treatment-seeking, daily smokers completed a randomized, parallel design trial. Participants were randomized to either a PWL or control (i.e., text only or no warning label) group and received packs of their preferred brand cigarettes affixed with their assigned label for 10 days. We assessed quitting attitudes, intentions, and beliefs at the onset and end of the study. At study end, smokers rated their PWL on a 5-point scale for 8 cognitive attributes: memorable, understandable, shocking, informative, offensive, boring, relevant, and interesting. **Results:** Mean ratings of the PWLs were high for memorable, understandable, informative, relevant, and interesting (range = 3.4 to 4.0), moderate for shocking (2.9), and low for offensive (1.7), and boring (1.5). Among smokers in the PWL groups, quitting-related attitudes, positive beliefs, and intentions increased over the study period ($p < .001$) and these changes were positively associated with most cognitive measures except offensive and boring ($p < .05$). For the text-only label group, attitudes and intentions increased significantly but these changes were not associated with any cognitive attributes. **Conclusion:** Smokers generally have favorable cognitive evaluations of PWLs following repeated exposures. Further, these evaluations are associated with increased quitting attitudes and intentions, which may facilitate cessation attempts over longer periods of exposure.

POD2-3

EFFECTS OF WATERPIPE TOBACCO RISK MESSAGES AMONG YOUNG ADULT WATERPIPE SMOKERS AND SUSCEPTIBLE NONSMOKERS: RESULTS OF A RANDOMIZED CONTROLLED TRIAL

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Significance: Waterpipe (i.e., hookah) tobacco smoking (WTS) is common among US young adults and many nonsmokers are susceptible to initiation, but research on interventions targeting young adults' WTS is limited. This randomized controlled trial (NCT04252014) tested the effects of WTS risk messages for preventing initiation and promoting cessation in young adults. **Methods:** Participants were US young adults aged 18 to 30 years who were current waterpipe smokers (n=551) or susceptible nonsmokers (n=315). Participants were randomized to a WTS risk messaging arm or a control arm after baseline measures. WTS risk messages were developed using a multimethod process and communicated the risks of health harms and addictiveness with content about flavors or social use. Messages consisted of brief text with accompanying imagery. Control messages were similar in format but were unrelated to tobacco. In both arms, participants received messages online up to 4 times over 12 weeks and completed outcome measures 2-, 4-, and 6-months later. **Results:** At 4 months, susceptible non-smokers who received 3 or 4 risk messages were significantly less likely (OR 0.15, 95% CI 0.04, 0.58, p = .006) to initiate waterpipe tobacco smoking than those who received no messages; this effect on initiation was sustained at 6 months (OR 0.11, 95% CI 0.03, 0.44, p = .002). There were no significant effects of the waterpipe risk messages on WTS risk perceptions; curiosity among susceptible nonsmokers; or motivation to quit or cessation among smokers. **Conclusions:** WTS risk messages were effective at the highest dose of exposure for preventing initiation among susceptible nonsmokers. They did not affect risk perceptions, or motivation to quit or cessation among water-pipe smokers. These findings advance the science of WTS prevention interventions and highlight important needs for future research to: 1) identify message content that motivates young adult waterpipe smokers to quit, and 2) to determine optimal dose of exposure for waterpipe tobacco risk messages.

POD2-4

THE ROLE OF AFFECTIVE REACTIVITY INDUCED BY CIGARETTE PACKAGING INCLUDING GRAPHIC WARNING LABELS

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Objective: To identify whether three types of cigarette pack designs (Graphic Warning Label [GWL] packs, Blank packs, Current US packs) differentially elicit the type of affect necessary to study how packaging influences cognitions and behavior among US smokers. **Design:** During one-on-one meetings, 324 daily smokers from San Diego, California were asked to handle a randomized presentation of packs (3 GWLs, 1 Blank, and 1 US) and "Think Aloud" their reactions as they examined each design. Participant thoughts were recorded and transcribed. Six trained coders scored these transcriptions on a 7-point reactivity scale (-3 to +3) and natural language processing software quantified the text for speech polarity (-1 to +1) and emotive word frequency. **Results**: Reactivity scores had excellent inter-rater reliability (agreement≥86%; ICC≥.89) and were correlated with speech polarity (rho's=.21-.37, p-values<.001). When considering their own US pack, approximately two-thirds of smokers had a low (31.5%) to medium (34.6%) positive response (reactivity=1.29; polarity=0.14) with expressed feelings of joy and trust. Blank packaging prompted a largely (65.4%) neutral response (reactivity=0.03; polarity=0.00). The gangrenous foot GWL provoked mostly medium (46.9%) to high (48.1%) negative responses (reactivity=-2.44; polarity=-0.20), followed by neonatal baby (reactivity=-1.85; polarity = -0.10) and throat cancer (reactivity=-1.76; polarity=-0.08) warnings. GWLs varied in their elicitation of disgust, anger, fear, and sadness. **Conclusion**: Initial reactions to three GWL packs, a blank pack, and smokers' current US pack reflected the targeted range of positive, neutral, or negative affect enabling tests of the role of packaging on smoking cognitions and behavior in a real-world randomized trial.

POD2-5

DEVELOPING TOBACCO PACK WARNING LABELS TO INFORM SMOKERS ABOUT THE MISLEADING EFFECTS OF FILTER VENTING

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Background: The tobacco industry has long misled smokers about the risks of cigarettes, including use of small holes in the filters of tailor-made cigarettes (filter-venting) to dilute the smoke with air. Smoke from more vented cigarettes feels lighter than smoke from cigarettes with fewer vents, and many smokers believe that lighter smoke is less harmful. We tested the effect of novel warning labels (WLs) on smokers' misperceptions about the lighter-feeling smoke produced by filter-venting.Methods: We used a mixed-methods program of research (two qualitative and two quantitative studies) with Australian adult smokers to systematically develop two WLs communicating the key messages that smoke that feels light (i) still contains cancer causing chemicals and (ii) can still be heavy on tar. Across the four studies we tested responses to various components of the WLs (i.e., front- and back-of-pack headlines, and images and detailed explanatory statements on the back), allowing us to revise each warning component in response to smokers' feedback.Results: We will present key learnings from each stage of WL development and perceived effectiveness scores for the final version of each WL. Key learnings include: explanations about what filter venting is and how it changes the smoke offered new information for many; explanations about the compensatory behaviours used by some smokers aided understanding of how venting does not reduce harm; smokers preferred the general term "cancer causing chemicals" to the specific but unfamiliar term "nitrosamines"; and smokers more favourably rated front-of-pack images that were more literal rather than metaphorical. After multiple revisions, the warnings tested in the final quantitative study significantly (p<.05) increased the proportion of smokers who accepted the main message of each WL compared to those in a control condition (cancer causing chemicals WL, 89% accept main message vs. 70% control; tar WL, 89% vs. 67% control).Conclusions: Tobacco pack WLs can be used to educate smokers about how filter venting is used to make smoke feel lighter, and to correct misperceptions that lighter-feeling smoke is less harmful.

POD2-6

ON-PACK MESSAGING FOR ENDS PRODUCTS: A DISCRETE CHOICE STUDY

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Background: Although people who smoke and switch to exclusive ENDS use may reduce the risks they face, non-smokers who begin using ENDS face increased health risks. On-pack labelling must thus attempt to encourage switching among the former group while deterring uptake among the latter. We tested the effects of a dual-message strategy and examined whether reduced-risk messages increased ENDS' appeal to smokers, and if increased-risk messages decreased ENDS' appeal to susceptible non-smokers, occasional and former smokers.Methods: We developed a discrete choice experiment comprising three attributes: information message, nicotine content (0mg or 3mg), and flavour (tobacco, menthol or fruit). Our online sample included 352 current smokers, 118 occasional and former smokers, and 216 ENDS-susceptible never smokers. Smokers saw reduced-risk messages (encouraging switching to ENDS); other groups saw increased-risk messages (discouraging ENDS use). All groups saw a typical addiction warning (i.e., status quo) and a no message condition. We estimated multinomial logit regression and adjusted latent class analysis models.Results: When compared to the no message condition, reduced risk-messages increased the appeal of ENDS uptake among one class of smokers but decreased appeal among other classes. However, among all smokers, reduced-risk messages increased preference more than an addiction warning. Among occasional or former smokers, and susceptible non-smokers, all information messages, including an addiction warning, discouraged ENDS use and decreased preference relative to no message. Conclusions: On-pack reduced-risk messages could make transition more attractive to smokers than the current addiction warning featured on e-liquids. Increased-risk messages could deter ENDS use among susceptible non-smokers, occasional and former smokers. The heterogeneity among and between smokers and non-smokers suggests differentiating retail channels so

specialist stores sell packs featuring with reduced risk messaging while general retailers sell those featuring increased risk messaging could support the dual behaviours policy makers wish to promote.

POD2-7

EFFECT OF NICOTINE CORRECTIVE MESSAGING ON NICOTINE-RELATED BELIEFS IN U.S. ADULTS: A RANDOMIZED CONTROLLED TRIAL

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SIGNIFICANCE: The public health impact of FDA's proposed nicotine reduction policy hinges on the extent to which tobacco users and non-users understand the harms of nicotine in relation to specific products, including nicotine replacement therapy (NRT). Population data, however, highlight widespread public misperceptions of the health risks of nicotine that could undermine the public health benefits of FDA's actions. METHODS: 794 U.S. adults (aged 18+) in NORC's AmeriSpeak Panel were enrolled in a study in Spring 2021 to test the effect of three brief exposures to nicotine corrective messages (NCM) on beliefs about nicotine, nicotine replacement therapy (NRT), e-cigarettes, and reduced nicotine content (RNC) cigarettes at 1-month and 3-month follow-up. Participants were randomized in a 1:1 ratio to the NCM (n=393) or no message control conditions (n=401). Bivariate analyses conducted in 2021 examined the effect of study condition on nicotine beliefs in complete cases (NCM, n=290; Control, n=319); linear regression models examined the association between study condition and nicotine belief scales, controlling for past 30-day cigarette smoking. RESULTS: At 3-month follow-up, participants in the NCM condition reported fewer false beliefs about NRT (p=0.04) and e-cigarettes (p=0.009). There was a marginal association between NCM exposure and correctly identifying that nicotine does not cause cancer (30% NCM vs. 22% control; p=0.06). Controlling for past 30-day smoking status, exposure to NCM was marginally associated with fewer NRT false beliefs (b=-0.39; p=0.06) and remained associated with fewer e-cigarette false beliefs (b=-0.36; p=0.02). In crude and adjusted analyses, there was no relationship between NCM and false beliefs scales on nicotine itself or RNC cigarettes at 3-months. CONCLUSION: Findings from the current study support that repeated exposures to a nicotine corrective messaging intervention may correct misperceptions of NRT and e-cigarettes in the short-term, but different message content or more intensive dose may be needed to address misperceptions of nicotine and RNC cigarettes.

POD2-8

ADOLESCENT PERCEPTIONS OF VAPING PREVENTION MESSAGES: AN EXAMINATION OF PERCEIVED MESSAGE EFFECTIVENESS

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Significance: Although e-cigarette use among adolescents continues to be a major public health concern, the field currently has limited guidance as to what vaping prevention message elements have the most potential to discourage vaping. This study aims to help fill that gap by testing a large set of vaping prevention messages to determine how various message elements may impact adolescent perceived message effectiveness (PME) and vaping appeal.**Methods:** The study included a large, diverse set of real-world prevention messages archived by Vaping Prevention Resource (vapingprevention.org). Two independent coders coded 220 messages on 37 objective elements. Participants were a national convenience sample of U.S. adolescents aged 13-17 recruited via Qualtrics online panels (N=1,532) in October 2020. Participants rated seven randomly assigned messages on PME and vaping appeal. **Results:** Content referencing nicotine or addiction (b=.25), chemicals (b=.42), and negative health effects were associated with greater PME (p<.05). Imagery associated with higher PME included warning symbols

(b=.36), graphic images (b=.73), and combustible cigarettes (b=.30; p<.05). Use of a hashtag, statistic, bright/vivid colors, memes, and use of first-person ("I" or "we") or the word "teen" were linked with lower levels of PME (p<.05). Flavor content was associated with increased levels of vaping appeal (b=.13, p<.05). Few differences were found on message elements by adolescent vaping status. **Conclusions:** Our results highlight message content, imagery, and other features that are both more and less promising for creating effective vaping prevention messages. Integrating this evidence-based guidance may enhance the impact of e-cigarette prevention campaigns.

PAPER SESSION 3: NEUROBIOLOGICAL MECHANISMS MEDIATING WITHDRAWAL AND CESSATION

POD3-1

NEGATIVE SOMATIC AND AFFECTIVE NICOTINE WITHDRAWAL BEHAVIOR ARE MEDIATED THROUGH THE LATERODORSAL TEGMENTAL NUCLEUS

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SIGNIFICANCE: The aversive experience associated with nicotine withdrawal contributes to relapse behavior. Understanding how nicotine withdrawal alters excitability of key brain areas is important for developing effective therapeutic interventions. Suppression of ventral tegmental area (VTA) dopamine (DA) signaling is one consequence of withdrawal. One key presynaptic regulator of VTA DA neuron activity is the laterodorsal tegmental nucleus (LDTg). Previous data has shown GABAergic drive from the interpeducular nucleus (IPN) to the LDTg mediates the aversive effects of acute high-dose nicotine exposure. It is known that nicotine withdrawal also activates IPN GABA neurons, and we hypothesize that IPN suppression of LDTg projections to VTA mediates aspects of aversive withdrawal symptoms. **METHODS:** Using optogenetic inhibition of the IPN GABAergic neurons synapsing within the LDTg, mecamylamine-precipitated nicotine withdrawal behaviors in naïve and withdrawn GAD2-Cre mice were tested. **RESULTS:** During real-time preference testing, we observed a decrease in the negative affective state associated with nicotine withdrawal, as mice experiencing withdrawal spent more time in the environment paired with optogenetic inhibition. This preference persists over three days of testing, after which, animals were assessed for conditioned responses to the previously light-paired chamber. Conditioned place testing revealed that preference was state-dependent, as the animals preferred the previously light-paired chamber only when they were experiencing withdrawal. In addition, we explored the impact of IPN GABAergic projections to LDTg in withdrawal-associated behaviors. During optogenetic inhibition of IPN GABAergic terminals in LDTg, we observed a normalization of exploratory behavior that is typically reduced during the withdrawal state, as measured by open field test, suggesting a role of this circuit in withdrawal associated anxiety. Our results also implicate a role for IPN-LDTg GABAergic projections in physical withdrawal symptoms, as we found a suppression of time spent performing withdrawal somatic signs with optogenetic inhibition. **CONCLUSIONS:** GABAergic projections from IPN to LDTg mediate affective and somatic nicotine withdrawal in mice, as optogenetic inhibition of these terminals decreases severity of the withdrawal state.

POD3-2

NICOTINE PLUS CUE-PRIMED REINSTATEMENT AND NATURAL REWARDS ARE SEX-DEPENDENTLY ENHANCED IN ADOLESCENT SPRAGUE-DAWLEY RATS CONTAINING THE HUMAN CHRNA6 3'UTR POLYMORPHISM (RS2304297) IN THE ALPHA(A)6 NICOTINIC ACETYLCHOLINE RECEPTOR SUBUNIT

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Background: Nearly 40 million adults in the United States are current smokers, almost all of whom initiate during adolescence. Large-scale human candidate gene studies have indicated that a genetic variant (rs2304297) in the alpha(α)6 nicotinic acetylcholine receptor subunit (nAChR), encoded by *Chrna6^{C123G}*, may play a key role in adolescent smoking. We hypothesized that the polymorphism selectively enhances nicotine + cue-primed reinstatement, but not nicotine- or cue-only reinstatement in GG (risk) versus CC (non-risk) allele carriers, without having baseline effects on natural rewards. **Methods:** Using CRISPR-Cas9 genomic engineering, we developed a humanized rat line with the human gene variant of the CHRNA6^{C123G} polymorphism in Sprague-Dawley rats. Genetically modified adolescent male and female rats were food trained under a fixed-ratio (FR)1 schedule of reinforcement and progressively increased to FR5. Animals were implanted with catheters and began nicotine self-administration (15 µg/kg/infusion) at FR5. Upon reaching stable responding, reinforced behavior was extinguished by removal of drug and cues. Reinstatement testing began for cue only, nicotine only, and nicotine + cue in a Latin Square Design. Animals were returned to extinction conditions for 2 days minimum between testing. **Results:** For natural food rewards, GG female rats had enhanced food reinforcement when compared with CC females. This

genotype effect on natural rewards was not significant in male rats. In contrast, male and female CC and GG-allele carriers exhibited equivalent nicotine self-administration and extinction. Male GG rats had enhanced nicotine + cue-primed reinstatement when compared with male CC rats. This genotype effect on reinstatement was not seen in female rats. **Conclusions:** Our findings support the *in vivo* functional role of the human CHRNA6[C123G] genetic variant in sex-dependently enhancing natural rewards and nicotine seeking behavior in adolescent rats. Overall, the findings support clinical and preclinical data highlighting a role of α6 nAChRs mediating gender heterogeneity in substance use and related phenotypes.

POD3-3

GENETIC DISSECTION OF NICOTINE AND LEARNING TRAITS USING BXD RECOMBINANT INBRED MICE

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Cognitive deficits, such as disrupted learning, are a major symptom of nicotine withdrawal. These deficits are heritable, yet the genetic basis is unknown. We recently identified a genome-wide significant quantitative trait locus in the BXD recombinant inbred panel on chromosome 4 underlying nicotine withdrawal deficits in learning. Here, we aimed to investigate phenotypic and transcriptomic variation of the high and low responders from the BXD recombinant inbred panel to further understand how variation in nicotine and learning phenotypes may impact nicotine withdrawal deficits in learning. We assessed four strains that exhibited extreme phenotypic variation (BXD64, BXD98, BXD56, BXD124) and the two BXD parental strains (C57BL/6J and DBA/2J) in fear conditioning, two nicotine (NIC) sensitivity assays (n=9-21 per sex per strain), and NIC metabolism (n=4-12 per sex per strain). NIC-induced locomotor activity and NIC-induced hypothermia phenotypes did not segregate into the same high and low responder groupings as the NIC withdrawal learning phenotype, providing further evidence that the cognitive deficits during NIC withdrawal are genetically independent from other NIC-induced phenotypes. Furthermore, nicotine metabolism as assessed by a cotinine ELISA assay did not segregate between the high and low responder groupings, suggesting that nicotine metabolism differences are not driving observed NIC behavioral differences. To expand upon these results and identify transcriptome changes associated with NIC withdrawal learning deficits, hippocampal mRNA-sequencing in the BXD lines exhibiting extreme phenotypic variation was examined.Funding: U01DA04163203 (T.J.G), T32GM108563 (L.R.S.)

POD3-4

ACTIVATION OF ACCUMBENS MICROGLIA AND ADENOSINE A2A RECEPTORS CONTRIBUTES TO NICOTINE SELF-ADMINISTRATION AND CUE-INDUCED REINSTATEMENT

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Neuroimmune mechanisms within the nucleus accumbens core (NAcore) are involved in nicotine seeking behavior. Further, microglia are activated following withdrawal from experimenter-delivered nicotine, and this is a critical neuroimmunological response in the nicotine-induced cellular signaling cascade. Adenosine 2 receptors (A2aRs) regulate the proliferation and survival of microglia, and have been found to trigger microglial activation and inflammatory cytokine release. Systemically agonizing A2aRs effectively reduces ethanol self-administration and cocaine reinstatement, but these receptors have not been thoroughly studied for their role in nicotine-motivated behaviors. In the current studies, Long Evans male and female rats underwent nicotine self-administration (0.06 mg/kg/infusion) followed by extinction training in which rats were administered with A2a agonist (CGS 21680, 0.4 mg/kg i.p.), A2a antagonist (SCH 58261, 0.4 mg/kg i.p.), or vehicle. One cohort of animals were used to quantify NAcore microglia morphology following nicotine self-administration while a second cohort received A2a agonist/antagonist treatments through extinction and prior to cue-induced reinstatement. Results show altered morphology indicative of microglia activation, and an increase in A2a expression within the NAcore following chronic nicotine-self administration. Pretreatment with systemic injections of CGS 21680 resulted in the significant decrease of cue-induced nicotine seeking compared to SCH 58261-treated animals. These results indicate that A2a activation counteracts nicotine seeking behavior. Ongoing studies are determining if this is mediated by microglia.

POD3-5

REINSTATEMENT OF COTININE SEEKING IN RATS: DIFFERENTIAL EFFECTS OF SEX

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Significance: Nicotine addiction is characterized by high rates of relapse following a period of abstinence, which represents a major obstacle in cessation management. Therefore, better understanding of relapse mechanisms will inform future treatments. Our previous studies suggest that cotinine, the major metabolite of nicotine, may play a role in nicotine reinforcement by supporting intravenous self-administration. However, whether cotinine may play a role in relapse remains unknown. The objective of the current study was to investigate potential relapse to cotinine-seeking behavior using the well-established reinstatement of drug seeking model in rats. **Methods**: Adult male and female Wistar rats were trained to self-administer cotinine at 0.03 mg/kg/infusion in daily 2-hr sessions for 20 sessions, and underwent extinction for 10 sessions. Rats were then tested for cue-, drug-, or stress-induced reinstatement of cotinine seeking. In cue-induced reinstatement, light cues associated with cotinine self-administration were presented during the reinstatement session. In drug-induced reinstatement, rats received pretreatment with cotinine (0, 1.0, 2.0 mg/kg, s.c.) prior to reinstatement sessions. Stress-induced reinstatement involved pretreatment with yohimbine (0, 1.25, 2.5 mg/kg, s.c.) prior to reinstatement. **Results**: Presentation of light cues associated with cotinine self-administration significantly increased active, but not inactive, responses during the reinstatement. In addition, the increase was more robust in female than male rats. Compared to vehicle pretreatment, cotinine or yohimbine significantly elevated active responses with similar enhancement seen in male and female rats. Furthermore, an overall analysis indicated a significant effect of sex during cotinine self-administration and extinction. Female rats obtained significantly more infusions during self-administration sessions, and were more resistant to extinction of active responses across extinction sessions. **Conclusions**: These results indicate that rats trained to self-administering cotinine displayed robust relapse to cotinine seeking, and that sex differentially affected cotinine self-administration, extinction, and reinstatement. These findings suggest that cotinine may play a role in relapse to nicotine seeking.

POD3-6

MECHANISTIC INSIGHTS INTO NICOTINE WITHDRAWAL: ROLE OF PURINERGIC SIGNALING IN THE MEDIAL HABENULA

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Nicotine is considered to be the primary reinforcer of tobacco dependence, which is one of the leading causes of preventable death worldwide. In these studies, we sought to investigate the role of purinergic signaling on neuronal activity in the medial habenula. Acute brain slicing is performed to obtain brain slices from both male and female mice and the neuronal activity in the medial habenula is recorded with patch clamp electrophysiology. Initial studies characterized the baseline firing rates and the effects of a receptor agonist on cholinergic habenular neurons. Next, since it has been demonstrated that the medial habenula is highly implicated in mediating symptomology associated with nicotine withdrawal, we then examined how activation of purinergic signaling alters neuronal activity during a state of nicotine withdrawal in both sexes. We discovered that activation of purinergic receptors mediates neuronal firing in the medial habenula, with different effects occurring during nicotine withdrawal. In conclusion, these data have further our understanding of the factors mitigating withdrawal effects that may underlie the nicotine dependence state. This work was supported by funding from the NIH National Institute on Drug Abuse (DP1 DA039658 to CDF).

PODIUM PRESENTATION 2

PAPER SESSION 4: RELATIONSHIPS BETWEEN COVID-19 AND SMOKING

POD4-1

EFFECTS OF COVID-19 SHELTER-IN-PLACE ORDERS ON ADOLESCENT CIGARETTE AND E-CIGARETTE USE IN CALIFORNIA

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Introduction: This study examined whether COVID-19 "shelter-in-place" (SIP) orders influence adolescents' risks of cigarette and e-cigarette use and how it may differ for adolescents of different racial/ethnic identities or socioeconomic status. We theorize that SIP-related changes to adolescent home, school, and work environments and stress levels may impact tobacco use opportunity and motivations (e.g. using to cope). **Methods:** California county SIP dates were collected through press releases, spanning March 13, 2020 through June 19, 2020. Outcomes included self-reported lifetime use of cigarettes and e-cigarettes to get nicotine and frequency of use in the past 6 months. Data were collected from a current longitudinal study on alcohol and other substance use with 3 follow-up surveys beginning May 8, 2019 to December 3, 2020. The sample included 1,249 adolescents, aged 12-16 at baseline, from 51 California counties with 3,670 total surveys over the 3 follow-up periods. The exposure was measured as whether the participant was living under an SIP order in their county (yes/no) at participant's survey completion date. Multilevel mixed effects logistic and negative binomial regression models were conducted accounting for nesting of respondents within counties and controlling for age, race, ethnicity, gender, and household income. Models including interactions of the exposure and race/ethnicity, gender, and household income were analyzed to evaluate differential associations. **Results:** Participants were 50% female, 52% White, and 36% Hispanic/Latinx. In main effects models, current SIP status was associated with greater number of days using cigarettes (IRR= 3.31, *p* less than 0.05) and e-cigarettes (IRR= 1.71, *p* less than 0.01). No significant associations were found between SIP status and lifetime use of cigarettes or e-cigarettes. Moderation analyses did not show significant differences between groups. **Conclusion:** Results showed that SIP increased the frequency of cigarette and e-cigarette use for current users but was not associated with initiation of use. Pandemic-era prevention efforts should consider these changed environments for adolescents' tobacco use.

POD4-2

CHANGES IN TOBACCO PRODUCT SALES IN THE UNITED STATES DURING THE COVID-19 PANDEMIC

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Background: The impact of the COVID-19 pandemic on tobacco sales in the U.S. is not fully known, and no study has evaluated changes in specific tobacco product sales. This study estimated changes in tobacco product sales after the onset of the COVID-19 pandemic. **Methods:** Data comprised of U.S. Department of Treasury's records of total monthly cigarette, little and large cigar, pipe, chewing, roll-your-own, and snuff tobacco product sales per person unit observed before the onset of COVID-19 pandemic (January 2007 to February 2020) and afterward (March 2020 to April 2021). Baseline monthly sales volume in the absence of COVID-19 (counterfactuals/expected sales) were estimated for each type of tobacco product using an interrupted time series model and then subtracted from the observed sales volume. The difference was summed from March 2020 to April 2021 to obtain excess (decline in) sales. **Results:** Compared to expected sales, the per capita sales in March 2020 increased for cigarettes by 9.277 (p<0.01) sticks, declined for large cigars by 0.477 (p<0.10) sticks, and remained unchanged for other tobacco products. After the onset of the COVID-19 pandemic, monthly per capita sales of little and large cigars increased by 0.006 (p<0.01) and 0.145 (p<0.01) sticks, respectively, and of chewing tobacco increased by 0.064 (p<0.01) pounds per 1000 person relative

to the expected trends. In contrast, the monthly sales trend of pipe tobacco decreased by 0.239 (p<0.01) pounds per 1000 person. Monthly sales trends of cigarettes and roll-your-own and snuff tobacco did not change from those observed before the onset of the COVID-19 pandemic. From March 2020 to April 2021, estimated excess sales for cigarettes, little, and large cigars were respectively 42,884.5, 183.2, and 1,544 million sticks, and for chewing tobacco was 1.9 million pounds (average population = 330,201,196.4). Pipe tobacco sales declined by 7.2 million pounds during that period, while roll-your-own and snuff tobacco sales remained unchanged. **Conclusions:** The excess sales indicate increased consumption of cigarettes and cigars, calling for stronger action in tobacco control in the post-COVID-19 era.

POD4-3

MARIJUANA USE, SMOKING, AND COVID-19 OUTCOMES

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Significance: It is unclear whether marijuana use is associated with health outcomes in patients with COVID-19 when considering known predictors including smoking. **Methods**: We analyzed the data from confirmed COVID-19 patients in a large healthcare system in US Midwest between Jan 1, 2020 and April 30, 2021. We analyzed endpoints of hospitalization, admission to intensive care unit (ICU), and death. **Results**: We evaluated 38,635 COVID-19 cases and health outcomes (24,178 hospitalized, 2,751 admitted to ICU, and 1,023 deaths) in our healthcare system. All health outcomes (hospitalization, ICU admission, and death) were associated with older age, male sex, minority race, rural residence, and positive medical comorbidity risk covariates. There were 8.0% current smokers, and 4.7% reported active marijuana use. (a) Smoking: When adjusted for risk covariates, current smoking was significantly associated with increased risk of hospitalization (OR=1.61, 95% CI 1.46-1.77, p<0.0001), ICU admission (OR=1.34, 95% CI 1.15-1.55, p<0.0001), and mortality (OR=1.48, 95% CI 1.15-1.91, p=0.002). (b) Marijuana use: When adjusted for age, sex, and race in model 1, marijuana use was significantly associated with increased risk of hospitalization (OR=2.41, 95% CI 2.12-2.73, p<0.0001), ICU admission (OR=1.70, 95% CI 1.43-2.00, p<0.0001), and mortality (OR=1.52, 95% CI 1.11-2.07, p=0.008). Further, when adjusted for age, sex, race, comorbidity, rural residence, and smoking in model 2, marijuana use was significantly associated with increased risk of hospitalization (OR=1.79, 95% CI 1.57-2.03, p<0.0001), ICU admission (OR=1.50, 95% CI 1.26-1.79, p<0.0001), and with borderline significant for mortality (OR=1.37, 95% CI 1.00-1.88, p=0.052). **Conclusion**: Among cases of Covid-19, patients with positive marijuana use had poorer clinical outcomes than those without, even when controlling for known risk factors such as comorbidity and smoking.

POD4-4

ASSESSMENT OF SEVERE CORONAVIRUS DISEASE 2019 OUTCOMES USING MEASURES OF SMOKING STATUS AND SMOKING INTENSITY

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Significance: Smoking status does not indicate the amount or length of tobacco use, and thus, it is an imperfect measure to assess the associations between cigarette smoking and severe coronavirus disease 2019 (COVID-19) outcomes. This investigation assessed whether cigarette smoking status, intensity of smoking (i.e., average daily packs of cigarettes smoked), duration of smoking, and pack-years of smoking were associated with severe outcomes among adults diagnosed with COVID-19. Methods: We conducted a retrospective, cross-sectional study in which we identified consecutive patients diagnosed with COVID-19 at a large, midwestern university healthcare system between March 13, 2020 and September 30, 2020 who had complete information on smoking status, severe COVID-19 outcomes, and covariates (i.e., demographics and comorbidities). We used logistic regression to evaluate the associations of smoking status and intensity of smoking with COVID-19 severity defined as hospitalization, admission to intensive care unit (ICU), or death, adjusting for sociodemographics and comorbidities. Results: Among the 4,611 COVID-19 patients included in the analysis, 18.2% were current smokers and 20.7% were former smokers. The prevalence of

COVID-19 outcomes was 28.9% for hospitalization, 9.8% for ICU admission, and 1.4% for death. In adjusted analysis, current smoking (AOR:1.23, 95% CI:1.02-1.49), former smoking (AOR:1.28, 95% CI:1.07-1.54), and pack-years of smoking (AOR:1.09, 95% CI:1.02-1.17) were associated with higher prevalence of hospitalization. Average daily packs of cigarettes smoked was associated with higher prevalence of hospitalization (AOR:1.30, 95% CI:1.10-1.53) and ICU admission (AOR:1.23, 95% CI: 1.04-1.44). Conclusion: Smoking status, pack-years, and intensity of smoking were associated with hospitalizations in patients with COVID-19 and intensity of smoking was associated with ICU admission. Findings underscore the need for detailed information beyond smoking status when evaluating smokers with COVID-19 so that the potential for adverse sequelae may be optimally managed in at-risk patients.

POD4-5

RACE, COVID-19-RELATED DISCRIMINATION CONCERN, AND CIGARETTE SMOKING BEHAVIOR: COMPARISON BETWEEN U.S. ASIAN AND WHITE ADULTS

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Significance: Anti-Asian discrimination incidents in the U.S. have resurged during the COVID-19 pandemic. It is unclear if these incidents affect Asian & Asian American (A&AA) adults in terms of concern about COVID-19-related racial discrimination and smoking behaviors as compared to White adults. We examined A&AA vs. White differences in COVID-19-related discrimination concern. Additionally, we examined associations between this concern with changes in cigarette smoking behavior. **Methods:** Data were from a U.S. representative sample of adult (≥21 years) recent and current commercial tobacco users (n=1,052), collected through an online panel oversampling A&AAs, from January-February 2021. In three items, participants reported their levels of concern, worry, and stress that "they or their families may be discriminated against, harassed, or treated unfairly because of the coronavirus outbreak" (0=Not at all, 4=Extremely). Responses were averaged across three items to represent COVID-19-related discrimination concern. We calculated changes in number of days smoked using self-reported number of cigarettes smoked at 30-days prior to the survey and at 12 months prior to the survey. We used weighted multivariable linear regression models to first examine race associations with discrimination concern, and then discrimination concern with changes in number of days cigarettes smoked, adjusting for demographics. **Results:** A&AA recent and current commercial tobacco users had higher COVID-19-related discrimination concern (adjusted mean=1.7, 95%CI=1.2-1.9) than their White counterparts (adjusted mean=0.60, 95%CI=0.48-0.69). During the pandemic, a higher proportion of A&AA (17.9%) than White adults (8.7%) reported increased number of days cigarettes smoked. Every unit increase in COVID-19-related discrimination concern was associated with 1.1 days more days smoked (95%CI=0.30-2.0). The association did not differ by race. **Conclusion:** Anti-Asian discrimination due to the COVID-19 pandemic increases psychological stress especially among A&AA adults, and in turn could lead to increased smoking frequency and related morbidity and mortality among A&AA adults.

POD4-6

FINANCIAL HARDSHIP DURING THE COVID-19 PANDEMIC AND TOBACCO DISCOUNT COUPONS REDEMPTION AMONG U.S. ADULTS

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Significance: Commercial tobacco (CT) users redeem discount coupons for CT products to manage their CT expenditures. We examined how financial hardships during the COVID-19 pandemic relate to increases in coupon use among current and recent former CT users. **Methods:** Data from a nationally representative sample of U.S. adult (ages≥21) recent former and current CT users were collected in an online panel from January-February 2021. Participants reported if they had increased use of discount coupons/promotions to save money on CT since the pandemic. Participants also reported financial hardships experienced during the pandemic (e.g., losing a job or

work-related income, depleted all or most of their savings, not having enough money to pay for food, rent or mortgage, utilities, medication, unexpected expenses, hand sanitizer, disinfectant, and face masks). The number of financial hardships experienced during the COVID-19 pandemic was summed (range: 0-7). Weighted multivariable logistic regression models were used to examine the associations between financial hardship experiences and increased coupon use, adjusting for demographics. **Results:** Overall, 8.29% of U.S. adult current and recent former CT users reported increasing CT coupon use to save money during the pandemic. Losing any work-related income (AOR=1.73, 95%CI=1.20-2.49), losing jobs (AOR=2.02, 95%CI=1.23-3.32), having to use up all/most of their savings (AOR=2.14, 95%CI=1.42-3.25), experiencing an increase in debt (AOR=2.49, 95%CI=1.73-3.61), and not having enough money to pay for food (AOR=2.35, 95%CI=1.62-3.42), rent/mortgage (AOR=2.19, 95%CI=1.51-3.18), utilities (AOR=1.92, 95%CI=1.32-2.79), and medications (AOR=2.09, 95%CI=1.44-3.05) were associated with increased CT coupon use. Every additional count of financial hardships was associated with higher odds of CT coupon use (AOR=1.19, 95%CI=1.11-1.28). **Conclusion:** Current and recent former CT users increased discount coupons use to manage their CT expenditures when facing financial hardships during the pandemic. This could hinder CT cessation and promote relapse. Prohibiting CT coupon redemption may promote CT cessation rather than perpetuate use among a vulnerable group.

POD4-7

DISPARITIES AMONG SMOKERS DURING THE COVID-19 PANDEMIC EXAMINATION OF COVID-19 RELATED WORRIES BY SOCIODEMOGRAPHIC VARIABLES IN A U.S. NATIONALLY REPRESENTATIVE SURVEY

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Significance: Underserved populations may be at higher risk for elevated stress due to the COVID-19 pandemic, including worries about finances, housing, and medical care. This is particularly important among smokers, who are at heightened risk for severe COVID-19 and for whom stress is a barrier to quitting. This study examined whether experiences with stress and worry among smokers during the pandemic differed by sociodemographic factors, and whether these factors predicted serious psychological distress (SPD). **Methods:** Data came from an October-November 2020 U.S. national representative survey of 1,223 current cigarette smokers. An adapted Domain-Specific Stress Scale assessed worries related to COVID-19 in the domains of food and job insecurity, housing instability, finances, healthcare, isolation, and racism. The Kessler-6 scale assessed SPD. **Results:** Hispanic smokers reported more worry regarding food and jobs than smokers of other ethnicities. Smokers with less than high school education indicated more worry in all domains except jobs and racism. Those with household income less than $30,000 and those who were unemployed reported greater worry in most domains. Smokers on Medicaid reported higher worry about food insecurity, finances, and isolation/loneliness. Women reported higher worry regarding food, money, medical appointments, ability to afford medical care, and isolation/loneliness. Women, those aged 30-44, those with income less than $30,000, those with less than high school education, those not working, and those on Medicaid were more likely to experience SPD. Each COVID-19 worry predicted higher likelihood of SPD when controlling for sociodemographics. When all COVID-19 worries were entered simultaneously, worries about money (aOR=2.3) and isolation/loneliness (aOR=3.0) uniquely predicted SPD. **Conclusion:** Among U.S. adult smokers, those with lower SES indicated disproportionately high worry about access to basic needs and were more likely to be experiencing SPD. Policies and interventions that address basic needs and mental health among marginalized populations of tobacco users are needed to address tobacco-related health disparities.

PAPER SESSION 5: COMMITTING TO INCLUSION AND EQUITY IN SMOKING CESSATION CLINICAL TRIALS

POD5-1

A NON-INFERIORITY TRIAL OF 25 DAYS OF CYTISINE VERSUS 84 DAYS OF VARENICLINE FOR SMOKING CESSATION - THE CESSATE STUDY

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Background. Cytisine is more effective than placebo and nicotine replacement therapy for smoking cessation. However, cytisine has not been tested against the most effective sole smoking cessation medication, varenicline, which is associated with adverse events known to lead to discontinuation of therapy. **Aim.** To examine whether standard cytisine treatment (25 days) was at least as effective as standard varenicline treatment (84 days) for smoking cessation. **Methods**. This noninferiority (NI), open-label randomized clinical trial with allocation concealment and blinded outcome assessment was undertaken in Australia. 1452 Australian adult daily smokers willing to make a quit attempt were included. Data collection was conducted primarily by telephone interview, but there was an in-person visit to validate the primary outcome. Treatments were provided in accordance with the manufacturers' recommended dosage: cytisine (n = 725), 1.5-mg capsules taken 6 times daily initially then gradually reduced over the 25-day course; varenicline (n = 727), 0.5-mg tablets titrated to 1 mg twice daily for 84 days (12 weeks). All participants were offered referral to standard telephone behavioral support. The primary outcome was 6-month continuous abstinence verified using a carbon monoxide breath test at 7-month follow-up. The NI margin was set at 5% and the 1-sided significance threshold was set at .025. **Results.** Among 1452 participants who were randomized (mean [SD] age, 42.9 [12.7] years; 742 [51.1%] women), 1108 (76.3%) completed the trial. Verified 6-month continuous abstinence rates were 11.7% for the cytisine group and 13.3% for the varenicline group (risk difference, −1.62% [1-sided 97.5% CI, −5.02% to ∞]; P = .03 for NI). Self-reported adverse events occurred less frequently in the cytisine group (997 events among 482 participants) compared with the varenicline group (1206 events among 510 participants) and the incident rate ratio was 0.88 (95% CI, 0.81 to 0.95; P = .002). **Conclusion.** Among daily smokers willing to quit, cytisine treatment for 25 days, compared with varenicline treatment for 84 days, failed to demonstrate NI regarding smoking cessation.

POD5-2

SMOKING BEHAVIORS, HEALTH CONDITIONS, PHARMACOTHERAPY USE, AND QUIT RATES IN BLACK AMERICANS WITH SERIOUS MENTAL ILLNESS

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Significance: Two communities that have been disproportionately targeted by the tobacco industry are Black Americans and those with serious mental illnesses (SMI). Both groups show high rates of smoking-related morbidity and mortality. While studies have examined the independent effects of race and SMI on smoking-related behaviors and outcomes, scarce research has evaluated the extent to which holding both identities (i.e., being Black and having SMI) may result in compounded negative outcomes. This study compares smoking behaviors and outcomes in non-Latinx Black and non-Latinx white individuals with SMI who smoke. **Methods**: This is a secondary data analysis of a PCORI-funded smoking cessation trial. The current sample consisted of 229 non-Latinx Black and 284 non-Latinx white people with SMI who smoked. Participants did not need to be ready or willing to quit smoking tobacco to participate, and were randomized to either a community health worker condition or to treatment as usual. The sample completed baseline, one-year, and two-medication evaluations of their smoking behaviors, health conditions, use of smoking cessation pharmacotherapy, as well as two-year biochemically verified abstinence. In this study, we compared baseline and longitudinal characteristics in Black versus white participants. **Results**: At baseline, Black participants smoked significantly fewer tobacco products per day than white participants but were significantly more likely than white participants to smoke menthol products. There were no racial differences in the level of nicotine dependence. Black participants were more likely to report having diabetes but less likely to report pulmonary illnesses. There were few racial differences in baseline or longitudinal use of smoking cessation medication. Overall, Black participants were 62% less likely to quit smoking than white participants. However, this effect was driven by participants who did not use medication. Among those who took medication, Black and white participants had comparable quit rates between 10-15%. **Discussion**: Pharmacotherapy interventions appear crucial to facilitate smoking cessation in Black Americans with SMI. This may be because Black Americans experience more stressors due to racism, increasing the challenge of quitting without support. Moreover, this study also highlights the importance of equitable care, showing that when gold-standard care is provided to Black and white participants, they show comparable outcomes. The study also had unexpected findings that warrant further investigation, including that white participants had more health conditions than their Black counterparts.

POD5-3

THE POTENTIAL IMPACT OF LABORATORY ASSESSMENTS OF TREATMENT MECHANISMS ON CLINICAL TRIAL REPRESENTATIVENESS AND EQUITY -- A QUASI-EXPERIMENTAL INVESTIGATION

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Significance: Experimental therapeutics, which aims to uncover the mechanisms that drive behavior change and harness them to produce more robust and efficient treatments, has the potential to reduce the science-practice gap and potentially improve population health equitably. However, our experience with a recent cessation trial suggested that pre-treatment laboratory assessments of treatment mechanisms may reduce trial enrollment, particularly among self-identified Black or African American people. The COVID-19 pandemic led us to halt the lab visits partway through the trial, allowing for a quasi-experimental test of these hypotheses. **Methods:** Participants were adult treatment-seeking cigarette smokers screened for enrollment in a randomized controlled trial (RCT; NCT03262662). Following phone and intake screening, participants completed 6 clinic visits and received cessation counseling and varenicline/placebo. Before the COVID-19 shutdown (4/2/20), participants also completed two 2+hour lab visits to assess hypothesized treatment mechanisms including reinforcement and cue reactivity (Lab Mechanism Cohort)- the first lab visit followed intake and occurred ~1 week before starting treatment, and the second lab visit occurred after ~2.5 weeks of treatment. Due to the pandemic, lab visits were halted for the remainder of the trial (No Lab Cohort). **Results:** In the Lab Mechanism Cohort, the percentage of participants eligible at intake who ultimately became Intent-to-Treat (ITT; i.e., attended Clinic 1) was lower than observed in our most recent trial (Lerman et al., 2015) and was notably lower among Black compared to White participants (65% [46/71] and 84% [196/233], respectively; p=.0004). Elimination of the lab visits was associated with a higher percentage of intake-eligible participants who became ITT (88% [21/24] and 98% [44/45] of Black and White participants, respectively, ps=.03 and .01), and the Black-White difference was attenuated and no longer statistically significant in the No Lab Cohort (p=.08). Once treatment began, retention was strong among Black and White participants in both cohorts (e.g., 93%-100% at Clinic 4, after 4 weeks of treatment). **Conclusions:** The present findings may reflect an unintended but important cost to laboratory assessments of treatment mechanisms. However, the quasi-experimental nature of the study makes it difficult to rule out confounds. If the current patterns of pre-treatment attrition are replicated (e.g., with experimental manipulations of assessment characteristics such as overnight abstinence), mechanistic trials will need to work to overcome this challenge or risk being even less relevant to real-world practice than standard RCTs, particularly for Black or African American people who already face substantial health disparities and are underrepresented in clinical trials.

POD5-4

ASSESSING THE HEALTH EQUITY EFFECTS OF CIGARETTE LABELING POLICIES, A RANDOMIZED FIELD TRIAL AMONG ADULT SMOKERS

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Significance: The potential health equity effects of different cigarette labeling policies are understudied. This experimental study assessed smokers' behavioral responses to pack inserts and pictorial health warning labels (HWLs), including differences by education and health literacy level. Methods: We conducted a 2X2 between-subject trial (inserts with efficacy messages vs. no inserts; pictorial vs. text-only HWLs), randomizing 359 adults who smoked at least 10 cigarettes a day to conditions. Recruitment included intercept strategies in disadvantaged neighborhoods. Participants received a 14-day supply of their preferred cigarette brand with packs modified to reflect their experimental condition. Each evening, participants reported cessation-related behaviors in the prior 24 hours (i.e., forgoing cigarettes, stubbing out cigarettes, and talking about smoking harms or cessation benefits). Mixed-effects logistic models regressed these behaviors on indicators of treatment group relative to control (i.e., no inserts, text-only HWLs), testing interactions between treatment and both educational attainment (high school or less vs more) and health literacy (limited vs. high literacy). Results: The sample included 42% with high school or lower education, and 30% had limited literacy. Relative to the control group, smokers in the insert only, pictorial HWL only, and insert + pictorial HWL groups were more likely to report forgoing cigarettes (OR=2.56, p=0.004; OR=2.10, p=0.02; OR=2.80, p<0.001, respectively), and those in the insert only and insert + pictorial HWL groups were more likely to report stubbing out cigarettes (OR=2.89, p=0.02; OR=5.37, p=0.0002). No differences were found for talking behaviors. The only statistically significant interaction concerned stubbing out cigarettes: high-literacy participants were relatively less likely to report this outcome if they were in insert only group compared to control. Conclusions: Both pack inserts and pictorial HWLs promote cessation-related behaviors and neither appear to reduce or exacerbate smoking disparities. Pictorial HWLs and inserts may reduce smoking, although optimal labeling policy requires further research.

POD5-5

UPTAKE AND EFFICACY OF A CO-LOCATED, OPT OUT SMOKING CESSATION SUPPORT PACKAGE DELIVERED AS PART OF A LUNG CANCER SCREENING PROGRAMME: THE YORKSHIRE ENHANCED STOP SMOKING STUDY (YESS)

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Significance: More than 85% of cases of lung cancer are caused by tobacco smoking, and stopping smoking, at any age, significantly reduces lung cancer risk. With the recommendation for annual low dose computed topography (LDCT) screening in the US and potential introduction of similar approaches across Europe offering a teachable moment for encouraging quit attempts in this high risk population, it is essential that any lung cancer screening programme provides smoking cessation support for participants. Further, doing so significantly increases the efficacy and cost efficacy of lung cancer screening programmes. Methods: The Yorkshire Enhanced Stop Smoking study (YESS) offered co-located, stop smoking support comprising NRT/e-cigarettes/varenicline and behavioural support on an opt out basis to all eligible smokers attending for a lung health check (LHC) as part of the Yorkshire Lung Screening Trial in the UK. This abstract reports initial findings relating to uptake of the offer of stop smoking support and the quit rates reported 4-weeks post LHC. Results: Of 2151 smokers eligible to receive stop smoking support as part of YESS, 1901 (88.4%) agreed to a consultation with a smoking cessation practitioner at the time of the LHC. Of these, 1603 (83.3%) agreed to receive ongoing cessation support. Approximately half of smokers used an e-cigarette to support their quit attempt, either alone or in combination with NRT. Four weeks after the LHC, 17.7% of smokers accepting ongoing cessation support were abstinent from smoking (13.2% of all eligible smokers attending for the LHC). Conclu-

sion: Study findings illustrate that the provision of a co-located, opt out, specialist stop smoking service delivered at the time of the LHC is well attended by smokers and has the potential to support quitting in a population at high risk of developing lung cancer. Policymakers should strongly consider recommending similar stop smoking provision as part of any lung cancer screening programme implemented.

POD5-6

SUBJECTIVE EXPERIENCES, CONTEXTS, AND RISK PERCEPTIONS OF VERY LOW NICOTINE CONTENT CIGARETTES AND ELECTRONIC CIGARETTES AMONG PEOPLE WITH AFFECTIVE DISORDERS WHO SMOKE

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Introduction: The FDA is considering mandating the reduction of nicotine in cigarettes to a non-addictive level. The availability of non-combusted, full-nicotine substitutes such as e-cigarettes may further help individuals switch from cigarettes under such a policy. We modeled this policy in the context of a clinical trial of people with affective disorders (ADs), who smoke at much higher rates than the general population and explored their subjective responses to using very low nicotine content (VLNC) cigarettes with or without e-cigarettes.**Methods:** We conducted semi-structured qualitative interviews with participants (N=20) who were completing a 16-week trial of VLNC cigarettes with or without electronic cigarettes. In-depth interviews were conducted to explore 1) experiences with these products, 2) social and environmental contexts for use and 3) relative risk perceptions of both products compared to usual brand cigarettes. Interviews were transcribed and analyzed using interpretive phenomenological analysis.**Results:** People with ADs were willing to use VLNC cigarettes despite negative sensory experiences. E-cigarettes helped to ease the transition from usual brand cigarettes to VLNC cigarettes. Some participants held beliefs that VLNC cigarettes could reduce cancer risk whereas others did not. In addition, some participants expressed skepticism about the safety of e-cigarettes whereas others felt e-cigarettes were a healthier alternative. Smoking restrictions or the presence of non-smokers influenced e-cigarette use in some instances, but product preference was the overriding factor that influenced use and situations for use.**Conclusions:** If a nicotine reduction policy were to be implemented, tailored messaging may be necessary to educate people with ADs about non-combustible alternatives and inform people about the lower risks of e-cigarettes relative to cigarettes.**Role of Funding Source:** This research was supported by grants F31DA049460 and U54DA036114 from the National Institutes of Health (NIH) and the Nora Kahn Piore Award from Brown University School of Public Health. This content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or Food and Drug Administration (FDA).

POD5-7

A REMOTE INTEGRATED INTERVENTION FOR TREATMENT AND SMOKING CESSATION AMONG SMOKERS LIVING WITH HEPATITIS C - A PILOT STUDY

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Significance. Despite the availability of highly effective direct-acting antiviral (DAA) medications with cure rates >95%, if left untreated, mortality rates in people living with Hepatitis C virus (HCV) remain very high and surpass other infectious diseases, including HIV. Cigarette smoking has emerged as a leading cause of mortality among people with HCV. This pilot study assessed the feasibility and preliminary efficacy of an integrated smoking cessation intervention designed to treat HCV and aid smoking cessation concurrently among people living with HCV.**Methods.** Current smokers living with HCV received a 12-week intervention delivered via phone. The integrated intervention consisted of weekly 30-min sessions involving: 1) medication; 2) medication adherence support for both HCV treatment (velpatasvir+sofosbuvir) and nicotine replacement therapy (chantix); 3)psychoeducation about both HCV and smoking; and 4) counseling. **Results.** Among 52 eligible participants, 21 (40.4%) met the inclusion criteria, and 10 were enrolled in the pilot study. The sample was 70% male, 38.4 years old on average, and all had a high school education or the equivalent. Most (70%) participants had a history of injection drug use and were receiving buprenorphine. The majority (90%) of participants started DAAs to treat HCV and 60% had an undetectable viral load at

the end of treatment. Most participants (70%) started pharmacotherapy for smoking cessation and decreased the number of cigarettes smoked per day on average from 12.6 at baseline to 8.4 at the end of treatment.**Conclusions.** The remotely delivered integrated intervention for HCV and smoking resulted in a decline on both HCV viral load and the number of cigarettes smoked per day**.** Future research warrants a confirmatory study with large sample size to test the effectiveness of the intervention in a real-world setting. Addressing both smoking and HCV can produce tremendous health benefits among people living with HCV.

PAPER SESSION 6: NOT JUST NICOTINE: PRODUCT CONSTITUTENTS AND DRUG CO-USE

POD6-1

ALTERATION OF JUUL CONTENT IN RESPONSE TO THE US FDA FLAVOR BAN

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Background: Soon after its release in 2017, JUUL captured a great share of the e-cigarette market in the US. JUUL was highly attractive to youth due to its sleek design, wide social media promotion, availability of different flavors, and "smooth" delivery of nicotine. In response to the high popularity of JUUL and similar devices among youth, the US FDA issued a ban on the sales of all flavored cartridge/pod-based e-cigarettes in February 2020. This ban exempted tobacco and menthol-flavored pods. Subsequent studies showed that users of the now-banned flavored JUUL pods (especially mint-flavored) switched to menthol-flavored pods with similar satisfaction. **Methods:** To understand this finding, we quantified menthol, other cooling agents, nicotine, propylene glycol (PG), and vegetable glycerol (VG) in JUUL pods (menthol, classic menthol, and cool mint) purchased in 2017, 2018, and 2020 (only menthol) to monitor possible differences before and after the ban. Also, we measured coil resistance, pod dimensions, and battery power output. **Results:** Nicotine concentration was found to be the same in all the tested pods except for menthol-flavored pods purchased in 2020. The PG/VG ratio was 30/70 in all the pods. Statistical analysis showed that menthol levels in pods purchased in 2020 were significantly higher than all the other pods. Also, one cooling agent isomenthol was identified by a developed GC-MS headspace method in classical menthol (2018) and menthol pods (2018 and 2020). Besides, two other cooling agents (neomenthol and neoisomenthol) were identified in cool mint pods (2017 and 2018). **Conclusion:** This finding highlights a possible maneuver by JUUL manufacturers to attract youth to menthol-flavored pods by increasing nicotine and menthol concentrations. This work calls for considering menthol level as a possible target for regulation.

POD6-2

EFFECTS OF CHERRY AND SWEET FLAVOR ORAL CUE ON NICOTINE SELF-ADMINISTRATION IN ADOLESCENT RATS

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Significance: Exposure to sweet flavorants throughout childhood may influence nicotine use during adolescence when those flavors are combined with nicotine. Indeed, tobacco products with sweet flavors (fruit, candy) are very popular among teenagers. The current study explores the impact of early exposure to sweet-associated flavorants, like cherry flavoring (benzaldehyde) and saccharin, on later nicotine-taking behavior in adolescent rats. **Methods:** Adolescent female and male Sprague Dawley rats were given a choice to consume water, benzaldehyde (0.01%), saccharin (0.32%), or a combination of benzaldehyde and saccharin for one week duration via two-bottle choice paradigm by starting postnatal day (PND) 21. On PND 28-29, rats were implanted with intraoral (IO) and intravenous (IV) catheters. On PND38, nicotine (30 µg/kg/infusion) self-administration (SA) was initiated in the presence or absence of IO flavorants. Initiation and maintenance of drug taking behavior, and motivation to work for drug delivery were determined. Moreover, two other cohorts were tested in flavorant IOSA or nicotine IVSA alone. **Results:** Rats acquired nicotine IVSA and displayed greater lever pressing than saline IVSA subjects. While saccharin alone and benzaldehyde + saccharin in combination demonstrated greater IOSA than water. Benzaldehyde alone IOSA was not different from water IOSA. On the other hand, IO benzaldehyde alone reduced nicotine IVSA in rats. However, IO saccharin or IO benzaldehyde + saccharin, when combined with IV nicotine, led to increased nicotine IVSA and drug-seeking, compared to IO water plus nicotine. **Conclusions:** Our results reveal that the characterizing sweet flavor, saccharin can increase nicotine IVSA in adolescent rats and blocked the ability of benzaldehyde to decrease nicotine IVSA. **Funding:** Research reported in this publication was supported by the National Institute on Drug Abuse of the National

POD6-5

SEX, AGE, AND GENOTYPIC DIFFERENCES IN THE EFFECTS OF MENTHOL ON NICOTINE INTAKE AND PREFERENCE IN MICE

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Significance: Accumulating evidence suggests that certain flavor additives in tobacco products may propagate nicotine dependence. Menthol, a commonly used flavorant, has been shown to exacerbate nicotine sensitivity in smokers, characterized by increased dependence scores, poorer cessation outcomes, and higher relapse rates compared to non-menthol smokers. Menthol use has also been shown to differ significantly between gender, age groups, and population subgroups, and although menthol has been a component of tobacco products for decades, its role in the initiation and maintenance of nicotine dependence is poorly understood. Comparative studies of phenotypes expressed by different inbred strains of mice could potentially identify neurobiological and genetic determinants of variability in menthol sensitivity at preclinical levels. **Methods**: The current study utilized adolescent (PND 21) and adult (PND 60), male and female C57BL/6J and DBA/2J mice to investigate the sex, age, and genotypic differences underlying the effects of menthol in the two-bottle choice (2BC) test. We chose these genetically distinct inbred strains due to their opposing preference to nicotine in the oral self-administration paradigm. Lastly, we investigated the effects of menthol after systemic administration to dissect potential mechanisms underlying menthol's effects. **Results**: Menthol (oral or systemic) significantly enhanced oral nicotine consumption in a sex-, age- and genotype-dependent manner, with females and adolescent C57BL/6J mice displaying greater sensitivity to its effects. In contrast, menthol failed to enhance nicotine preference or reduce aversion to nicotine in DBA/2J mice in the 2BC test after oral or systemic administration. **Conclusions**: These findings suggest that menthol's effects on nicotine intake and preference depend on the genetic background of the animal and support the existence of genotype-specific neurobiological and genetic mechanisms that may contribute to the variable effects of menthol in different populations.

FUNDING: Federal

POD6-3

ALCOHOL AND VAPOURIZED NICOTINE CO-EXPOSURE DURING ADOLESCENCE CONTRIBUTE DIFFERENTIALLY TO SEX-SPECIFIC BEHAVIOURAL EFFECTS IN ADULTHOOD

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Introduction: Co-occurrence of e-cigarette use and alcohol consumption during adolescence is frequent. However, little is known about their long-lasting effects when combined. Here, we examined whether adolescent co-exposure to alcohol drinking and vapourized nicotine would impact reward- and cognition-related behaviours in adult male and female rats during adulthood. **Methods:** Four groups of male and female Sprague Dawley rats (n=8-11/group/sex) received either nicotine (JUUL 5% nicotine pods) or vehicle vapour daily between postnatal days 30-46, while having continuous voluntary access to ethanol and water during this time in a two-bottle preference design. Upon reaching adulthood, rats underwent behavioural testing utilizing Pavlovian conditioned approach testing, fear conditioning and a two-bottle alcohol preference test. **Results:** A sex-dependent effect was found in the two-bottle preference test in adulthood such that females had a higher intake and preference for alcohol compared to males regardless of adolescent exposure; both male and female adult rats had greater alcohol preference compared to adolescents. Male rats exposed to vapourized nicotine with or without alcohol drinking during adolescence exhibited altered reward-related learning in adulthood, evidenced by enhanced levels of sign-tracking behaviour. Male rats that drank alcohol with or without nicotine vapour in adolescence showed deficits in associative fear learning and memory as adults. In contrast, these effects were not seen in female rats exposed to alcohol and nicotine vapour during adolescence. **Conclusions:** The present study provides evidence that co-exposure to alcohol and vapourized nicotine during adolescence in male, but not female, rats produces long-term changes in reward- and cognition-related behaviours. **Significance:** These findings enhance our understanding of the effects of alcohol drinking and nicotine vapour exposure in adolescence. Moreover, they highlight potential sex differences that exist in the response to alcohol and nicotine vapour, underscoring the need for follow-up studies elucidating the neurobiological mechanisms that drive these sex differences, as well as the long-term effects of alcohol and nicotine vapour use.

FUNDING: Federal; Academic Institution; Other

POD6-6

CHRONIC ADMINISTRATION OF SYNTHETIC CONTRACEPTIVE HORMONES ALTERS ETHANOL AND NICOTINE INTAKE IN A CO-USE MODEL IN FREELY CYCLING FEMALE RATS

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Significance: Tobacco and alcohol use disorders (TUD and AUD) are tremendous health liabilities, and co-use of these substances is highly prevalent. Women are particularly at risk, as AUD is increasing at alarming rates and long-term smoking cessation is more difficult to achieve in women than men. Ovarian hormones can affect frequency of binge drinking, as well as cigarette craving, with increases in 17β-estradiol (E2) and progesterone being associated with addiction risk and resilience, respectively. It is important to consider how exogenous synthetic hormones often found in hormonal contraceptives may influence motivation for alcohol and nicotine. However, despite widespread contraceptive use and the influence of hormones on addiction vulnerability, little is known regarding the influence of contraceptives on nicotine and alcohol co-use. The aim of this study is to determine the influence of synthetic estrogen (e.g., ethinyl estradiol, or EE) and/or progesterone (e.g., levonorgestrel, or LEVO) on nicotine and ethanol (EtOH) intake in rats. We hypothesized that female rats given LEVO will show lower rates of nicotine and EtOH intake, whereas rats given EE+LEVO will show higher rates of intake of both drugs. **Methods:** Rats first underwent a 4-hr drinking in the dark (DID) paradigm in which the water bottle was replaced with 10% EtOH or vehicle (water). Following DID, rats receive a subcutaneous injection of either LEVO, EE+LEVO, or vehicle (sesame oil) and began nicotine SA (0.06 mg/kg/infusion) on an FR1 schedule. **Results and Conclusion:** Rats that received EE+LEVO consumed more nicotine as compared to rats that received LEVO alone or vehicle. There was no difference in nicotine consumption with hormone treatment in animals that drank EtOH prior to nicotine SA. Contrary to our hypothesis, animals that received LEVO alone consumed more EtOH then either the EE+LEVO or vehicle animals. Overall, we found EE+LEVO decreased EtOH intake when EtOH was co-used with nicotine, whereas this combination increases nicotine consumption when rats are not concurrently drinking. Taken together, we found that LEVO *enhances* EtOH consumption when EtOH and nicotine are co-used,

POD6-4

EPIGENETIC ANALYSES OF ALCOHOL CONSUMPTION IN COMBUSTIBLE AND NON COMBUSTIBLE NICOTINE USERS

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Alcohol and tobacco use are highly comorbid, and exacerbate the associated morbidity and mortality of either substance alone. However, the relationship of alcohol consumption to the various forms of nicotine containing products is not well understood. To improve this understanding, we examined the relationship of alcohol consumption to nicotine product use using self-report, cotinine and two epigenetic biomarkers specific for smoking (cg05575921) and drinking (Alcohol T Scores (ATS)) in n = 424 subjects. Cigarette users had significantly higher ATS values than the other groups (p < 2.2e-16). Using the objective biomarkers, the intensity of nicotine and alcohol consumption was correlated in both the cigarette and smokeless users (R = -0.66, p = 3.1e-14; R² = 0.61, p = 1.97e-04). Building upon this idea, we used the objective nicotine biomarkers and age to build and test a Balanced Random Forest classification model for heavy alcohol consumption (ATS > 2.35). The model performed well with an AUC of 0.962, 89.3% sensitivity, and 85% specificity. We conclude that those who use non-combustible nicotine products drink significantly less than smokers, and cigarette and smokeless users drink more with heavier nicotine use. These findings further highlight the lack of informativeness of self-reported alcohol consumption and suggest given the public and private health burden of alcoholism, further research into whether using non-combustible nicotine products as mode of treatment for dual users should be considered.

FUNDING: Academic Institution; Nonprofit grant funding entity

but *decreases* nicotine consumption in animals only self-administering nicotine. Thus, these results can inform women's care by determining safer hormonal contraceptive use when women either only smoke, or concurrently drink and smoke.

PAPER SESSION 7: TOBACCO CONTROL POLICY EVALUATION: COMPLEXITY AND UNINTENDED CONSEQUENCES

POD7-1

DOES IMPLEMENTING SMOKE-FREE PUBLIC HOUSING INCREASE RESIDENT TURNOVER

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BACKGROUND. Smoke-free policies (SFPs) are adopted in public (subsidized) housing to reduce residents' secondhand smoke exposure. While the benefits of preventing secondhand smoke exposure are well-documented, any unintended consequences of SFPs relative to housing stability (a key social determinant of health) are not yet documented. We investigated whether housing transitions increased after Massachusetts public housing authorities (MA PHAs) instituted SFPs. METHODS. Demographic and tenancy data on all residents of federally-funded public housing in MA (2009-2018) were obtained from the U.S. Department of Housing and Urban Development (67 PHAs, 48,162 households in sample). Data on SFPs were obtained from public records and a survey of MA PHAs. We used Cox proportional hazards models including SFPs as time-varying covariates to assess the association between SFPs and rates of transition out of public housing within 2 years of SFP introduction among households who were admitted prior the adoptions of SFPs. The models adjusted for PHA characteristics (size, rurality) head of household (HOH) characteristics (age at admission, sex, race/ethnicity, disability, year of admission), and PHA-level random effects. Subgroup analyses were conducted by PHA funding (residence in elderly/disabled vs. family developments), PHA size, and HOH demographics. RESULTS. The earliest SFP was instituted in 2011 and by 2018, all federally-funded PHAs in MA had instituted SFPs. Overall, there were no significant associations between the introduction of SFPs and housing transitions (adjusted hazard ratio [HR] 1.03, 95%CI 0.98-1.08). After Bonferroni correction there were no significant associations in subgroups defined by PHA funding (family vs. elderly/disabled) or HOH age, sex, or race. However, in PHAs that were medium sized (100-1000 units), SFPs were associated with an increased rate of tenant departure (HR 1.22, 95%CI 1.11-1.34). CONCLUSION. Overall, in a large sample of public housing residents in MA, there is no evidence of an increase in housing transitions with the introduction of SFPs. Further research is necessary to understand transition dynamics in particular PHAs.

POD7-2

TOBACCO PRODUCT TAX RATES AND EMERGING ADULT TOBACCO USE

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Significance: While over half of US states have passed taxes on electronic nicotine delivery systems (ENDS), recent evidence linking ENDS taxes to reduced adult smoking cessation and increased adult smoking suggests potentially substantive health costs. Effects on uptake of habitual use are less clear, as analyses have not assessed ENDS tax rates' effects on smoking in emerging adulthood (ages 18-25), when over half of daily smokers report initiating daily use. **Methods:** To estimate changes in emerging adult cigarette and ENDS use following cigarette and ENDS tax rate changes, we matched state policy information to nine waves of nationally representative data from the 2010-2019 Current Population Survey's Tobacco Use Supplement. We estimate multivariable regression models for emerging adults (ages 18-25, N=38,906) to assess ENDS and cigarette taxes' relationship to recent (past-30-day) and daily cigarette and ENDS use, adjusting for nationwide time-trends, time-invariant differences in each outcome by state, and an array of potential sociodemographic and policy confounders. **Results:** Increased ENDS taxes yielded significant reductions in emerging adults' daily ENDS use (-2.5 percentage points [pp]; 95% CI: -3.7, -1.4 pp) versus increases in recent cigarette use (3.7 pp; 95% CI: 1.3, 6.1 pp) and, though marginally non-significant, daily cigarette use (2.5 pp; 95% CI: -0.05, 5.1 pp; p=0.054). Similarly, a one dollar increase in cigarette taxes was associated with 2.1 and 2.5 percentage point increases in recent and daily ENDS use, respectively. **Conclusions:** ENDS taxes were associated with reductions in ENDS use but increases in cigarette use among emerging adults. As uptake of daily use

disproportionately occurs in this age-range, this result calls for care in setting tobacco product taxes, to ensure that regulations do not inadvertently incentivize habituation of more lethal tobacco products.

POD7-3

THE EVALI OUTBREAK AND TOBACCO SALES IN THE UNITED STATES, 2014—2020

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Significance: The E-cigarette, or Vaping Product-Use Associated Lung Injury (EVALI) Outbreak of 2019 hospitalized thousands of people in the US and raised perceptions of the dangers posed to health by e-cigarettes. These illnesses along with continued increases in youth vaping rates triggered the passage of many state and federal laws intended to curtail the sales of flavored e-cigarettes. Little is known about the impact of these events on US electronic cigarette and cigarette sales. **Methods**: Using Nielsen Scantrack sales data from January 2014 to January 2020 for 23 US states, we evaluate the effect of the EVALI outbreak. First-differenced fixed-effects state-panel regressions tracking unit sales of total- and category-level e-cigarettes and cigarette sales controlling for price, time, Tobacco 21 policy coverage, product distribution, seasonality, EVALI-attributable hospitalizations, and state-level e-cigarette policies affecting the availability of e-cigarettes (non-tobacco flavored and total) were employed. **Results**: Dollar sales of e-cigarettes declined 34% from their pre-EVALI peak by February 2020. Sales of e-cigarettes declined in response to the EVALI outbreak and the total e-cigarette sales ban put in place in Massachusetts adopted in its wake, while they remained unaffected by state bans on sales of non-tobacco flavor e-cigarettes. Cigarette sales were largely unchanged by either the direct or indirect policy effects of the EVALI outbreak, except for cigarette brands smoked by young people which rose in Massachusetts. **Conclusion**: Sales of e-cigarettes declined in response to the EVALI outbreak and from the most restrictive regulatory policies that were adopted in response, while sales of cigarettes were largely unaffected.

POD7-4

FLAVOURS AND FEATURES IN TOBACCO PACKS BEFORE PLAIN PACKAGING IN URUGUAY

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Significance Marketing strategies are constantly being developed by tobacco industry, to reach new consumers such as children and youth. One of these strategies is marketing through design appeals and flavours. Uruguay is the second country to implement plain packaging legislation for cigarettes in the Americas. This study aims to explore flavouring and design features of tobacco products available near schools immediately before the implementation of plain package in Uruguay. Methods Fieldwork protocol was adapted from the one developed at Johns Hopkins University and implemented in fifteen neighbourhoods in Montevideo, Uruguay, across different socioeconomic areas. A high school was selected per neighbourhood as the hub, from which the protocol was started. We surveyed retailers, purchased tobacco, and coded according to its characteristics. Results A total of 23 unique tobacco products were purchased. Appealing design features were found in 17 of the 23 packs, and 8 of the 23 products were flavoured cigarettes. Flavoured cigarettes lacked the child protection warning in a greater proportion than non-flavoured ones. Also, flavoured products were available in at least one retailer for across all socioeconomic levels. The most frequently found filter designs concerned the activation of flavour with ball or capsule designs (7/21), and features meant to imitate technological symbols that appeal to youth (3/21). Conclusion Our study shows an increase in availability of flavoured cigarettes in Uruguay immediately before plain packaging implementation according to previous report. However, proliferation of flavoured packs is much lower than other countries in the region, possibly attributable to the single presentation requirement. In countries developing plain packaging legislation flavour proliferation and modification of design features must be especially monitored and addressed

POD7-5

HOW DID CIGARETTE SMOKING CHANGE IN JAPAN AS HEATED TOBACCO PRODUCTS RAPIDLY ASCENDED? FINDINGS FROM THE 2018-2020 ITC JAPAN SURVEYS

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Significance: Heated tobacco products (HTPs) were launched in Japan in 2016. Since then, cigarette sales have decreased by >40% and HTP sales now account for 30% of total tobacco market. We examined whether the increase in HTPs in Japan was accompanied by significant decreases in smoking on two measures: (1) percentage of daily smokers, and (2) cigarette consumption. **Method**: Data came from adult (aged 20+) smokers (≥weekly) who participated in at least one of three ITC Japan Surveys conducted in 2018 (Wave 1, W1; n=3810), 2018-2019 (W2, n=2728), and 2020 (W3, n=2757). The analyses were conducted among exclusive cigarette smokers (ES) and concurrent (i.e., dual) users (CU: smoke and use HTPs ≥weekly). Cross-sectional analyses examined differences across the three waves in smoking and HTP use. **Results:** Among all smokers the percentage of CU increased from 6.3% (W1) to 36.4% (W3; p<0.001), while ES decreased from 93.7% (W1) to 63.6% (W3; p<0.001). Overall, the percentage who smoked daily was unchanged between 2018 and 2020 (96.0% to 93.6%, p≥0.05); however, among CU only, the percentage who smoked daily decreased significantly from 97% to 92% between 2018 and 2020, p<0.001. No statistical differences in CPD were observed overall or separately for ES or CU between 2018 and 2020. **Conclusion:** From 2018 to 2020, there was a nearly six-fold increase in concurrent use. Although the percentage of daily smokers did not change among exclusive smokers, percentage of daily smokers decreased slightly among concurrent users. Cigarette consumption did not change among all smokers. These findings show that in Japan from 2018 to 2020, when HTP use continued to increase, this was not accompanied by substantial changes in daily smoking or cigarette consumption.

POD7-6

USING A BITE-STYLE MODEL TO EVALUATE POLAND'S MENTHOL CIGARETTE BAN

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Significance: In May 2020, the European Union Tobacco Products Directive mandated that EU member states, including Poland, ban the sale of menthol cigarettes. With menthol making up 28% of cigarette sales before the ban, Poland is the country with the largest menthol cigarette sales share in the world to ban their sale. We analyze how this ban changed the Polish tobacco market. *Methods*: We use monthly NielsenIQ sales data (May 2018—April 2021) on sales of cigarettes and roll-your-own tobacco by menthol and standard flavor in 8 regions of Poland. We set up a bite-style regression model controlling for pre-ban menthol share, climate, border opening status, and Apple movement data to estimate the effect of the May 2020 menthol ban. We perform an event study to confirm whether the parallel trends assumption is met. *Results*: We find that menthol cigarette sales fell at least 97% after the menthol cigarette ban across Poland and standard cigarette sales rose in their place. Regression modeling indicates that total cigarette sales fell, after the ban, an average of 2.3 sticks per capita per month, equal to a 2.9% decline, however, results were not significant (p=.107). The bite component of our model reveals effects were significantly larger in regions with more pre-ban menthol sales share. Roll-your-own tobacco sales increased by 1.1 stick-equivalents after the ban (p=.014). Roll-your-own tobacco and cigarette prices also fell in the wake of the menthol ban. *Conclusions*: In Poland, the EU state most exposed to the bloc's menthol cigarette sales ban, we find mixed evidence that the ban is working as intended. Further research is needed to understand compensatory behaviors by smokers and tobacco companies in the face of such policies.

POD7-7

IS THE EU JUUL VAPING DEVICE SUFFICIENTLY SATISFYING TO UK SMOKERS: COMPARING THE SUBJECTIVE EFFECTS AND NICOTINE ABSORPTION LEVELS FOLLOWING USE OF THE EU AND THE US JUUL POD

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*Background:*Pod Vaping Devices (PVD) such as JUUL have become extremely popular in the US and their popularity is growing in the UK. A key difference between the US and the UK is the nicotine strength which is typically 59mg/mL in the US but capped at 20mg/mL in the UK and EU. This may limit the ability of EU vaping devices to deliver satisfactory nicotine levels and promote smoking cessation especially for highly nicotine dependent smokers. The primary aim was to compare the EU JUUL (18mg/mL nicotine strength) with the US JUUL (59mg/mL) on daily smokers' subjective experiences, craving relief and blood nicotine levels. *Methods:* Double-blind, counter-balanced within-participants design with 2 conditions: 18mg/mL vs. 59mg/mL. N=21 (11 Males, 10 Females) UK smokers vaped ad libitum for 60 mins and provided blood samples at baseline 5, 15, 30 and 60 mins on 2 separate occasions. Craving and withdrawal symptoms were measured at baseline, 10 and 60 mins and subjective effects at 10 and 60 mins. *Results:*Liquid consumption was doubled under the 18 versus the 59mg/mL (p=.001) and plasma nicotine levels were significantly higher in the 59mg/mL at all time-points (p≤.001). There were no differences in subjective effects including craving, withdrawal symptoms relief or satisfaction (all ps>.05). Throat hit scores were significantly greater in the 59mg/mL at 10 (p=.030) and 60 mins (p=.031). Participants reported a greater likelihood to replace their cigarettes with the device when using the 18mg/mL compared to the 59mg/mL nicotine strength at 10 mins. *Discussion:* Plasmanicotine levels were greater under the 59mg/mL despite participants vaping double the quantity of liquid in the 18mg/mL nicotine strength. The differences in liquid consumption suggest an attempt to compensate for lower nicotine levels which may have been successful at least subjectively, given scores in subjective effects (including changes in craving, withdrawal symptoms relief and satisfaction) did not differ.

PAPER SESSION 8: BIDIRECTIONAL RELATIONSHIP BETWEEN MENTAL HEALTH AND NICOTINE USE

POD8-1

ESCALATION OF ENDS USE ACROSS YOUNG ADULTHOOD - ASSOCIATIONS WITH DEPRESSIVE SYMPTOMS AND SENSATION SEEKING

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Significance: Depressive symptoms and sensation seeking are important risk factors for the development of tobacco use behaviors. However, the interactive effects of depressive symptoms and sensation seeking on tobacco use changes across young adulthood have not been explored. The purpose of this study was to 1) examine intraindividual change in frequency of ENDS use across young adulthood, ages 18-30, and 2) determine if depressive symptoms and sensation seeking, independently and in interaction with one another, influenced these changes. Methods: This study used six waves of web-based longitudinal data (fall 2015-spring 2019) from the Marketing and Promotions Across Colleges in Texas project (Project M-PACT). Participants were 1,298 young adults who were 18-25 when recruited and who reported past 30-day ENDS use on at least one wave (mean age in fall 2015 is 21.6 (SD)=1.89; 36.3% White, 56.3% Women). We used growth curve models for an accelerated longitudinal design to examine if the frequency of ENDS use (number of days used in the past 30 days) changed across increasing ages. We also examined if depressive symptoms and sensation seeking, independently and in interaction with one another, were associated with changes in ENDS use. Results: Frequency of ENDS use increased with increasing age (b = 0.44, p < .001). Depressive symptoms, but not sensation seeking, were independently associated with a faster increase in ENDS use frequency across increasing age (b = 0.11, p < .01). The two-way interaction between sensation seeking and depressive symptoms was significant (b = 0.21, p < .05). Probing the interaction indicated that young adults with elevated depressive symptoms used ENDS more frequently, but only when they had high levels of sensation seeking (b = 0.32, p = 0.02), and not low levels (b = -0.09, p = 0.52). Conclusions: Evidence indicates that young adults high in sensation seeking may be more sensitive to the mood-altering effects of nicotine than their peers. Those with elevated depressive symptoms may use ENDS to alleviate negative affect, but only when they are also high in sensation seeking. Interventions for young adults high in both sensation seeking traits and depressive symptoms may help prevent escalation of ENDS use over time.

POD8-2

STRESS AND E-CIGARETTE USE AMONG YOUTH AND YOUNG ADULTS: A LONGITUDINAL EXAMINATION OF INITIATION, REUPTAKE, AND CONTINUATION

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Objectives: E-cigarettes are the most commonly used tobacco product among youth and young adults. While much is known of the relationship between e-cigarette use and indicators of poor mental health (eg, depression), limited research has examined how stress impacts e-cigarette use among young people. We examine the longitudinal associations between perceived stress score (PSS) and e-cigarette use behaviors among a diverse cohort of youth and young adults. **Methods:** This study analyzed two waves of data collected in Fall 2019 (baseline) and Spring 2020 (6-month follow-up) of the Texas Adolescent Tobacco and Marketing Surveillance (TATAMS) system. Participants were classified into three mutually exclusive subsamples: (1) n=1,177 never e-cigarette users; (2) n=806 ever but not current (past 30-day) users (ie, former users); and (3) n=257 current (past 30-day) e-cigarette users. Three multivariate logistic regression models examined the relationship between stress (PSS) at baseline and: (1) initiation among never users; (2) reuptake among former users; and (3) continuation among current users, at 6-month follow-up. Models controlled for race/ethnicity, sex, age, past 30-day alcohol use, and ever other tobacco use at baseline. **Results:** Mean age for each subsample ranged from 18.6 to 19.4 at baseline. Hispanics were the largest group among never (37.7%) and former (40.4%) users. Non-Hispanic Whites were the largest group among current users (48.3%). Risk for e-cigarette initiation increased by 1.56 (95% CI: 1.04 - 2.35) for each unit increase in PSS at baseline. Risk for e-cigarette reuptake increased by 1.38 (95% CI: 1.00 - 1.98) for each unit increase in PSS at baseline. PSS at baseline was not associated with e-cigarette continuation among current users. **Conclusion:** Stress predicted greater risk of e-cigarette initiation among never users and reuptake among former users 6-months later. Research and prevention strategies should consider stress as an important risk factor for e-cigarette use among young people, especially as the health effects of e-cigarette use emerge, particularly respiratory illness like EVALI and COVID-19.

POD8-3

INTERNALIZING AND EXTERNALIZING PROBLEMS ON THE AGE OF E-CIGARETTE INITIATION IN THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) USA YOUTH (2013-2017)

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Objective Internalizing and externalizing problems have been shown to be associated with e-cigarette initiation in youth. Yet, it is unknown if internalizing and externalizing problems increase the risk of an earlier age of initiation of e-cigarette use in youth. **Methods** Secondary analyses of PATH youth (12-17) waves 1-4 (2013-2017) were conducted. Among never e-cigarette users at the first wave of PATH participation (n=16,143; N=29,349,76), the age of initiation of ever and past 30-day e-cigarette use was estimated using follow-up surveys in 2014-2017. The GAIN-SS is a validated measure for internalizing and externalizing problems in youth. Youth were classified as having none/low (0-1 symptoms), moderate (2-3 symptoms), and high (≥4 symptoms) internalizing and externalizing problems in the past year measured at the wave prior to e-cigarette initiation for youth who become users and at the latest wave of participation for youth who remained non-users. Four weighted interval-censored Cox proportional hazard models were fitted to estimate the relationship between internalizing and externalizing problems and the age of initiation of each e-cigarette use outcome while adjusting for sex, race/ethnicity, previous use of other tobacco products (cigarettes, any cigar product, hookah, and smokeless tobacco), and psychoactive substances (alcohol, marijuana, prescription opioid drugs, and any other substance). Weighted interval-censored survival analyses were used to estimate the hazard function for the age of initiation of each outcome stratified by internalizing and externalizing scores. **Results** Youth with high internalizing problems had increased risk of initiating ever (AHR=1.87;95%CI=1.69-2.05) and past 30-day (AHR=1.88;95%CI=1.58-2.18) e-cigarette use at earlier ages compared to youth with none/low internalizing problems. Youth with high externalizing problems had increased risk of initiating ever (AHR=2.48;95%CI=2.22-2.76) and past 30-day (AHR=2.46;95%CI=2.05-2.98) e-cigarette use at earlier ages compared to youth with none/low externalizing problems. **Conclusion** E-cigarette prevention efforts should target youth with high internalizing or externalizing problems.

POD8-4

PSYCHOSOCIAL PREDICTORS OF LONGITUDINAL CHANGES IN TOBACCO AND MARIJUANA USE AMONG YOUNG ADULTS FROM 2018 TO 2020

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Significance: Young adults decreased their use of cigarettes but increased use of alternative tobacco products (ATPs) and marijuana in recent years. Research is needed to examine intraindividual changes in tobacco product and marijuana use during young adulthood, as well as related psychosocial predictors. **Methods:** We analyzed data from 3,006 participants (ages 18-34) in a 2-year, 5-wave longitudinal study (2018-2020), including baseline sociodemographics, depressive symptoms, personality traits, and adverse childhood experiences (ACEs) and waves 1-5 past 6-month use of cigarettes, e-cigarettes, traditional cigars, little cigars, smokeless tobacco [SLT], hookah, and marijuana. **Results:** Participants were, on average, 24.56 years old (SD=4.72), 54.8% female, 31.6% sexual minority, 71.6% White, 5.3% Black, 12.2% Asian, and 11.4% Hispanic. Baseline past 6-month use prevalence ranged from 5.2% for SLT to 47.4% for marijuana. Latent growth modeling indicated that, on average, participants decreased in their likelihood of using each tobacco product, but did not change in their likelihood of using marijuana over time. After controlling for sociodemographics, predictors of less decrease in use likelihood over time were: for cigarettes and traditional cigars, ACEs; for e-cigarettes, extraversion; for little cigars, depressive symptoms and extraversion; for SLT, openness; and for hookah, neuroticism. Predictors of more rapid decrease in use were: for e-cigarettes and hookah, conscientiousness; and for marijuana, agreeableness. Also, older age predicted slower decrease over time in use of cigarettes, cigars, and SLT. Being White predicted slower decrease over time in e-cigarette and cigar use, but being racial/ethnic minority was associated with slower decrease in cigarette and marijuana use. **Conclusion:** While some psychosocial factors (e.g., conscientiousness) may promote more rapid decrease in substance use, others (e.g., extraversion, stressful events, mental health) may differentially impact risk for ongoing or escalating use of tobacco products and marijuana. Intervention efforts may address such factors to reduce young adults' use or escalation in use.

POD8-5

EXAMINING THE LONGITUDINAL, INTERACTIVE ASSOCIATIONS OF DEPRESSIVE SYMPTOMS AND PEER TOBACCO USE ON YOUNG ADULT TOBACCO USE

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Significance: Previous research indicates that depressive symptoms and peer tobacco use are independently associated with young adults' tobacco use. Few studies, however, examine the interaction between these two factors. This study examined if peer tobacco use moderated the longitudinal impact of depressive symptoms on subsequent tobacco use. We hypothesized that 1) elevated levels of depressive symptoms would be associated with a greater number of tobacco products used across ages 18-30 and 2) this association would be stronger among those with a greater number of tobacco-using peers compared to those with fewer tobacco-using peers. **Method**: Participants were 4,534 young adults participating in eight waves of Project M-PACT, spanning a 4.5-year period (2014-2019). At Wave 1, participants were 18-25 years old (*M*=20.6; *SD*=1.81); 64.2% female; 35.2% non-Hispanic white, 31.0% Hispanic/Latino, and 33.8% another race/ethnicity. Growth curve modeling within an accelerated longitudinal design was used to test study hypotheses. **Results**: Depressive symptoms did not amplify or attenuate the rate of change in number of tobacco products used as young adults aged, however, elevated depressive symptoms were associated with a greater number of tobacco products used concurrently (t[24,761]=6.86, p<.001) and at least six months later (t[24,700]=6.75, p<.001). Results from the depressive symptoms X peer tobacco interaction indicate that elevated depressive symptoms were associated with a greater number of tobacco products used concurrently (t[24,233]=5.11, p<.001) and at least six months later (t[24,035]=3.48, p<.001), but only amongst those with a greater number of tobacco-using peers. **Conclusions**: This study extends prior research by indicating that depressive symptoms do not elevate risk of tobacco use for all young adults. Rather, depressive symptoms are associated with tobacco use only for young adults with a greater number of tobacco-using peers. Those experiencing depressive symptoms may rely on peers for emotional support. However, tobacco-using peers may encourage

and model use, and thus elevate risk for tobacco use. Results point to the continued importance of peers in young adult tobacco use and underscore the need for prevention and intervention programs that address young adults' peer contexts.

POD8-6

DISCRIMINATION, NICOTINE WITHDRAWAL, AND THEIR ASSOCIATIONS WITH INSOMNIA SEVERITY IN A SAMPLE OF SMOKERS

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SIGNIFICANCE: Insomnia is commonly associated with numerous negative health outcomes, including cardiovascular disease, obesity, anxiety, and depression among others. Racially underrepresented groups tend to experience more severe insomnia and everyday discrimination has been found to drive such association. Also, ample evidence suggests that smokers tend to experience significant sleep problems since nicotine interacts with neurotransmitters that alter the sleep-wake cycle. In addition, previous research has shown a well-established positive relationship between nicotine dependence and everyday discrimination, and some evidence suggests that discrimination can also have an impact on tobacco withdrawal experiences, specifically in mood and cognitive-related aspects of withdrawal. However, no studies to date have evaluated nicotine withdrawal as a potential mediating factor in the relationship between discrimination and insomnia severity. **METHODS**: The present cross-sectional survey of N=61 (67.2% female) current smokers investigated the indirect effects of everyday discrimination on the daytime and nighttime components of the Insomnia Severity Index (ISI) Scale, with nicotine withdrawal as the proposed variable mediating the relationship. **RESULTS**: Multivariate analyses supported a statistically significant indirect effect of everyday discrimination on the total ISI score as well as each of the seven components of the ISI scale through nicotine withdrawal. The direct effect of everyday discrimination on certain ISI outcomes was not significant: difficulty falling asleep (p=0.37), difficulty staying asleep (p=0.20), issues waking up too early (p=0.41), and interference of sleep problems on daily life (p=0.09). **CONCLUSIONS**: Smokers experiencing perceived everyday discrimination might be at increased risk of experiencing specific insomnia-related outcomes exacerbated by nicotine withdrawal. Future work is necessary to understand possible implications for smoking relapse and success of smoking cessation programs. [**Funding:** National Institute of Drug Abuse R01DA046096]

PAPER SESSION 9: IDENTIFYING AND ELIMINATING ENDURING DISPARITIES IN TOBACCO USE AMONG SEXUAL AND GENDER MINORITY ADULTS

POD9-1

CHANGES IN SEXUAL IDENTITY OVER TIME AND INCREASES IN TOBACCO USE

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Significance: Sexual minority individuals are at increased risk for tobacco use. However, despite considerable evidence that sexual identity changes over time for some individuals, sexual identity is often conceptualized as static in epidemiologic studies. This static conceptualization may mischaracterize tobacco risk groups. This study examines associations of sexual identity fluidity (i.e., at least one change in sexual identity) and sexual identity stability (i.e., no change in sexual identity) with increases in tobacco use and nicotine dependence. **Methods:** We used data from Waves 1-4 of the Population Assessment of Tobacco and Health (2013/14- 2016/18) study (ages 14 and older; n = 25,889). Individuals were categorized into four sexual identity groups based on reported sexual identity across four waves: heterosexual-stable, gay/lesbian-stable, bisexual-stable, or fluid. Using multivariable logistic regression, we examined associations of sexual identity fluidity and stability with increases in the number of tobacco products and symptoms of nicotine dependence from Wave 1-4 among males and females. **Results:** Among males, sexually fluid individuals were more likely to increase the number of tobacco products used (aOR[adjusted odds ratio]=1.50; 95% CI=1.06,2.12) and increase nicotine dependence symptoms (aOR=1.50; 95% CI=1.04,2.17) compared to heterosexual-stable individuals. Gay-stable males were less likely to increase the number of tobacco products used (aOR=0.37; 95% CI=0.15, 0.94) compared to heterosexual-stable males. Among females, sexually fluid individuals were more likely to increase the number of tobacco products used (aOR=1.35; 95% CI=1.06,1.71) and increase nicotine dependence symptoms (aOR=1.34; 95% CI=1.02,1.76) compared to heterosexual-stable individuals. Bisexual-stable and gay/lesbian-stable females were not more likely than heterosexual-stable females to increase the number of tobacco products or nicotine dependence symptoms. **Conclusions:** Sexual fluidity may be a marker of risk for increases in tobacco use for males and females. Individuals experiencing changes in sexual identity may need tobacco use interventions and support resources to prevent increases in tobacco use.

POD9-2

DISPARITIES IN COMBUSTIBLE TOBACCO USE ACROSS SEXUAL IDENTITIES: COMPARISON OF GAY/LESBIAN, BISEXUAL, AND QUESTIONING YOUTH (2015-2019)

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Significance: Combustible tobacco use is a leading cause of death and disability in the United States. Previous research suggests a disparity in combustible tobacco use among sexual minority youth (SMY), or adolescents who identify as gay/lesbian, bisexual, or not sure ("questioning"), when compared to heterosexual youth. This study aims to explore this disparity as well as differences in combustible tobacco use among gay/lesbian, bisexual, and not sure ("questioning") groups that comprise SMY. *Methods:* Data were pooled from the 2015-2019 Youth Risk Behavior Surveillance Survey. Participants were 9th through 12th grade high school students (n = 37,131). A subsample of students who identified as gay/lesbian, bisexual, or 'not sure' was also analyzed (n = 5,020). Weighted, adjusted analyses were conducted to determine associations between sexual identity and combustible tobacco use. *Results:* Sexual minority youth (SMY) had 1.76 higher odds of using combustible tobacco compared to heterosexual youth, controlling for covariates. Subsample analyses revealed youth who identified as gay/lesbian (aOR: 0.71) or not sure/questioning (aOR: 0.69) had lower odds of combustible tobacco use relative to youth who identified as bisexual, controlling for covariates. *Conclusion:* This study shows that sexual minority youth (SMY) status,

particularly bisexual identity, is associated with greater odds of combustible tobacco use. Tobacco prevention and cessation interventions need to be expanded to meet the unique needs of the SMY community.

POD9-3

CIGARETTE AND CIGAR BRAND PREFERENCES AMONG SEXUAL MINORITIES IN THE UNITED STATES

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Introduction: Tobacco use is higher among lesbian/gay and bisexual (LGB) adults, relative to heterosexual adults. Tobacco companies have targeted their marketing efforts toward the LGB community, which may influence cigarette and cigar brand preferences. The current study used a nationally representative sample to examine differences between LGB and heterosexual adults on cigarette and cigar brand preferences. Differences between lesbian/gay and bisexual adults, as well as by sex (male vs. female), were also examined. **Methods:** Data were pooled from the 2015-2019 National Survey on Drug Use and Health (N=210,392; 7.13% LGB). Participants reported on their past 30-day use of cigarettes and cigars (yes/no). Past 30-day users reported the brand they most often used. **Results:** LGB adults were more likely to use cigarettes and cigars in the past 30-days. Controlling for demographic covariates, multivariable logistic regression analyses revealed that LGB adults were more likely to use Camel and Natural American Spirit cigarettes, but less likely to use Marlboro cigarettes, relative to heterosexual adults. There were no differences between LGB and heterosexual adults on cigar brand preference. Heterosexual males were more likely to use Backwoods cigars compared to heterosexual females. Among heterosexual and bisexual participants, females were more likely to use Swisher Sweets compared to males. **Conclusions:** Tobacco marketing targeting LGB adults may impact brand preference, particularly for cigarettes. Policies should be implemented to regulate tobacco marketing to the LGB community in order to reduce tobacco use disparities.

POD9-4

PROJECT RESIST: A CASE STUDY ON LESSONS LEARNT FROM USING A COMMUNITY-ENGAGED RESEARCH PROCESS TO DEVELOP TAILORED ANTI-SMOKING MESSAGES FOR YOUNG ADULT SEXUAL MINORITY WOMEN

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Project RESIST aimed to create and evaluate tailored anti-smoking messages for young adult sexual minority women (SMW) and engage with community partners to increase future adoption and sustainment of the communication intervention. We present a case study on how the community-engaged formative research process directly informed the message design.Methods: Our approach integrates inoculation theory, minority stress theory and resilience frameworks, community-engaged research principles, and implementation science. We used a multiphase mixed methods study design in this project. We first reviewed and extracted anti-smoking arguments from anti-smoking campaigns targeting young adults and LGBTQ audiences. Next, we engaged with four LGBTQ community leaders for input on appropriate anti-smoking arguments, visual treatments, and representation of SMW from diverse backgrounds. We surveyed young adult SMW to assess perceived effectiveness targetedness, and reactance quantitatively. We also examined their qualitative emotional responses to and evaluations of draft and finalized messages. Finally, we interviewed 22 key informants from LGBTQ-serving community organizations to assess their needs and preferences for adopting evidence-based anti-smoking communication interventions.Results: We obtained 825 unique anti-smoking

arguments from over 1800 campaign messages. We developed and pretested 34-38 unique arguments using two surveys iteratively. We conducted two additional surveys to compare SMW's ratings and open-ended comments of 3 message concepts and 21 images and integrated the results to develop 30 anti-smoking messages that we tested in a separate survey of SMW. Throughout the formative research process, we obtained community leaders' input on messaging decisions and organizations' needs and preferences to inform our selection of 20 finalized messages that will be used in an intervention trial. Discussion: The community-engaged research process yielded a diverse set of promising anti-smoking messages tailored for young adult SMW. We gained new insights regarding messages more likely to be adopted by a broad range of LGBTQ-serving community organizations.

POD9-5

DO LESBIAN GAY BISEXUAL TRANSGENDER AND QUEER (LGBTQ) CUES IN MESSAGES DESIGNED FOR WOMEN IMPACT SUPPORT FOR TOBACCO CONTROL POLICIES

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Significance: Tobacco control policies are essential for reducing tobacco use prevalence in the United States. We studied the impact of anti-smoking messages targeting sexual minority women (including lesbian/gay, bisexual, or other sexual orientations) on tobacco control policy support for sexual minority and heterosexual women because in other contexts minoritized group cues have had negative effects on policy support. **Methods**: This study was a two (cue-condition: cue absent vs. cue present) by six (message repetition, randomly selected from 28 messages) mixed factorial design, participants were randomly assigned to a cue present or abstence condition. Messages in the cue condition included a tagline referencing LGBTQ health and a rainbow logo. Identical messages in the no-cue condition referred to women's health and used a dark pink logo. We measured policy support before and after viewing all messages using eight items (e.g., "Increasing taxes on tobacco products"). We asked participants whether they favored or opposed each policy and computed the sum of policies they were in favor of pre-exposure (M=4.64, SD=2.26) and post-exposure (M=5.77, SD=2.40). **Results**: Participants (M_{age}=24.13, SD_{age}=3.68, range=18-30) (N=306) identified as either bisexual (N=74), lesbian (N=103) or heterosexual (N=125) and the majority were non-smokers (N=275). Using an ANCOVA with post-message policy support as the dependent variable, cue-condition as an independent variable, and adjusting for pre-message policy support and sexual orientation, we found a significant main effect of the pre-exposure policy support $F(1, 299) = 1,080.58$, $p < .001$, $\eta^2 = 0.7$, a significant main effect of cue-condition $F(1, 299) = 4.00$, $p = .046$, $\eta^2 = 0.0$ such that there was more policy support when sexual and gender minority cues were present, and a main effect of sexual orientation $F(2, 299) = 8.74$, $p < .001$, $\eta2 = 0.01$ such that heterosexual participants responded more favorably to policy support across conditions. **Discussion**: Sexual minority women were less likely to support policies, irrespective of condition but there were no negative impacts on support of sexual and gender minority cues being present. Findings from this study should be replicated with a larger sample. Concerns of tobacco policies should be considered in this community.

POD9-6

LGBTQ+ REACTION TO A MENTHOL CIGARETTE BAN: A QUALITATIVE STUDY

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Significance: For decades, the tobacco industry targeted the LGBTQ+ community with tailored community and print advertisements as well as sponsorship of pride events contributing to the higher smoking prevalence observed in this population relative to cisgender/heterosexual adults. Recently, the FDA proposed a ban on the sale of menthol cigarettes, which are disproportionately smoked by LGBTQ+ people. Thus, the purpose of this qualitative study was to explore menthol smoking and reactions to a potential

menthol ban among LGBTQ+ people. **Methods:** We conducted a multi-session lab study using the Experimental Tobacco Marketplace (ETM). During the ETM task, participants (N=40) could buy menthol and non-menthol cigarettes, menthol and tobacco flavored e-cigarettes, little cigars/cigarillos, smokeless tobacco, or medicinal nicotine from an online store. Across task trials, the price of menthol cigarettes increased to simulate potential menthol regulations including a ban while prices for the other tobacco products (OTP) remained the same. At their highest price, menthol cigarettes were unaffordable so most had to purchase OTPs or abstain. Participants received these OTPs to use at home. At the last visit, we completed follow-up interviews asking participants about (1) smoking their preferred menthol cigarettes, (2) using OTPs instead of menthol cigarettes, and (3) their attitudes towards a menthol ban. **Results:** LGBTQ+ participants (n=8) were on average 28.3 years old (SD=10.2), 38% female, and smoked 15.6 (SD=6.6) cigarettes per day. Participants reported smoking their menthol cigarettes due to enjoying the flavor. Most viewed smoking as a communal social activity. Half reported their partner also smoked and this contributed to difficulty quitting. All participants took home e-cigarettes and reacted positively to the mint/menthol e-liquid flavors. The majority said they would switch to e-cigarettes if menthol cigarettes are banned. Half of the participants supported the ban because they felt menthol cigarettes were more harmful than non-menthol cigarettes. **Conclusions:** Our findings indicate menthol e-cigarettes may be appealing substitution products for LGBTQ+ individuals if the FDA proceeds with banning menthol cigarettes. However, switching completely to e-cigarettes may be difficult due to the highly social component of smoking in the Queer community. Further research is needed to identify methods for facilitating switching to less harmful products and/or increasing cessation in this priority smoking population.

POD9-7

RESPONSE TO HYPOTHETICAL E-LIQUID FLAVOR RESTRICTIONS AMONG SEXUAL AND GENDER MINORITY YOUNG ADULTS

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Significance: Sexual minority (e.g., asexual, bisexual, gay) and gender minority (e.g., transgender, genderfluid) adolescents and young adults (AYAs) may be at increased risk to use e-cigarettes (ECs). This study examined EC use characteristics and intentions to continue vaping should a hypothetical product standard limiting EC e-liquid flavor occur. **Method**: Participants (N=1,504) were AYA past 30-day EC users, aged 14-21 (M^{Age} = 18.2 years, SD = 1.9 years) from a larger, national cross-sectional convenience sample. Participants answered questionnaires about preferred e-liquid flavor, nicotine dependence, and demographic/gender/sexual identity characteristics. Binary logistic regression models examined yes/no responses to a hypothetical product standard (e.g., "Would you still vape if only [tobacco/menthol] flavor was available?"). Independent-samples t-tests compared age of initiation, frequency of use, and nicotine dependence. **Results**: Gender (M^{Age} = 16.0 years, SD = 2.3 years) and sexual minority (M^{Age} = 16.3 years, SD = 2.1 years) AYAs reported initiating EC use significantly earlier than their cisgender (M = 16.6, SD = 2.0), p = 0.04) or heterosexual (M = 16.7, SD = 2.0), p < 0.001) peers. Sexual minority AYAs reported higher nicotine dependence (M = 1.37, SD = 1.1), p = 0.03) compared to heterosexual AYAs (M = 1.26, SD = 1.06). No differences were observed for frequency of use or preferred current flavor. Compared to their heterosexual and cisgender peers, sexual minority AYAs were more likely to continue vaping under the menthol hypothetical (aOR = 0.70, 95%CI: 0.55-0.90) and gender minority AYAs were more likely to continue vaping under the tobacco hypothetical (aOR = 0.38, 95% CI: 0.18-0.79) product standard. **Conclusions**: In this study, compared to their cisgender and heterosexual peers, AYAs who identify as sexual or gender minorities reported initiating EC use at an earlier age and sexual minority AYAs reported increased nicotine dependence. Further, a flavor product standard may impact AYAs differently. Future and more comprehensive research is needed to identify and evaluate EC-related disparaities, particularly among young people.

PAPER SESSION 10: SMOKING CESSATION FOR MEDICALLY VULNERABLE POPULATIONS

POD10-1

CONTINUOUS GLUCOSE MONITORING TO EXPLORE THE ACUTE EFFECTS OF SMOKING CESSATION ON GLYCEMIC CONTROL AMONG AMERICAN INDIAN SMOKERS WITH TYPE 2 DIABETES

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Introduction: American Indian populations in Oklahoma have a higher prevalence of type 2 diabetes mellitus (T2DM) and commercial cigarette smoking compared to other racial groups. Smoking cessation is known to paradoxically increase HbA1c for up to three years, but the acute effects on glycemic control are unknown. We examined the feasibility of using continuous glucose monitoring (CGM) and mobile health (mHealth) to understand acute effects of cessation on glycemic control. **Methods:** We recruited T2DM adult current smokers in the Cherokee Nation Health System willing to make a smoking cessation attempt. Patients wore two 14-day FreeStyle Libre Professional CGM sensors to examine changes in mean glucose, desired time in range (TIR) defined as 70-180 ml/dL, and glycemic variability (GV) two weeks pre- and two weeks post-quit. Patients completed daily smartphone assessments using mHealth to report cigarettes, meals, exercise, and nicotine replacement therapy. Remote carbon monoxide (CO) sensors were used to biochemically verify abstinence. Patients also completed an exit interview to describe experiences. **Results:** We enrolled 13 patients and 10 successfully made a smoking cessation attempt defined as at least a 10% reduction in cigarette consumption. Patients who reduced consumption experienced a reduction in mean glucose. In two weeks post-quit, we found an overall reduction in mean glucose, a 13% absolute change in TIR, and an increase in GV. Changes varied by baseline HbA1c, with an increase in TIR among those with HbA1c $\geq$9% and a decrease in TIR among those with HbA1c <9% due to increased episodes of hypoglycemia. Patients reported overall satisfaction with technology and reported the phone, CO sensor, and CGM as easy to use. **Discussion:** We found CGM and mHealth to be feasible in obtaining a granular view of acute glycemic changes during smoking cessation. In our pilot, a decrease in cigarettes per day resulted in acute metabolic changes including hypoglycemia. A better understanding of these acute effects could inform a tailored smoking cessation intervention that includes monitoring and adjustments in diabetes management to improve outcomes in this population.

POD10-2

EFFICACY OF MAPS IN FACILITATING SMOKING ABSTINENCE AMONG CERVICAL CANCER SURVIVORS: RCT OUTCOMES

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One-third of cervical cancer survivors are current smokers. This prevalence of smoking is higher than among any other subgroup of cancer survivors. We recently completed an NCI-funded RCT evaluating the efficacy of a theoretically- and empirically-based "**M**otivation **A**nd **P**roblem-**S**olving" (**MAPS**) telephone counseling approach to facilitating smoking cessation among cervical cancer survivors. MAPS is a holistic, dynamic behavior change intervention that integrates motivational interviewing (MI) with a social cognitive theory based approach. Participants (n=202) were randomized to Standard Treatment (ST; n=100) or MAPS+ST (n=102). ST was administered at baseline, 6 and 12 months and included quitline referral, no-cost NRT, and standard self-help materials. MAPS comprised ST + 6 proactive counseling calls over 12 months. Participants had a mean age of 48 years, were predominantly non-Hispanic white (75%) and generally low-SES (41% had an annual household income <$20,000 and 37% had ≤ a high school education/GED). Participants had a mean smoking history of 29 years, 42% smoked

within 5 minutes of waking and mean of 15 CPD. Cervical cancer stage varied: 42% had carcinoma in situ, 33% stage I, 12% stage II, 10% stage III and 3% stage IV, 14% preparing to start treatment, 12% in treatment and 74% post-treatment. Participants were recruited in-clinic and online via Facebook. Results indicated that, based on an intent-to-treat approach where missing equals smoking, MAPS was associated with a greater than 2-fold increase in abstinence at the end of the 12-month treatment period (22.5% vs. 10.0%; OR=2.62, 95% CI [1.18-5.84], p=.019). Unfortunately, this treatment effect was no longer significant at 18 months (i.e., 10.2% in MAPS vs. 11.4% in ST, p>.05), indicating that efficacy dissipated as time from end of treatment increased. This decline does not appear to have been driven by dropout as retention was high (82% at 18 months; 84% in ST vs. 78% in MAPS at 18 months), which signals participants' motivation for long-term engagement in treatment. Findings highlight the need for sustained interventions to reduce smoking within this vulnerable population.

POD10-3

DEVELOPMENT OF A TARGETED BEHAVIORAL TREATMENT FOR SMOKING CESSATION AMONG INDIVIDUALS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Significance: Individuals with Chronic Obstructive Pulmonary Disease (COPD) face a critical medical need to quit smoking, but commonly report difficulty due to reliance on smoking to cope with negative emotional states. **Methods:** In this early-phase evaluation of three treatment components (Mindfulness, Practice Quitting, and Countering Emotional Behaviors), we conducted two serial studies guided by the ORBIT model for behavioral treatment development. Study 1 was a single-case design experiment (N=18); Study 2 was a pilot feasibility study (N=30). In both studies, smokers with COPD ($\geq$ 5 cigarettes/day) were randomized to receive one of the three treatment modules. Study 1 examined module-specific implementation targets, daily changes in smoking for coping motives, 24-hour quit attempts, and changes in smoking rate. Study 2 examined overall feasibility and participant-rated acceptability, 24-hour quit attempts, and changes in smoking rate. **Results:** Study 1: Treatment implementation targets were met by 3/5 Mindfulness participants, 2/4 Practice Quitting participants, and 0/6 Countering Emotional Behaviors participants. The Practice Quitting condition led to dramatic improvement in daily reports of smoking for coping motives, with 100% of participants meeting the clinically significant threshold. Incidence of quit attempts ranged from 20% and 33% across components, and smoking rate was reduced by 50% overall. Study 2: Recruitment and retention met feasibility targets, with 97% of participants completing all four treatment sessions. Participants reported high treatment satisfaction by qualitative responses and rating scales (M = 4.8/ 5.0). Incidence of quit attempts ranged from 25% to 58% across components. Participants reported a mean 56% decrease in cigarettes per day and a 41% decrease in smoking for coping motives from pre- to post-treatment. **Conclusion:** These two small-*N* studies provide complementary findings on internal validity and implementation of the novel intervention. While Study 1 provided initial support for proof-of-concept and plausibility of clinically significant change for each component, Study 2 provided data on key feasibility parameters. Continued development of this treatment will feature combining the three components into one intervention and extending its length.

POD10-4

OPTIMIZING REACH AND EFFECTIVENESS OF TOBACCO TREATMENT IN CANCER PATIENTS: LESSONS FROM THE CANCER MOONSHOT CANCER CENTER CESSATION INITIATIVE

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Significance: Nearly 25% of cancer patients are current smokers at the time of diagnosis. Quitting smoking after diagnosis improves patients' treatment response and health outcomes, yet smoking is rarely addressed as part of cancer care. The Cancer Center Cessation Initiative (C3I) supports 52 NCI-Designated Cancer Centers to integrate tobacco treatment into routine cancer care. C3I Centers apply a multitude of implementation approaches in settings varying in program size, smoking prevalence, and resources, thus offering an unprecedented opportunity to examine drivers of tobacco treatment reach and effectiveness among cancer patients. **Methods**: This study utilizes data from 38 C3I Centers reported 18 months after receiving NCI funding. Reach is the proportion of smokers who received at least one evidence-based tobacco treatment component (e.g., point-of-care counseling, telephone-based counseling, medications.) Effectiveness is the proportion of smokers reporting 7-day point prevalence abstinence 6 months following any tobacco treatment. We calculated associations of mean reach and effectiveness by **program size** (number of current smokers), **resource-to-burden score** (tobacco treatment specialist FTE: number of smokers), **treatment component offered**, and **implementation support strategies** (e.g., leadership buy-in, staff training). **Results**: Over 85% of the nearly 1 million patients seen at 38 C3I Centers were screened for smoking during the reporting period. Approximately 65,000 reported a current smoking status. Mean reach across all centers was 24.3% (range: 2.7-76.2%); mean effectiveness was 27.9% (n=18 centers, range: 0-64.7%). Program size was negatively but insignificantly associated with reach and effectiveness. Higher resource-to-burden scores were associated with higher reach but not greater effectiveness. Mean reach was similar across Centers offering point-of-care counseling (29.5%) and telephone-based counseling (28.3%); effectiveness was 32.3% at centers offering point-of-care counseling and 19.3% at those offering telephone counseling (19.3%). Securing IT leadership buy in, defining the clinical workflow, and training staff to implement the program were associated with greater reach, whereas securing clinical leadership buy in was associated with greater effectiveness.**Conclusion**: Understanding drivers of patient reach and effectiveness in population-based tobacco control programs can help guide cancer centers and community oncology practices to select and implement interventions that fit the needs and resources available and improve patient outcomes.

POD10-5

COMPARATIVE EFFECTIVENESS OF TWO POST-DISCHARGE SMOKING CESSATION INTERVENTIONS FOR HOSPITAL PATIENTS: THE HELPING HAND 4 RANDOMIZED TRIAL

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SIGNIFICANCE: Hospital admission offers an opportunity to quit smoking. In-hospital cessation treatment is effective if it continues after discharge, but how best to sustain treatment post-discharge is unclear. Should hospitals provide it or refer to community resources? METHODS: A 3-site pragmatic RCT compared 2 active strategies—Hospital-based Tobacco Care Management (HTCM) vs. Quitline eReferral (QL)—for delivering cessation counseling and nicotine replacement (NRT) post-discharge. We enrolled daily smokers who had in-hospital counseling and planned to quit. At discharge, HTCM provided participants 8 weeks of free NRT (patch, gum, lozenge or a combination) and 7 interactive voice recognition (IVR) calls over 12 weeks. Each IVR call offered a callback

from a hospital tobacco coach. Participants randomized to QL were referred from the electronic health record to the free state quitline that offered 4-8 weeks of NRT and up to 5 counseling calls. Outcomes were assessed at 1, 3, and 6 mo post-discharge. Primary outcome was verified 7-day tobacco abstinence at 6 mo. Analysis was ITT with multiple imputation for missing data. RESULTS: 1409 daily smokers admitted 9/2018-3/2020 were randomly assigned to HTCM (n=706) or QL (n=703). Groups were comparable at baseline (56% female, 15% Black, 9% Latinx, 77% White, mean age=52y; mean cig/d=16). Follow-up survey completion at 1, 3, 6 mo was 82%, 76%, and 74%, respectively. HTCM, vs. QL, increased smokers' use of any medication at 1 and 3 mo (80% vs 56%, 67% vs. 50%, respectively) and any counseling at 1 and 3 mo (44% vs 27%, 46% vs. 24%, respectively, all p<.001). Self-reported past 7-day abstinence rates were significantly higher for HTCM vs. QL at 1 mo (50.7% vs. 41.8%, RR 1.21, 95% CI 1.08-1.35, p=.002) and 3 mo (50.3% vs 40.8%, RR 1.23, 95% CI 1.08-1.39, p=.003) but not at 6 mo (43.6% vs. 38.6%, RR 1.13, 95% CI 0.99-1.28, p=.079). Biochemically verified past 7-day tobacco abstinence rates at 6 mo were 24.8% (HTCM) vs. 20.7% (QL; RR 1.20, 95% CI, 0.95-1.49, p=.13). CONCLUSION: Among recently hospitalized daily smokers, the health system-based HTCM initially produced higher quit rates than eReferral to the community-based QL, but effects were non-significant by 6 months.

POD10-6

EVALUATION OF AN OPT-OUT CHRONIC CARE PROGRAM TO TREAT SMOKING IN ADULT PRIMARY CARE

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Background: Effective smoking treatments are underused, particularly in socioeconomically disadvantaged and minoritized populations. Efforts to integrate smoking cessation treatment into routine primary care, where most people who smoke present for health care services each year, have shown a low rate of treatment utilization and highlighted persistent implementation challenges. Proactive, opt-out, chronic treatment approaches that use multiple outreach strategies with immediate treatment access may enhance treatment reach, reach equity, and abstinence rates. **Methods:** Six adult primary care clinics in a healthcare cooperative launched a comprehensive tobacco cessation intervention program (CTIP) in 3 waves in a stepped-wedge design. The opt-out CTIP was guided and tracked via electronic health record (EHR) tools and involved: clinician point-of-care smoking treatment; promotion of CTIP via EHR patient portal and mail outreach, and tobacco care managers who coordinated care with primary care providers and conducted direct telephonic outreach with immediate access to smoking cessation treatment. Data extracted from the EHR were analyzed using chi-square and t-tests to assess the reach and effectiveness of CTIP among 10571 adult patients over 16-22 months. **Results:** Smoking cessation treatment reach increased significantly after CTIP launch in 5 of 6 clinics, and was significantly higher in clinics active vs. inactive in CTIP in the stepped-wedge design. Rates of converting from current to former smoking status in the EHR were also significantly higher in active vs. inactive clinics. Reach was particularly high in historically underserved populations, including African-American, Hispanic, and Medicaid-eligible patients. **Conclusions:** Implementation of a comprehensive opt-out chronic-care program with multiple outreach methods was associated with increased rates of providing smoking cessation pharmacotherapy and counseling, and with increased smoking cessation rates, as indicated by EHR data. Proactive outreach effectively engages many patients who do not receive cessation treatments at clinic visits and may help reduce disparities in treatment access.

PAPER SESSION 11: TACKLING AND TRANSCENDING THE BARRIERS OF SMOKING CESSATION AND PREVENTION IN PRIORITY POPULATIONS

POD11-1

SYSTEMATIC REVIEW OF RECRUITMENT BIAS OF ADULTS IN U.S. PHASE 2 AND 3 RANDOMIZED CLINICAL TRIALS FOR SMOKING, NICOTINE, AND TOBACCO CESSATION: 2008 TO 2019

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Significance: To promote health equity in the treatment of smoking, nicotine, and tobacco dependence, clinical trials should strive for unbiased representation. **Methods:** A systematic review of randomized phase 2 and 3 clinical trials recruiting U.S. adults for treatment of smoking, nicotine, and tobacco dependence, and initiated between 2008 and 2019, was performed using four databases: Medline, Embase, Central, and the U.S. Clinical Trial registry. The Cochrane Handbook of Systematic Reviews of Interventions and PRISMA guidelines were used to identify trials. Meta-analyses were performed to obtain summary proportions and 95% confidence intervals (CI) of gender, ethnicity, and race groups. Summary proportions were compared with the corresponding Census proportions based on the 2010 U.S. Census. **Results:** We identified 75 trials (total participants, n=24,280) related to the treatment of smoking, nicotine, and tobacco dependence. Among them, all reported gender, 41% reported ethnicity (31 trials) and 57% reported race of the participants (43 trials). The summary proportions of females (43.2%, 95% CI 37.7-48.8), Hispanics (7.17%, 95% CI 3.08-12.8), Asians (0.50%, 95% CI 0.15-0.98), and whites (58.7%, 95% CI 49.0-68.1) were lower than Census proportions (51.5%, p=0.004; 14.2%, p=0.017; 5.01%, p<0.001; 79.8%, p<0.001). The summary proportions of Native Hawaiians and Pacific Islanders (NHPI) (0.53%, 95% CI 0.36-0.77), blacks (30.2%, 95% CI 21.8-39.4), and multiracial participants (3.66%, 95% CI 2.53-5.28) were higher than Census proportions (0.20%; 12.3%; 1.56%, ps<0.001). **Conclusions:** These results highlight disparities in clinical trial recruitment for treatment of smoking, nicotine, and tobacco dependence. More than half of the trials did not report ethnicity. The results suggest that females, Hispanics, Asians, and whites are underrepresented, while NHPI, blacks, and multiracial participants are overrepresented. Overall, trials for treatment of smoking, nicotine, and tobacco dependence may not reflect the demographics of the populations sought to be served.

POD11-2

GIILANG GAWIMARRA (GATHERING STORIES) OF ABORIGINAL AND TORRES STRAIT ISLANDER WOMEN'S SMOKING AND QUITTING JOURNEY

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Introduction: Commercial tobacco smoking among Aboriginal and Torres Strait Islander peoples in Australia is intrinsically linked to colonisation, racism and dispossession. Commercial smoking is also responsible for over a third of all Aboriginal and Torres Strait Islander deaths. The vast majority of Aboriginal and Torres Strait Islander peoples who smoke want to quit, and there are ongoing calls for comprehensive approaches to support smoke-free behaviours. However, there is limited information about smoking and pregnancy among Aboriginal and Torres Strait Islander women across diverse language, social and nation groups. This Indigenous-led study aims to quantify and begin to unpack the stories of Aboriginal and Torres Strait Islander women, informing meaningful development of smoke-free supports. **Methods:** A national cross-sectional survey of Aboriginal and Torres Strait Islander women of reproductive age was conducted online (July-October 2020). Survey captured demographics, smoking and quitting characteristics, and interest in a range of support programs. Distribution of smoking and quitting characteristics were quantified by remoteness and age. Prevalence Ratios (PR) for sustained abstinence by selected demographic, smoking characteristics and support program were calculated using Log Binomial regression. **Results:** Smoking and quitting characteristics between women (n=428) across Australia residing in urban, regional and remote areas were similar. A greater proportion of younger women smoked fewer cigarettes daily, waited longer to smoke after waking, and were categorised as low smoking dependency compared to those aged 35+ years. Older women reported trying stop-smoking medications more than young women. Quitting suddenly, rather than gradually was significantly associated with sustained abstinence after adjusting for age and remoteness (PR 1.26, 95% CI 1.10-1.45). Five of seven broad program categories (support groups, holistic support, cultural programs, one-on-one support, and self-directed support) were chosen by over half of participants (57.2% to 80.8%). Women then selected their first preference of the abovementioned programs (i.e. most helpful), over half chose support groups or holistic support programs (31.8% and 22.2% respectively). **Conclusion:** Aboriginal and Torres Strait Islander women are making quit attempts. Suddenly quitting, rather than reducing, was associated with sustained abstinence. Supports should be multi-faceted, holistic and culturally safe, including support groups. Aboriginal Community Controlled Health Services should be resourced appropriately to reduce tobacco use, reflecting their role as a preferred health care provider.

POD11-3

EXPLORING POTENTIAL FOR A PERSONALIZED MEDICINE APPROACH TO SMOKING CESSATION WITH AN AMERICAN INDIAN TRIBE

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Significance: One precision medicine approach to smoking cessation that is gaining attention in research settings is tailoring pharmacological treatment to a biomarker known as the nicotine metabolite ratio (NMR). Because the American Indian (AI) population suffers disproportionately from cigarette use and is underrepresented in this area of research, AI adults who smoke were recruited to participate in a study that 1) examined correlations between NMR, nicotine dependence, and smoking exposure; 2) assessed the extent to which self-preference for cessation treatment aligns with NMR-based recommendations; 3) explored perceptions towards using NMR to inform treatment selection. **Methods:** AI adults (n=54) who smoke were recruited from a tribal clinic in Minnesota to provide samples for assessment of salivary NMR and urinary total nicotine equivalents (TNE) and to complete a questionnaire that assessed cigarettes per day (CPD), Fagerstrom test for cigarette dependence (FTCD), Heaviness of smoking index (HSI), cessation treatment preference, and perceptions of using NMR to inform treatment selection. **Results:** Significant positive correlations were observed between NMR and FTCD (r=0.29; p-value=0.0383) and HSI (r=0.28; p-value=0.0426) which were driven by the measure time to first cigarette (TTFC). Non-significant, but directionally consistent, relationships were observed between NMR and CPD (r=0.21; p-value=0.1436) and TNE (r=0.24; p-value=0.2906). About one-half (54%) of participants' self-preference for cessation treatment matched their NMR-based treatment recommendation. Approximately sixty percent (62.0%) of participants supported using NMR to inform treatment selection which is lower than prior studies among White and Black participants (97.5% support). **Conclusion:** NMR appears to be related to cigarette dependence in the Tribe and since this has not be consistently found in other populations it raises the question of how using NMR to inform cessation treatment selection would perform in this Tribe. Results also suggest that an NMR informed approach to cessation may not be equitably utilized and future work could include identifying community-based solutions to mitigate concerns.

POD11-4

SMOKING CESSATION IN LUMBEE INDIANS: A QUALITY IMPROVEMENT PROJECT

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Significance: Smoking cessation is an effective method of health promotion and disease prevention. Although the 2019 United States of America (USA) federal mandate increased the minimum age to purchase tobacco products, cigarette smoking remains high among Americans. In the community of Robeson County, North Carolina, 2020 statistical data demonstrated that 24 percent of adults in the county smoked cigarettes, 31.5 percent of individuals in the county lived at or below the federal poverty level, and 42.3 percent of the population identified as Lumbee Indian. National data was consistent with abnormally high health disparities for tobacco use in American Indian populations. Methods: A quality improvement project was established at a primary care facility in the county where a need for a smoking cessation program was identified. The project was assessed and approved by the Institutional Review Board (IRB) prior to implementation. Funding was obtained by direct donations from the author, and by donation from the primary care facility owner. A low-cost intervention that utilized an evidence-based, individualized cessation plan via the smokefree.gov website was implemented for sixty days. Providers were educated on how to implement the plan and how to guide patients in using a personalized cessation tool. Results: A total of four healthcare providers implemented the project. A total of eleven patients consented to participation in the project. After project completion, data was analyzed. Evidence demonstrated that 75 percent of providers felt the project increased cessation rates, was cost-effective, and improved the quality of healthcare provided to patients. Patient data demonstrated a 20.9 percent decrease in daily smoking rates, which was correlated with the 90.3 percent usage rate of the project tool. Conclusion: Web-based low-cost interventions may decrease smoking in Lumbee Indian patients and help decrease health disparities for this population. Further research is needed to determine the effectiveness of implementing a web-based cessation plan with Lumbee Indian patients as a primary tool for smoking cessation.

POD11-5

DISPARITIES IN THE ASSOCIATION BETWEEN "TIPS FROM FORMER SMOKERS" CAMPAIGN AND QUIT INTENTIONS/ ATTEMPTS AMONG SEXUAL MINORITIES

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Significance: The Tips From Former Smokers (Tips) campaign has been shown to have a substantial impact on smoking cessation behaviors among US adult smokers. However, its potential differential impact among sexual minorities is not well studied. This study aims to examine the potential disparities in the association between the Tips campaign and quit intentions and quit attempts among sexual minority smokers. Methods: Data were from the Population Assessment of Tobacco and Health (PATH) Study Adult Cohort Wave 5 (Dec 2018 to Nov 2019). Study population was current established cigarette smokers. Exposure variable was frequency of exposure to Tips in the past 12 month, and outcomes were intention to quit within 12 months, serious quit attempts (Yes/No), and number of serious quit attempts in the past 12 month. Multivariate logistic and ordinal regressions were used to estimate the associations, controlling for socio-demographic variables, e-cigarette use, other tobacco use, and state tobacco control policies. Interactions between Tips exposure and individual characteristics were examined to explore potential disparities. Results: Among current established smokers, frequency of exposure to Tips were: 45.1% never, 14.6% rarely, 23.8% sometimes, 10.9% often, and 5.6% very often in the past 12 month. Exposed to Tips often or very often was significantly associated with stronger intention to quit and more serious quit attempts. These associations were significantly stronger for heterosexuals than sexual minorities. Subgroup analysis showed that heterosexual smokers exposed to Tips frequently were more likely to intent to quit within 12 months (aOR=1.39, 95% CI=1.18-1.63), have serious quit attempt (aOR=1.45, 95% CI=1.23-1.71), and have more serious quit attempts (aOR=1.42, 95% CI=1.22-1.67). In contrast, these associations were not significant among sexual minorities (aOR=0.85, 95% CI=0.54-1.36; aOR=0.67, 95% CI=0.41-1.10; and aOR=0.40, 95% CI=0.40-1.03; respectively). Conclusions: Efforts are needed to increase the coverage and exposure frequency of the Tips campaign. More targeted contents for sexual minorities are needed to address the disparities.

POD11-6

EFFICACY AND UTILIZATION OF SMARTPHONE APPLICATIONS FOR SMOKING CESSATION AMONG AMERICAN INDIANS AND ALASKA NATIVES: RESULTS FROM THE ICANQUIT TRIAL

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Introduction: There is tremendous need for efficacious and accessible interventions for smoking cessation among American Indians and Alaska Natives. We tested the efficacy of an Acceptance and Commitment Therapy (ACT)-based smartphone application (iCanQuit) vs. US Clinical Practice Guidelines based smartphone application (QuitGuide) for smoking cessation among American Indians and Alaska Natives.Methods: We compared cessation, changes in ACT-based processes, engagement and satisfaction between all American Indian and Alaska Native iCanQuit (n=89) and QuitGuide (n=80) participants enrolled in the iCanQuit trial. The primary outcome was self-reported, complete-case, 30-day point prevalence abstinence (PPA). Follow-up timepoints were 12, 6, and 3-months. Results: Randomized American Indians and Alaska Natives from 31 US states (70% urban, 30% rural, with 25% of participants residing on tribal land). The outcome data retention rates were 93%, 92%, and 90% at the 12-, 6-, and 3-month follow-ups, respectively, with no differential retention between arms. The 30-day PPA for iCanQuit vs. QuitGuide was 30% vs. 18% at the 12-month follow-up (OR=1.96; 95% CI: 0.90, 4.26), 25% vs. 11% at 6-months (OR=2.62; 95% CI: 1.06, 6.45), and 15% vs. 6% at 3-months (OR=2.93; 95% CI: 0.90, 9.59). Increases in acceptance of internal cues to smoke mediated the effect of treatment on smoking cessation at 12 months. iCanQuit arm participants were also significantly more engaged and satisfied with their assigned application.Conclusions: In a nationwide sample with high data retention and participant engagement, this is the first study to show that a digital intervention may be efficacious for helping American Indians and Alaska Natives quit smoking.

POD11-7

WORKING TOGETHER TO REDUCE COMMERCIAL TOBACCO-RELATED HARMS, THE SOUTHERN CALIFORNIA TRIBAL TOBACCO COALITION

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Significance: Of US populations, American Indian/Alaska Natives (AIANs) report the highest use of commercial tobacco products, including youth. More AIANs reside in California than any other US state; and more sovereign Tribal nations are co-located with California than any other state. A California voter-approved tax on commercial tobacco products enabled grants to (a) research programs, (b) school-based prevention programs; and (c) community-based prevention programs, including innovative grants directly to Tribal nations. In Southern California, four Tribal nations on lands near to each other, as well as a clinic-based research program and a school-based program serving area tribes, each secured grants to reduce and prevent commercial tobacco-related harms to tribal youths. All seven programs feature youth leadership. Methods: Program staff began to meet and formed a coalition to best serve the tribal communities by reducing redundancies in programs and outreach; providing mutual support; and optimizing complementary programming. Due to COVID pandemic conditions, all coordination took place via teleconferencing. With improved conditions, the coalition was able to hold three commercial tobacco clean-up events outdoors at tribal community sites, and an inaugural Inter-Tribal Tobacco Prevention Youth Summit, with participant evaluations. Results: 6-14 youths participated in each clean-up event. For the summit, 37 participants aged approximately 9-22 years old and 27 adult staff, parents, and elders convened for four hours outdoors on tribal lands. Youth and staff from each of the participating organizations led presentations on: tobacco health harms; history; types, ingredients, and environmental impacts of commercial tobacco products; and local tribally-specific uses of sacred tobacco and other plant medicines. Presentation forms included posters and demonstrations. Activities included breakout groups, quizzes, making medicine bundles, and cleaning up commercial tobacco product trash. Evaluation surveys indicated high satisfaction, learning, and support of the programs. Conclusions: Combining efforts of separately-funded Tribal-community based programs improved the ability of the programs to engage with the local communities, bring together community members across all age groups, to provide integrated messaging and engaging activi-

ties. Tribally-specific programming promoted local knowledge of traditional/ceremonial tobacco as a community strength, while also developing awareness of the history of and harms related to commercial tobacco products. Combined efforts supported increased Tribal community engagement, despite challenging COVID conditions.

PAPER SESSION 12: RAPID FIRE: NEW TRENDS IN PACKAGING AND MARKETING TO YOUTH AND ADULTS

POD12-1

STANDARDIZING THE SHAPE OF SMOKELESS TOBACCO PACKS SOLD IN BANGLADESH - POTENTIAL IMPACT ON HEALTH WARNING LABEL VISIBILITY AND HARM PERCEPTIONS

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Introduction. Smokeless tobacco (SLT) use is extensive in Bangladesh, and consumers often view these products as less harmful than combustible tobacco. The most popular forms of SLT - zordha and gul - are sold in a variety of pack shapes and sizes (plastic packet, tin cylinder). Lack of standard SLT pack shape limits compliance with the placement of graphic health warning labels (HWLs) on the top 50% of each pack side and provides space for attractive corporate branding. The current study qualitatively explored how HWL placement on existing SLT packs vs. a proposed standardized SLT pack influences harm perceptions among current and never SLT users in Bangladesh. **Methods.** In February 2021, we conducted 28 focus groups across three regions of Bangladesh: Dhaka, Sylhet, and Khulna. Groups were stratified equally by urban/rural residence, gender, and SLT use. Each participant was given their own set of existing zordha and gul packs, along with two mock SLT packs (one zordha, one gul) that were manufactured to fit recommended standard pack shape/size dimensions. Trained facilitators led group discussions of HWL visibility and harm perceptions of existing vs. standard packs. Data were collected in Bangla, translated into English, and thematically analyzed. **Results.** Across groups, participants discussed the limited visibility of HWLs on existing packs, noting that images were often distorted, printed in dark colors, and small compared to product branding. Many groups also observed that HWLs on existing zordha packs were placed on one side only and gul packs lacked HWLs. These factors contributed to lower levels of perceived harm of existing packs. In contrast, most groups discussed that standard pack HWLs seemed larger and were more visible due to their placement at the top half of both pack sides. Given the prominence of the HWLs, all groups discussed that the standard packs appeared more harmful than existing packs. **Discussion.** Results suggest that standardizing the pack shape and size of SLT sold in Bangladesh could increase harm perceptions of SLT use among current and never users, which may have implications on reducing rates of use at the population level.

POD12-2

THE SHORT-TERM AND LONG-TERM ASSOCIATION BETWEEN RECEIVING CIGARETTE DISCOUNTS/COUPONS AND CIGARETTE SMOKING CESSATION BEHAVIORS AMONG US ADULT SMOKERS WHO HAVE INTENTION TO QUIT

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Significance: Previous studies indicate that receipt of price promotion may impact tobacco use behaviors. This study examines how receipt of cigarette discounts/coupons is associated with smoking cessation behaviors among US adult smokers who have intention to quit. Methods: Data were from the Population Assessment of Tobacco and Health (PATH) Study Wave 3 (Oct 2015 to Oct 2016), Wave 4 (Dec 2016 to Jan 2018), and Wave 5 (Dec 2018 to Nov 2019). Wave 3 and 4 was each considered as the baseline of its next consecutive wave, i.e., Wave 4 was the one-year follow-up of Wave 3, and Wave 5 was the two-year follow-up of Wave 4. Baseline single-wave weights were applied. Study population was adult current established cigarette smokers who intended to quit within one year at Wave 3 and who intended to quit at Wave 4. Exposure is past-12-month receipt of discounts/coupons at baseline, and outcome is completely quit smoking at follow-up. Multivariate logistic regressions were used to estimate the one-year and two-year associates between receipt of cigarette discounts/coupons and outcome, controlling for demographics, strength of intention to quit, cigarette depen-

dence, use of other tobacco products, and state-level tobacco control policies. Results: 35.9% (95% CI=34.2%-37.7%) and 43.6% (95% CI=42.2%-45.1%) of smokers with intention to quit received discounts/coupons for cigarettes in the past 12 month at Wave 3 and 4, respectively. Respondents who received discounts/coupons at baseline were less likely to quit completely at one-year follow-up (aOR=0.67, 95% CI=0.49-0.91) and at two-year follow-up (aOR=0.74, 95% CI=0.61-0.90). Additionally, smokers who had stronger intention to quit, were less dependent on cigarettes, or had higher levels of education were more likely to quit completely at follow-up. Receipt of discounts/coupons for other tobacco products were not significantly associated with cigarette cessation outcome. Conclusions: Receipt of cigarette price discounts and coupons is associated with reduced likelihood of successful quitting. Prohibition of cigarette price promotions may help more smokers to quit.

POD12-3

GLOBALIZATION OF CIGARETTE MARKETING: YOUNG ADULT SMOKERS' SHARED PERCEPTIONS OF FLAVORED CIGARETTE PACK DESIGN IN MEXICO AND IN THE PHILIPPINES

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Background Reviews of tobacco industry documents uncover transnational tobacco companies' knowledge of a comparable young adult (YA) market across countries in terms of attitudes and lifestyle aspirations, and the resulting standardized marketing approach some companies took to expand their market. We examined YA smokers' perceptions of flavored cigarette packs, focusing on flavor capsule variants (FCVs), in Mexico (MX) and the Philippines (PH). **Methods** A secondary analysis of five focus groups (FGs) held in MX and four FGs held in PH with YA smokers (ages 18-24), stratified by gender and socioeconomic status, was conducted. Participants interacted with cigarette packs purchased locally. Transcribed and translated data were thematically analyzed and compared between countries. **Results** Three themes emerged: FCVs are recognizable via pack design, colors increase appeal and signal flavor, and YAs perceive flavored cigarettes as youth products. Participants in MX and PH easily recognized FCVs on the pack: "Those that have little dots have double capsules."(MX)/"The imaging... Like this one shows that when you pop this section, it would heighten the flavor."(PH) Colors signaled flavor: "By the colors, you could even deduce that this is mint flavored."(MX)/"Most of the menthol cigarette colors are green, blue, and black."(PH) and were attractive: "Because these have more colors... they are eye-catching."(MX)/"They're colorful and cool."(PH) Participants said flavored cigarettes are mainly used by and appealing to youth, including themselves: "The kids, young people, the ones who are starting to smoke regularly, smoke one of these flavored ones."(MX)/"[A capsule pack] will appeal to millennials."(PH) **Conclusion** YA smokers across countries interpreted flavored cigarette pack design similarly and agreed young people are the main audience for these products, suggesting that a standardized marketing approach is successful at creating shared perceptions in different world regions. This strengthens the argument that local evidence on tobacco marketing may be generalizable beyond specific regions and can support evidence-based tobacco control policies and counter-marketing globally. **Funding** Part of this work was supported with funding from Bloomberg Philanthropies' Bloomberg Initiative to Reduce Tobacco Use (bloomberg.org). JEC holds the Bloomberg Professorship of Disease Prevention at the Johns Hopkins Bloomberg School of Public Health; the earnings from that endowment helped to support part of this work.

POD12-4

ELECTRONIC CIGARETTES SALES TRENDS AND MARKET SHARE FROM SOUTH AFRICAN SALES SCANNER DATA

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Significance: Despite the introduction of electronic cigarettes (e-cigarettes) into the South African market about ten years ago and new entries in recent times, only limited information is available on e-cigarette market in South Africa. Hence, this study sought to describe e-cigarette sales trends and market share using Nielsen's sales data. **Methods**: We used sales volume (L) data to calculate e-cigarette sales market share from Nielsen market channels (excludes vape shops or online sales) during the 3-year period starting July 2018 through the period ending June 2021. This included the period of temporary

ban in sales of tobacco and e-cigarette products (March 27, 2020 - 17th August 2020) in response to COVID-19 pandemic in South Africa. Internet searches were used to supplement Nielsen brand information, including labelled nicotine content, flavour and form (Prefilled Cartridges or refill liquids). **Results**: In 2018, the top three brands were Twisp (87% of market share), Switch (4% share) and E-Sense (2% share) - none owned by traditional tobacco companies. By 2021, the top three brands were Twisp (acquired by BAT in 2019), VUSE (launched by BAT in Q2 2021) and NJOY, accounting for 85%, 9% and 2% respectively of the market share. Of those with available data on labelled nicotine, the sales of e-liquid with nicotine content between 18-24mg/ml increased from 57.4% in 2018 to 72.4% of total volume sales in 2021, while those with labelled content between 0.5-8mg/ml nicotine dropped from 38.7% in 2018 to 21.8% in 2021. Similarly, there was an increase in the sales of fruit flavour (22.1% to 34.1%) and menthol/mint flavour (18% to 20.7%), but a decline in sales of tobacco flavour (23.2% to 17.8%). The sale of prefilled cartridges, including pods, also experienced significant growth during 2018-2021 (21.3% to 31.1%). **Conclusion**: E-cigarette brand leaders are now owned by BAT. The rapid growth in market share of VUSE, within three months of its launch, may be a result of a combination of its availability in various flavours, nicotine salt formulation and the aggressive marketing, including recent online streaming of youth-focused concerts - 'festival of inspiration'. The study findings highlight the need for regulation of e-cigarettes in South Africa.

POD12-5

EXPOSURE TO E-CIGARETTE ADVERTISING AND ITS ASSOCIATIONS WITH ATTITUDES AND BEHAVIORS TOWARDS E-CIGARETTES AMONG US ADOLESCENTS, 2017-2019

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Significance: In response to the youth vaping epidemic in the US, federal agencies have taken steps to curb youth-targeted e-cigarette marketing since early 2018. However, studies examining the effect of such regulations are scarce. This study aims to investigate: (1) trends of e-cigarette ad exposure from different channels from 2017 to 2019; (2) how e-cigarette ad exposure is associated with curiosity about using an e-cigarette and e-cigarette use, among US adolescents. Methods: Data were from the Population Assessment of Tobacco and Health (PATH) Study Youth Cohort Wave 4 (Dec 2016 to Jan 2018), Wave 4.5 (Dec 2017 to Dec 2018), and Wave 5 (Dec 2018 to Nov 2019). The study population was US adolescents 12-17 years old. Wave 4 cohort all-wave weights were applied to account for the sampling design and generate national representative estimates. E-cigarette ad exposure from eight channels (stores, billboards, print, radio, TV, events, clubs or bars, and online) was estimated. Generalized estimating equations (GEEs) were used to estimate how e-cigarette ad exposure was associated with contemporary curiosity about using an e-cigarette and e-cigarette use status at 12-month follow-up, controlling for socio-demographic characteristics, mental health status, cigarette use, other tobacco use, and survey waves. Results: During the study period, more than 60% US adolescents were exposed to e-cigarette ads in the past 30 days at the survey time. E-cigarette ad exposure from print media decreased from 15.2% (95% CI=14.3%-16.0%) in 2017 to 9.1% (95% CI=8.6%-9.7%) in 2019. Ad exposure from billboards, radio, and TV decreased from 2017 to 2018 but did not change significantly from 2018 to 2019. Ad exposure online did not change significantly. Adolescents who were exposed to e-cigarette ads were more likely to feel curious about using an e-cigarette (aOR=1.69, 95% CI=1.56-1.83) and to be current e-cigarette users at 12-month follow-up (aOR=1.38, 95% CI=1.18-1.60). Conclusions: Continued monitoring of e-cigarette ad exposure and its impact on e-cigarette use among adolescents are needed. Additional efforts to reduce youth exposure to e-cigarette ads may be warranted.

POD12-6

DETERMINING IF PLATFORM AND FEDERAL TOBACCO CONTROL POLICIES ALIGN WITH CURRENT INDUSTRY PRACTICES

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Significance: Social media platforms are now frequently used to market tobacco products. Marketing strategies include traditional approaches such as paid online advertising, and novel approaches, such as brands/retailers posting promotional content on their own social media accounts and partnering with social media influencers. These marketing practices raise concerns about the sufficiency of existing regulatory policies aimed at tobacco industry promotional practices on social media. **Methods:** Qualitative framework analysis was used to analyze and compare: (A) Platform policies related to tobacco product promotion (e.g., sponsored tobacco content and posts on tobacco brand/retailer accounts) and sales on Discord, Facebook, Instagram, Pinterest, Snapchat, TikTok, Tumblr, Twitch, Twitter, and YouTube in May 2021, and (B) Federal policies related to the promotion of tobacco products on social media. **Results:** Eight of the ten platforms prohibited paid advertising for tobacco products, although Tumblr allowed e-cigarette marketing when legal in the target market. Twitch and Discord lacked policies for tobacco products. Five platforms restricted posts that sell tobacco products and three mentioned age-gating posts that promote or sell tobacco products. Only Facebook, Instagram, and TikTok clearly prohibited sponsored content (i.e., social influencers) that promotes tobacco. US FDA policies applicable to tobacco marketing online require the use of warning statements, restrict unauthorized health and risk claims, and prohibit sales to minors. **Conclusion:** Most platform policies prohibited paid tobacco advertising but failed to address more novel strategies such as sponsored/influencer content or promotional content on brand and retailer accounts. While federal regulations apply to paid advertising as well as commercial and sponsored posts that promote tobacco, there are no policies to restrict the overall proliferation of this content on social media. There is a pressing need to ensure that platform and federal policies reflect the ever-evolving tobacco promotion landscape.

POD12-7

HOW REPETITION AFFECTS THE PERCEIVED TRUTH OF (MIS) INFORMATION ABOUT TOBACCO PRODUCTS

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Significance. As concerns about the effects of health misinformation rise, understanding how health (mis)beliefs are formed is increasingly important. Tobacco warnings containing new information are perceived as less factual and misbeliefs about tobacco are rampant (i.e. nicotine causes cancer and organic tobacco is less harmful). Numerous studies have found that people believe repeated trivia statements more than novel statements, an effect known as truth by repetition. This study examines how repeated exposures to both true and false statements about heated tobacco and cigarettes affects the perceived truthfulness of the statement claims. **Methods**. We recruited an online convenience sample of 1,436 U.S. adults ages 21+ in May, 2021. In an exposure phase, each participant rated the truthfulness of 48 randomly selected statements about tobacco products and general knowledge trivia, half true and half false. The study had a two (tobacco product familiarity: heated tobacco, cigarettes) by two (familiarity of statement claim: recognizable, novel) between-subjects design. During the testing phase, participants rated the truthfulness of 24 repeated statements and 24 unseen statements. The testing phase occurred on the same day and again three days later. **Results.** Repetition of true _and_ false statements increased their subjective truth compared to novel statements (diff=.36, p<.001). For recognizable false heated tobacco claims, the effect of repetition increased the perceived truthfulness rating (diff=.21, p<.01) but not true claims (diff=.05, p=.14). For novel heated tobacco claims, repetition significantly increased truthfulness ratings (diff$_{true}$ =.15, p<.01; diff$_{false}$ =.31, p<.001). For cigarettes, repetition increased perceived truth of recognizable claims (diff$_{true}$=.09, p<.01; diff$_{false}$=.31, p<.001) and novel claims (diff$_{true}$ =.21, p<.001; diff$_{false}$ =.24, p<.001). **Conclusion**. The repetition effect increases the believability of claims about tobacco, and the effect is generally

stronger for false claims compared to true claims. This underscores the importance of strategies to inoculate people against misinformation and calls for interventions that can stop the repetition of newly generated false claims.

POD12-8

TOBACCO ADVERTISING AT POINT OF SALE IN DHAKA, BANGLADESH, IDENTIFYING TOBACCO INDUSTRY STRATEGIES

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Significance This study demonstrates that (1) tobacco companies have a strategic approach to influencing the retail environments where their products are sold and (2) tobacco product marking at point-of-sale (POS) is robust in Bangladesh. In Bangladesh, _The Smoking and Using of Tobacco Products (Control) Act, 2005_ prohibits producing or disseminating an advertisement of a tobacco product in any way at the point of sale, including any kind of commercial activity intended to promote a tobacco product or tobacco use either directly or indirectly. This study tracks the journey of promotional and advertising materials from source to store and provides detailed descriptions of tobacco companies' retailer incentive programs, unpacking these companies' strategies to undermine and knowingly violate Bangladesh's tobacco advertising, promotion, and sponsorship (TAPS) laws. To our knowledge, this is the first report to detail tobacco companies' marketing and promotional strategies across the chain of tobacco product distribution in Dhaka, Bangladesh, from wholesalers to small vendors. _Methods_ Between January and February 2021, Voice Bangladesh conducted 28 key informant interviews (KIIs) from 14 high- and 14 low- socioeconomic (SES) areas and 8 focus group discussions in 8 high- and 8 low-SES areas among tobacco retailers (mobile vendors, roadside tobacco stands, tea stalls, small grocers, supermalls), tobacco wholesalers, and tobacco dealers in Dhaka, Bangladesh. _Results_ Nearly every POS displays tobacco advertising or promotional materials. BAT and JTI provide more POS promotional materials to vendors in areas of low-SES. BAT and JTI provide financial and non-cash incentives at all levels of distribution. Incentives differ at all levels of the distribution chain between high- and low-SES areas. _Conclusion_ Bangladesh does not explicitly ban point-of-sale tobacco product displays and enforcement of other TAPS policies is weak, particularly in low-income areas. Multinational tobacco companies exploit these policy and enforcement gaps with routine provision of marketing and promotional materials to points of sale at all levels of product distribution. Finally, tobacco companies exploit workers' inadequate earnings with financial and non-cash incentives, including household needs such as beds, appliances, and milk.

PODIUM PRESENTATION 5

PAPER SESSION 13: RAPID FIRE: NOVEL TOBACCO CESSATION TREATMENTS IN ADULTS AND TEENS

POD13-1

TESTING AUGMENTED REALITY FOR EXTINCTION OF CUE-PROVOKED URGES TO SMOKE: INITIAL EVIDENCE FROM A CONTROLLED EXPERIMENT

Min-Jeong Yang[1], Karen O. Brandon[1], Marloes Kleinjan[2], Laura M. Hernandez[1], Leslie E. Sawyer[1], Steven K. Sutton[1], Thomas H. Brandon[1], Christine Vinci[1]. [1]H. Lee Moffitt Cancer Center, Tampa, FL, USA, [2]Trimbos Institute, Utrecht, Netherlands.

Background: Cue exposure therapy (CET) aims to extinguish conditioned cue reactivity to aid in smoking cessation. However, despite achieving extinction in the lab/clinic, the long-term efficacy of CET remains poor. A key disadvantage of CET is its limited ability to generalize extinction to the real-world, where smoking occurs. To address this limitation, our team developed a set of augmented reality (AR) smoking-related and neutral cues that can appear in real-time in smokers' natural environments as viewed through a smartphone screen. We previously established that AR smoking cues elicit cue reactivity. Prior to deployment as a clinical tool, the current study tested the ability of AR smoking cues to extinguish cue reactivity in a controlled laboratory study. We hypothesized that daily smokers who completed a single session of CET with AR smoking cues (extinction condition) would demonstrate a decrease in cue reactivity compared to those who completed CET with AR neutral cues (control condition). **Method:** Daily smokers (N=129, 46.5% female, *Mean Age* = 47.6, *Mean Cigarettes/Day* = 19.1) in acute abstinence were randomized to either the extinction or control condition comprising 28 AR trials. In both conditions, the same AR neutral and smoking cues were presented at the beginning and at the end of the session to assess change in cue reactivity. Participants rated urge to smoke following each cue presentation. **Results:** The results showed the hypothesized two-way interaction (p<.05) between trial and condition. Urge ratings significantly increased across trials in the control condition, presumably reflecting increasing nicotine withdrawal over the course of the session, whereas no such increase was found in extinction condition, presumably reflecting extinction. **Conclusion:** Results suggest that reactivity to AR cues can be extinguished in the laboratory, setting the stage for testing their clinical efficacy in smokers' naturalistic environments. AR-based CET has potential as a relapse-prevention adjuvant to a range of smoking cessation interventions, including counseling, quitlines, mHealth interventions, and pharmacotherapy.

POD13-2

TELEHEALTH DELIVERY OF A BRIEF SAVORING INTERVENTION FOR SMOKING CESSATION

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Significance: One aspect of behavioral interventions for tobacco use is addressing maladaptive reward and motivational processes formed through long-term cigarette smoking. Restructuring these processes may be accomplished by increasing the salience of pro-social rewards through positive psychology techniques. Savoring is a mindfulness-based technique that enhances one's attention to positive sensations, thus amplifying natural reward. Savoring interventions have demonstrated efficacy in reducing opioid use, and interventions including savoring techniques have been shown to reduce nicotine use. Methods: In the present pilot study, daily cigarette smokers interested in quitting were provided nicotine replacement therapy (NRT) and randomized to either a brief Savoring intervention (Savoring, n=22) or no intervention (Control, n=22) delivered via telehealth. Participants completed daily surveys regarding smoking (cigarettes per day [CPD]), cravings, mood, and practice of Savoring over a 28-day treatment period. Mixed models for repeated measures evaluated the independent effects of treatment condition and study day on CPD, cravings to smoke, and mood. Results: Analyses showed that there was a significant effect of treatment on CPD such that the Savoring group smoked less (F = 14.10, p<.001). Across both treatment groups, study day was associated with reductions in cravings (F = 1.98, p<.01). Finally, there was a significant effect of treatment on mood, such that the Savoring group reported higher mood scores (F = 5.71, p<.05). Conclusions: Overall, results of this study suggest that Savoring can be feasibly delivered via telehealth alongside NRT. Despite being a brief intervention, participants who received Savoring had greater reductions in smoking and higher mood ratings as compared to controls. Future studies should test Savoring in a fully-powered clinical trial and continue to adapt this brief intervention for telehealth, which will improve outcomes and increase access to efficacious treatment services. Funding: NIH Institutional Postdoctoral Training Grant NIH-T32-HL144470 and Hollings Cancer Center, Charleston, SC USA (P30 CA138313).

POD13-3

VERY LOW NICOTINE CONTENT CIGARETTES AND CUE-PROVOKED CRAVINGS EFFECTS OF NICOTINE REDUCTION STRATEGY AND FACILITATING EXTINCTION

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Background: Very low nicotine content cigarettes (VLNC) may aid smoking cessation by decreasing reinforcement from smoking and reducing craving through extinction processes. In a randomized controlled trial, a facilitated extinction (FE) approach (Brandon et al.,2018) was adapted and crossed with two 5-week schedules of pre-cessation VLNC cigarettes. A cue reactivity (CR) task was administered pre- and post-treatment to assess the effects of nicotine reduction schedule (immediate vs. gradual) and FE techniques on cue-provoked cravings. We predicted CR reduction, particularly among smokers in the immediate reduction arms and those who received the FE intervention. Methods: 98 smokers completed the pre- and post-treatment CR task, randomized to immediate vs. gradual reduction to the lowest nicotine level (0.44±0.01 mg/g for menthol; 0.42±0.01 mg/g for non-menthol). Half in each of the reduction groups received the FE intervention (via written material and individual counseling) and half received a standard (STD) cognitive-behavioral intervention. A validated picture-viewing CR paradigm was administered at baseline (Visit 1) and at the end of the 5-week pre-cessation treatment period (Visit 6). 12 smoking and 12 neutral images were presented (6 secs) in random order as craving ratings were obtained. Generalized Estimating Equations tested the effects of the intervention (FE vs. STD) and nicotine reduction schedule (gradual vs. immediate) on craving. Results: Mean age was 52.7 years, 61% were female, mean cigarettes/day was 20.7, and mean FTND score was 5.5. As expected, smoking cues elicited greater craving than neutral cues (p < .05). This CR declined from pre- to post-treatment (p < .05). However, these effects did not differ as a function of intervention type (FE vs. STD) or nicotine reduction schedule (all interaction ps > .05). Conclusions: As predicted, strong CR was found at baseline, with significant reduction following treatment. However, no differences were observed in CR reduction as a function of treatment condition (nicotine reduction schedule or FE intervention). These findings support the use of VLNC cigarettes to reduce cue-provoked cravings during smoking cessation and suggest that this effect is robust across treatment specifics. Further research is needed to determine the optimal treatment parameters to maximize both CR and smoking cessation outcomes using reduced nicotine cigarettes.

POD13-4

PRELIMINARY FINDINGS SUPPORT GAMIFICATION AS A METHOD TO INCREASE ENGAGEMENT IN A SOCIAL MEDIA-BASED SMOKING CESSATION INTERVENTION

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Significance. Digital health interventions have the potential benefits of increasing access to health-related interventions, ensuring fidelity of treatment, reducing costs associated with treatment delivery, and reducing patient burden. Social media platforms, such as

Facebook (FB), may be particularly useful for smoking cessation. However, digital interventions have been criticized for generally poor treatment engagement and adherence. The use of game design elements in non-game contexts, gamification, is an innovative strategy to address poor engagement and retention. Methods. We a conducting a pilot clinical trial comparing *PridePosts (PP)* to *PP + Gamification (PP+G)* with a planned sample size of 40 smokers in each condition. PP is a 6-month, FB-based, smoking cessation intervention culturally-tailored to sexual and gender minority (SGM) cigarette smokers. Participants receive 150 cessation-relevant posts over 180 days and weekly "live" chat sessions. PP+G integrates a point-based reward system into the PP intervention. Gaming elements include quiz questions, competitive polls, challenges, badges/trophies, and social engagements. Points are converted to monetary compensation monthly. Measures of engagement include total number of active comments/replies to posts and duration of active participation. Smoking abstinence is assessed at 6 months (end of treatment). Results. Preliminary findings are based on 43 SGM smokers who have completed the 6 month intervention. Demographics - Sample is diverse. Racial/ethnic identification is 59% White, 19% Multiracial, and 13% Latinx. 41% identify as male, 30% transgender/nonbinary/other, and 29% as female. 49% report an annual income of less than $30,000 per year. Engagement - Participants in the PP+G condition displayed significantly higher active engagement with the intervention with a mean of 61.9 comments/replies (SD 63.2) while PP participants had a mean of 16.0 comments/replies (SD14.3, p=.003). Mean duration of active participation was also higher in PP+G condition than the PP condition (11.5 versus 8.4 weeks, n.s.) Conclusions. These preliminary findings support the use of gamification elements to increase engagement in digital-based interventions. Further evaluation of the relationship of gamification to engagement and smoking abstinence is planned once the full sample has completed the study.

FUNDING: State

POD13-5

METHODS USED TO QUIT VAPING BY TEENS AND DEVELOPMENT OF A VIRTUAL REALITY PROGRAM TO HELP TEENS STOP VAPING

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Immersive virtual reality (VR) has the potential to promote vaping cessation among youth; it has the 'cool' factor to compete with vapes, while also providing coping skills. This study assessed: 1) previous methods used by teens to quit vaping and future intentions to use them, including VR, and 2) reactions to a proposed VR-based vaping cessation program. Participants were current and former vapers aged 14-19 from various US regions (n=101, 52.5% female, 68% white) who completed an online survey about vaping cessation methods; 29 attended Zoom focus groups about the proposed VR vaping cessation program. Descriptive analyses for survey data and thematic coding for focus group data were conducted. Survey data revealed that 42.9% used ultra-high nicotine in their devices and 42.3% of teens tried to quit vaping =3 times in their lives. The percent reporting past use of quit methods/future intentions to use quit methods were: Cold turkey (76%/72%) counseling (7.3%/31.3%), nicotine replacement therapy (NRT; 17.7%/41.7%), stop smoking medication (4.2%/30.2%), school program (2.1%/15%), text messages (15.6%/30.2%), mobile app (13.5%/34.4%), friend advice (54.2%/71.9%), and doctor's office (3.1%/40.6%). Of those who tried social media to quit (18.8%), the top three platforms used were: online forum (Reddit, Quora; 38.9%), TikTok (77.8%) and Instagram (77.7%). Fifty percent reported prior use of a VR headset for entertainment and 79% said they would likely use it for vaping cessation. Themes emerging from qualitative data were: program tone (e.g., avoid teen slang), intervention targets (sadness, anxiety, boredom), structure (tailor program to reasons to vape, create story, gamification, multiplayer), and content (finding new activities, developing coping strategies). Teens stressed the importance of not having a structured program because 'that's for addicts.' A vaping intervention delivered via VR could be an engaging for teens, possibly paired with other quit methods such as counseling and use of NRT, given their enthusiasm for these strategies.

FUNDING: Federal; Nonprofit grant funding entity

POD13-6

OUT OF THE HAZE AND INTO YOUR DMS: CO-CREATING AND PILOTING A VAPING CESSATION PROGRAM FOR TEENS DELIVERED THROUGH INSTAGRAM

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Introduction: We adapted a social media-based smoking cessation intervention to support teens who vape and for delivery on Instagram. Method: A 30-day program based on US Clinical Practice Guidelines for Smoking Cessation was adapted for teens age 13 to 20 who vape in an iterative co-creation process consisting of teen surveys (N=262), product feedback and co-creation sessions (N=26), piloting (N=195), and revisions. A prototype was developed that was administered in Instagram private groups. A pilot delivered through a state public health department with teens who vaped at least once in the past 30 days surveyed teens at baseline and at intervention end (4 weeks). Feedback was used to create a final version to evaluate in a randomized trial. Results: Early surveys/interviews yielded three design principles to inform a prototype intervention: (1) unrelenting hope while acknowledging the challenging vaping addiction presence (through balancing optimism and realism in the brand and user experience); (2) prioritizing compassion for the person behind the vape (through six program values introduced at program start and infused throughout); (3) designing for connection and support between the teens (through opportunities to support each other and limited role for live coach to "nudge the conversation" along). The initial 4-week program consisted of content sent through Instagram DMs, including messages, images, videos, and posts; interactive discussion and questions between guide and group members; and tools to support group connection and quitting (e.g., progress tracker, quit kit). Pilot data showed 78% engagement with the coach and/or peers in the group, 85% reported using group material, 91% would recommend the group to friends, and increased self-efficacy to quit vaping over 4 weeks (6.55->8.54, p<.05). Updates post pilot included extending the program to 5 weeks, integrating an additional group quit date, and increased preparation and support for maintaining post-group recovery. Conclusions: Findings demonstrated the importance of iteration and co-creation with teens when aiming to build an effective product that feels meaningful and engaging to teens.

FUNDING: Academic Institution; Nonprofit grant funding entity; Other

POD13-7

A PILOT STUDY OF NICOBLOC® AS A NOVEL INTERVENTION TO ENCOURAGE QUIT ATTEMPTS

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Background: NicoBloc® is a novel, non-pharmacological liquid applied to the filter end of a conventional cigarette that blocks 33% of tar and nicotine with one drop; three drops blocks up to 99%. NicoBloc® allows smokers to gradually lower their nicotine levels over the course of several weeks while continuing to use their own brand of cigarette. While this product is available in the U.S. and internationally, few clinical trials have explored how NicoBloc® may influence quit attempts and cessation in comparison to conventional smoking cessation aids.Methods: Smokers (N=45) from the community were recruited and randomized to receive either NicoBloc® or nicotine lozenges in combination with four weeks of in-session use of these products. Participants continued use of these products for an additional 8 weeks and then returned for a one month follow-up session. Primary outcomes included quit attempts and smoking reductions. Descriptive statistics characterized the sample and t-tests were used to examine differences between two groups on quit attempts and reductions in CPD.Results: Participants were predominately Black (66.7%) men (71.1%) with a mean age of 49.7 years (SD=10.7). Across all time points, both lozenge and NicoBloc® resulted in reductions in CPD across time (NicoBloc: 14.5 CPD at BL to 7.6 CPD at 1M F/U; Lozenge: 14 CPD at BL to 2.2 CPD at 1M F/U). Similarly, 62% of lozenge and 31% of NicoBloc® participants made a 24 hour quit attempt at 1M F/U, although these differences were not significant (p=0.13).Conclusions: Both NicoBloc® and lozenge participants reduced CPD across time and made quit attempts. NicoBloc® represents a unique, non-pharmacological option for intervention that may be most effective in subpopulations where pharmacological approaches are restricted, such as pregnant smokers and teens. Alternatively, NicoBloc® may be preferred among smokers not fully committed to quitting or who would prefer to quit gradually and not use medication. A fully randomized clinical trial is needed to determine the efficacy of NicoBloc® compared to conventional cessation methods such as NRT.

FUNDING: State; Pharmaceutical Industry; Academic Institution

PAPER SESSION 14: CIGARETTES AND E-CIGARETTES: TOXICITY AND DISEASE

POD14-1

SEX-DEPENDENT EFFECTS OF PRENATAL EXPOSURE TO THIRDHAND SMOKE ON THROMBOSIS-BASED DISEASE STATES

Hamdy Ali[1], Ahmed Alarabi[1], Zubair Karim[2], Victor Rodriguez[2], Keziah Hernandez[2], Patricia Lozano[1], Medhat El-Halawany[1], Leticia Rodrigues[1], Daniel Villalobos-García[1], Fatima Z. Alshbool[1], **Fadi T. Khasawneh**[1]. [1]Texas A&M University, Kingsville, TX, USA, [2]University of Texas at El Paso, El Paso, TX, USA.

Significance: Thirdhand smoke (THS), the persistent residue of tobacco smoke that remains after a cigarette is extinguished, materialized as a threat for human health over the last decade. We previously showed that THS exposure modulates platelet function and enhances thrombogenesis in adult exposed mice. However, whether prenatal THS exposure produces similar effects on the offspring of exposed-dams, and whether the consequences of this exposure manifest in a sex-dependent manner, is yet to be investigated. Methods: Using a validated approach that mimics real life THS exposure, C57BL/6J female mice were exposed starting one week before mating, and throughout the entire period of gestation; and the offspring were assayed at 8-10 weeks of age. Results: Interestingly, our studies demonstrated a drastic reduction in bleeding time as well as an increased tendency to arterial thrombosis in response to the in utero THS exposure. Moreover, the enhanced thrombosis and hemostasis phenotype was supported by a state of platelet hyperactivity manifested as enhanced platelet aggregation, secretion, integrin $\alpha IIb\beta3$ activation as well as activation of Akt, ERK and Rap1b. As for the role of sex, interestingly, we did observe some intersex differences at the level of granule secretion, glycoprotein IIb-IIIa activation, phosphatidyl serine-exposure, and Rap1b activation, but not hemostasis or thrombus formation. We also found that clot retraction, a step critical for the solidification into a stable thrombus, is enhanced as a result of THS. Finally and in terms of its effects on development, our analysis did reveal a difference between clean air and THS-exposed mice with regard to their weight, albeit it did not reach statistical significance. Of note, there were no differences in the blood cell count between THS and clean air mice. Conclusion: Taken together, our data clearly demonstrate for the first time- that in utero THS exposure of mice results in long-term changes in the platelet biology of their exposed offspring, in a sex-dependent manner, thereby making them more susceptible to cardiovascular diseases. Thus, the negative health consequences of THS should not be underestimated, and new policies should be enacted to vulnerable populations against exposure to this type of tobacco exposure.

POD14-2

POWER- VERSUS TEMPERATURE-CONTROLLED ELECTRONIC CIGARETTES: IMPLICATIONS FOR EMISSIONS TESTING AND EXPOSURE

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Smoking machines are commonly used to compare toxicant yields across tobacco products. These machines are usually programmed to execute a number of puffs according to some pre-determined regimen. Prior to the advent of temperature controlled electronic nicotine delivery systems (ENDS), it was found that puff velocity did not impact nicotine emissions, unlike combustible products. Nicotine emissions of a given device and liquid were proportional to puff duration and count, but not flow rate. With temperature-controlled devices (TCDs) such as JUUL, this assumption does not hold in theory; physical principles suggest that for TCDs, greater flow rates result in greater vaporization rates and toxicant emissions. Because flow rates vary widely depending on device design, reports of toxicant yields would need to account for the flow rates at which a given product is used. In this study we investigated how flow rate affects JUUL emissions. We generated and sampled JUUL aerosols using the Aerosol Lab Vaping Instrument. Ten puffs of 4sec duration and 10sec interpuff interval were executed for three flows: 1, 1.5, and 2LPM. Total particulate matter was measured gravimetrically. We found that emissions increased with flow rate; a doubling of flow rate from 1 to 2LPM resulted in approximately a 50% increase in emissions. Unlike the case of power-controlled ENDS, nicotine emissions from TCDs depend on flow rate. The results suggest

that previous estimates of JUUL flux and yield using the 1LPM CORESTA method may have been greatly underestimated. This highlights the need to use topography parameters appropriate to the device when measuring emissions.

POD14-3

EVALUATING CELLULAR TOXICITY OF CURRENT DISPOSABLE VAPES

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Significance: Disposable e-cigarettes/vapes have increased in popularity. While many flavors have been banned from established e-cigarette brands such as JUUL, disposables are marketed in a vast array of continually evolving flavors, often with little published information on ingredients or toxicity. The ongoing rise of EVALI cases demonstrates a critical need for comprehensive toxicological assessment of all e-cigarette products. This study aims to use high throughput screening techniques to evaluate the cytotoxicity of disposable vapes. Methods: E-liquids were collected from 5 brands of disposable vapes (Stig, Bidi Sticks, Hyde, Hyppe and Puff). Human alveolar A549 cells were cultured and exposed to e-liquids at a range of concentrations (0.1-30% vol/vol) for 24 h and stained to detect cell viability (calcein-AM) and ROS production (DCFDA). E-liquid exposed cells were assayed using the FLIPR® Membrane Potential Blue Assay Kit to detect changes in cell membrane potential. DNA damage was assessed using an anti-phospho-histone H2A.X (Ser139) antibody after exposure to 0-20 "puffs" for 24 h. Results: All 65 e-liquids displayed cytotoxicity after 24 h exposure with LC50 values ranging 1.4 to 7.7 %vol/vol. The most toxic flavors of each brand were Lush Ice (Stig: LC50, 1.4 %vol/vol), Marigold (Bidi Sticks: LC50, 1.7 %vol/vol), Pink Lemonade (Hyde: LC50, 1.7 %vol/vol), Peach Ice (Hyppe: LC50, 1.6 % vol/vol) and Neon Rain (Puff: LC50, 2.8 %vol/vol). The effects of e-liquid exposure on cellular ROS production, membrane potential and DNA damage are currently being evaluated. Conclusion: This study suggests that disposable vapes are cytotoxic and maintain other properties that are harmful to the microenvironment of airways. Cytotoxicity and DNA damage are potential precursors to pulmonary complications. Without stronger regulation and more research, disposable vapes are a threat to public health and cannot be deemed as a safer alternative to cigarettes.

POD14-4

EXOSOMES ARE PATHOGENIC ENTITIES THAT DRIVE TISSUE REMODELING DURING CONVENTIONAL SMOKING

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Background and Significance: Chronic lung diseases associated with conventional smoking continue to be leading causes of death globally and pose a heavy economic burden worldwide. Despite the distinct strides made in our understanding of the pathology associated with smoking, the therapies available for smoke-induced lung diseases remain limited. Thus, investigations into drivers of the tissue destruction prompted by smoking have the potential to expand the therapeutic arsenal for the treatment of associated lung diseases. Exosomes are small, extracellular vesicles that are released by most cells. While the biochemical makeup of exosomes can vary depending on cell origin, they act as important mediators of cellular communication by carrying protein and nucleic acid cargo to neighboring cells. In addition to these homeostatic roles, external stimuli can alter the exosome signature among tissues to drive the initiation and progression of disease. Methods and Results: Using proteomic techniques, our laboratory has extensively characterized the airway exosome profile of individuals with chronic obstructive pulmonary disease (COPD). Interestingly, we have found that conventional smokers with or without COPD have a unique population of pathogenic exosomes that carry surface-associated proteases. Enzymatic assays reveal that these exosomes have increased proteolytic activity and an enhanced ability to degrade the lung's delicate tissue matrix. Using a murine model of smoke exposure, we have shown that this deleterious population arises early and becomes evident at 2 weeks. The exosome fraction associated with smoke exposure also has the potential to recapitulate features of chronic lung disease. Upon transferring the smoke-associated exosomes to naïve recipient mice, we observe distinct tissue remodeling and damage. Conclusions: Taken together, our investigations have uncovered novel drivers of smoke-associated lung damage with the potential to inform new therapeutic strategies.

POD14-5

CHRONIC HIV-1 TAT EXPOSURE ALTERS NICOTINE DEPENDENCE IN MICE

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Significance. Rates of current smoking among HIV-population remain 2-3 times higher than that of the general population. In addition, HIV patients are more likely to become dependent on nicotine and less likely to quit than HIV-negative individuals. HIV infection is often associated with chronic pain states, including sensory and painful neuropathy. Recent population-based studies support a high co-occurrence of chronic pain and smoking dependence. However, preclinical investigations modelling this interaction between nicotine dependence and chronic pain are lacking, thus providing a major obstacle to studying pain-related risk factors in nicotine dependence. **Methods.** To address this deficit in preclinical models, the present study examines nicotine withdrawal in a HIV-induced neuropathy (mice conditionally expressing HIV Tat[1-86] protein) mouse model. **Results.** Nicotine withdrawal somatic and affective signs increased in intensity and persisted longer in the transgenic mice compared to their WT controls. Plasma nicotine and cotinine levels were not significantly changed in the model of neuropathy. **Conclusion.** Taken together, these findings showed that mice are more susceptible to nicotine withdrawal and possibly more susceptible to escalations in nicotine intake when undergoing chronic neuropathic pain.

POD14-6

COMPARATIVE TOXICOLOGICAL RISK-ASSESSMENT OF MENTHOL AND TOBACCO FLAVORS FOR E-CIGARETTE REGULATORY STANDARDIZATION

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Rationale: Tobacco and menthol-flavored e-cigs are available at various nicotine strengths and the chemical constituents of these flavors lack regulatory standardization. We hypothesized that acute exposure to menthol and tobacco flavors from different brands induce an inflammatory response in mice. *Methods:* Menthol and tobacco flavored ECTO and EC-Blend e-liquids were characterized for their chemical composition by GC-MS. C57BL/6J and BALB/cJ mice of both sexes were exposed to e-cig aerosols, PG/VG (50:50), 0 and 6 mg nicotine menthol and tobacco flavors. These whole-body exposures were performed 2 hrs/day for 3 days, using Scireq inExpose exposure system. Inflammatory mediators secreted in the bronchoalveolar lavage fluid (BALF) were measured by Luminex assay and the inflammatory cells were phenotyped by flow cytometry. Changes in lung surfactant proteins were determined by western blot analyses in the lung homogenates. *Results:* Tobacco flavored e-liquids contained benzyl alcohol, ethyl maltol, eugenol, and menthol, while menthol and pulegone were predominant in menthol flavored e-liquids in varying concentrations between the two tested brands. PG/VG ratio was approximately 50:50 in both flavors in both brands. Acute exposure to PG/VG and menthol flavor increased the total cell counts in the BALF compared to tobacco flavor. PG/VG induced the highest cell infiltration in BALF. Neutrophil counts were increased in both PG/VG and menthol exposure. T-lymphocyte counts were significantly altered by both menthol and tobacco flavors in both mouse strains. Most significant changes in BALF cell counts with menthol exposure were observed in BALB/cJ strain. Menthol differentially affected inflammatory cytokines, such as MCP-1, IFNγ, KC, TNFα, RANTES, and Eotaxin in both the mouse strains compared to the air group. Similarly, tobacco flavor exposure deferentially affected IL-3, IL-1β, TNF-α, IL-9, IFN, KC, IL-2, IL-13, IL-6, IL-4, IL-5, IL-1a.IL-10, IL-17A, GM-CSF, MIP-1α, IL-1, and MIIP-1β levels predominantly in C57BL/6J mice. Lung surfactant proteins (SP-A and SP-D) were deferentially affected by the aerosol exposures. *Conclusion:* E-liquids of the same flavor category but different brands are not identical in chemical composition. Acute exposure to PG/VG, menthol, and tobacco flavors induced a Th1 driven inflammatory response with neutrophilia demonstrating potential acute lung injury. The presence of nicotine affected chemotaxis, inflammatory mediators, and increased susceptibility to immune-toxicity in menthol and tobacco exposed mice. Our data suggest that constituents and concentrations of flavoring chemicals determine the toxicity due to inhalation; thus, it is imperative to conduct risk assessment and standardization of these flavor constituents in e-liquids for regulatory purposes. **This study was supported by NIH R01HL135613 and U54CA228110.**

PAPER SESSION 15: LESSONS FROM DIVERSE POLICY IMPLEMENTATION ACROSS THE GLOBE

POD15-1

EVALUATION OF THE U.S. FEDERAL TOBACCO 21 (T21) LAW AND LESSONS FROM STATE-WIDE T21 POLICIES: FINDINGS FROM POPULATION-LEVEL SURVEYS

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SIGNIFICANCE: On December 20, 2019, Tobacco 21 (T21) became U.S. federal law, raising the minimum age for tobacco purchases to 21 years. We evaluated the impact of this federal law at the one-year mark. **METHODS:** We examined shifts in actual and perceived ease of access among US middle and high school students using data from the 2011-2020 U.S. National Youth Tobacco Survey. Data were weighted to yield representative estimates. **RESULTS:** The overall percentage perceiving it was easy to buy tobacco products from a store decreased between 2019 (67.2%) and 2020 (58.9%). However, perceived ease of online purchases was high and plateaued between 2019 (86.6%) and 2020 (85.8%). Furthermore, while perceived ease of buying tobacco products from physical stores increased with increasing grade level during 2020 (p-trend<0.001), no significant trend was seen for perceived ease of online purchases (p-trend=0.261). Non-Hispanic blacks were the only racial subgroup to report no significant decrease in perceived ease of buying tobacco products from a store during 2011-2020. Overall, 10.1% of all students tried buying cigarettes from a store within the past 30 days, down from 14.1% in 2018 (p<0.001). Only 17.0% of those who attempted a cigarette purchase in 2020 reported that the sales clerk refused to sell it to them because they were underaged. **CONCLUSIONS:** Evaluation of the federal T21 law at the one-year mark shows it has the potential to reduce ease of tobacco access, but intensified efforts are needed with compliance. Over 4 in 5 US middle and high school students who attempted to buy cigarettes in the past 30 days were successful, underscoring the need for intensified efforts to reduce illegal sales of tobacco to minors through enforcement of local, state, and federal access laws. Targeted efforts are needed in minority communities as differential enforcement of T21 policies in white neighborhoods versus those of color may lead to uneven impact of T21 policies and may deepen disparities in tobacco use. **Funding statement:** No external funding.

POD15-2

IMPLEMENTATION BARRIERS AND FACILITATORS OF THE 2019 TOBACCO FLAVOR RESTRICTION LAW IN MASSACHUSETTS

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Significance: In November 2019, the Massachusetts legislature passed the nation's first statewide law to restrict retail sales of *all* flavored (including menthol) tobacco products. The law also increased excise taxes for e-cigarettes, penalties for sales to minors, and coverage for tobacco cessation treatment. This study aimed to identify the barriers and facilitators during the initial implementation of the law. **Methods:** We conducted in-depth interviews with 9 public health officials and policy advocates in Massachusetts from March to July 2021 to explore six areas informed by the Exploration, Preparation, Implementation, Sustainment Framework (i.e., sociopolitical context, impact of funding, range of advocacy efforts, interorganizational networks, organizational characteristics, and characteristics of decision-makers and leaders). We conducted thematic analysis of interview transcripts using deductive codes based on the study constructs and inductive codes of key themes emerging from the interviews. **Results:** Participants described key implementation challenges including in enforcement of

retailer compliance, navigating tobacco industry tactics around naming flavors, and health insurance coverage for tobacco use cessation programs. Also highlighted was the potential for unintended consequences of the legislation, especially in communities of color. Facilitators included the tenacity of legislative champions in pushing for the flavor ban and advocacy efforts particularly by youth. The autonomy of 351 municipalities' boards of health in Massachusetts to pass local policies also had a powerful influence in shaping state-wide legislation starting at the local level and preventing the tobacco industry from launching legal challenges against local policies. The COVID-19 pandemic was an important barrier in conducting retailer compliance checks and implementing various provisions of the new law. **Conclusions:** The findings provide preliminary data on implementation barriers and facilitators of the Massachusetts law experienced by public health officials and can inform the use of appropriate implementation strategies for similar tobacco control policies in other states.

POD15-3

PROTECTING NONSMOKERS FROM TOBACCO SMOKE PENETRATION IN MULTI-UNIT APARTMENT BUILDINGS - PROGRESS VIA LITIGATION IN ISRAEL

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Significance Tobacco smoke penetration in multi-unit apartment buildings is a significant public health problem in many countries. In Israel, where most of the population lives in multi-unit housing, research conducted in 2017 and 2021 showed that about 50% of the population is subject to this nuisance. Nonsmokers are exposed to substantial amounts of tobacco smoke toxins, resulting in health damage and economic damage to property value. Yet, initiatives to protect non-smokers in their own homes are often stymied because smokers claim an alleged right to smoke anyplace in their own homes, and to smoke on porches, even if this causes regular exposure of non-smoking neighbors. **Methods** We review recent litigation in Israel on this topic, including a civil case which was settled in 2019, a court ruling on a civil case with a ruling in July 2021, and the administrative case which is currently before the Supreme Court. **Results** In 2019, a civil appeal to a district court resulted in a settlement in which the smoking neighbor was forced to move her place of smoking on her porch, without financial charges to any parties. By contrast, a landmark ruling in a civil case in July 2021 held smokers financially accountable; they were forced to pay compensation to the nonsmokers exposed to secondhand smoke inside their own homes. The claims brought by the plaintiffs included both health and financial aspects. The court did not specify the extent to which the health claims and the financial claims contributed to the ruling. At present, a third case, this time an administrative case, is pending in the Supreme Court. It was initiated by the non-governmental organization (NGO), Clean Air (Avir Naki), in conjunction with 6 people who suffered significant health damage in the wake of regular and intense exposure to tobacco smoke by neighbors who smoke. The case is against the authorities responsible (as opposed to individuals), namely, the Minister for the Environment, the Minister of Health, and the Minister of Interior Security (Police), for enforcement of existing laws which refer to air pollution. All three cases have received massive media coverage. **Conclusion** Progress in protection of nonsmokers in their own homes, from smoke penetration by neighbors' smoking, represents a serious challenge. Recent litigation in Israel suggests that courts have the power to promote the reduction and even abolition of exposure of adults and children to secondhand smoke in their own homes, however, serious challenges remain for further action by individuals and governments.

POD15-4

THE FACILITATORS AND BARRIERS TO TOBACCO CONTROL POLICIES AND THEIR IMPLEMENTATION IN FIVE LMIC'S- A QUALITATIVE ANALYSIS

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Significance: With 1.2 billion tobacco users globally and >80% living in low- and middle-income countries (LMICs), concerted progress to implement WHO's Framework Convention on Tobacco Control (FCTC) is needed. In response, UKaid funded a £15m programme 'FCTC 2030' to strengthen tobacco control mechanisms, policy and legislation, build capacity and enhance implementation of WHO FCTC in 15 LMICs.Objectives: We undertook an independent evaluation of FCTC 2030 using multiple methods. Here we report our qualitative findings to highlight the facilitators and barriers to strengthen and implement tobacco control policies in LMICs.Methods: We conducted case studies in five FCTC 2030 countries: Zambia, Sierra Leone, Colombia, Nepal, and Jordan using individual interviews and document analyses. Interviewees were purposely sampled (n=38) from civil society, government, academia, and country-level WHO FCTC focal points (conducted Oct 2020 to Jan 2021). Document analysis verified accounts of FCTC 2030 inputs and any advances in tobacco control.Findings: The case studies highlighted the importance of country context, particularly the levels of tobacco industry interference and operation (mainly tobacco growing), the strength of governance structures and the extent of devolution, the role and influence of civil society, norms of tobacco use and strength of political will for tobacco control as key contextual influences in the progression towards implementation of FCTC. Given the importance of context, FCTC 2030's initial needs assessment and alignment of approaches to country context were an important facilitator. The tobacco industry and lack of political will were noted as significant and interrelated barriers in all case study countries. In countries new to tobacco control work, limited awareness of the dangers of tobacco was seen as a barrier, and FCTC 2030's support to education campaigns was found valuable.Conclusions: The thrust of tobacco control activities was found as a return on investment of FCTC 2030. These activities were most effective where they were able to amplify existing facilitators and counter barriers. Given the pervasiveness of industry interference, this was frequently challenging.

POD15-5

AN EVALUATION OF FCTC 2030- A PROGRAMME TO ACCELERATE THE IMPLEMENTATION OF THE WHO FRAMEWORK CONVENTION FOR TOBACCO CONTROL IN LOW- AND MIDDLE-INCOME COUNTRIES

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Significance. Many low- and middle-income countries (LMICs) have not made sufficient progress in implementing policies of the WHO Framework Convention on Tobacco Control (FCTC). The FCTC 2030 Programme, created by UKAid, was launched to lay the foundation to accelerate FCTC implementation in 15 LMICs in its first phase (2017-2021). We evaluated the FCTC 2030 Programme in 6 domains: Governance; Smoke Free Policies; Taxation; Packaging and Health Warnings; Tobacco Advertising, Promotion and Sponsorship (TAPS) bans; and International and Regional Cooperation. We also assessed if FCTC 2030 provided value for money. Methods. Our evaluation framework was adapted in part from the evaluation framework of the FCTC Impact Assessment Expert Group. We surveyed (Jun-Sept 2020) FCTC focal persons in 14 out of the 15 countries, which provided data on FCTC 2030 financial and technical inputs and on progress scores in each of the 6 domains. We computed the correlation between the FCTC 2030 inputs and progress scores in each domain. We also conducted a Payback Framework analysis to generate estimates of value for money.Results. FCTC 2030 offered substantial financial and technical inputs across all six domains that were responsive to the needs of the 15 countries. The achievements included establishing national coordinating mechanisms, securing intersectoral support, policy amendments, raising tobacco taxes increases, and effective policy implementation. There was a very high and statistically significant correlation between technical inputs and progress in 5 of the 6 domains, ranging from $r=.61$ for taxation to $r=.91$ for smoke-free policies. The Payback Framework analysis found that FCTC 2030 did indeed provide significant value for money.Conclusions. In its first phase (2017-21), the FCTC 2030 Programme—notably the technical assistance provided—led to significant progress in moving FCTC implementation forward in the 15 LMICs. As expected, much of the progress was in augmenting existing structures and resources for FCTC implementation. As the Programme moves into its second phase, these advances are more likely to lead to progress in FCTC policy implementation.

POD15-6

UNREGULATED-FINDINGS FROM SMOKELESS TOBACCO SUPPLY CHAIN RESEARCH IN PAKISTAN

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Introduction An estimated 8% (18 million) people in Pakistan consumes smokeless tobacco (ST) but despite this high prevalence, tobacco control efforts in the country have placed little emphasis on curbing ST. Pakistan ratified the World Health Organization's Framework Convention on Tobacco Control (FCTC) in 2004 but has yet to align its ST control with the relevant articles of the FCTC. The primary objective of our study was to assess the compliance of naswar (a popular ST product in Pakistan) supply chain actors and products with the national laws of Pakistan and to highlight the gap between naswar sales practices and the relevant provisions of the FCTC, applicable to Pakistan as a party. **Methods** We conducted a cross-sectional survey of 286 naswar sellers and qualitative research with naswar wholesale vendors and tobacco farmers in four districts of the Khyber Pakhtunkhwa province in Pakistan. The survey included point-of-sale observations and vendor interviews to assess the compliance with national laws. The qualitative methods focused on understanding why the different supply chain actors engage in the business of manufacturing and selling naswar, their perceptions of potential effects of FCTC guided ST control policies on their business and viable alternatives. **Results** None of the naswar products carried written or graphical health warning. A quarter of the respondents were aware of a ban on sale to minors, of whom majority (75%) reported selling naswar to minors, with the practice being more common in rural areas. Exclusive tobacco sellers were less likely to stop selling naswar compared to general vendors, citing profit margins and huge demand of naswar as the reasons. Land-suitability for tobacco cultivation, larger profits, and family traditions were the main reasons for the farmers to grow tobacco. A lack of governmental support was the main reason for the reluctance to switch to viable alternatives among the farmers. **Conclusion** There is a lack of compliance with the applicable national tobacco control laws, with indications of urban-rural disparities. Governmental support for viable alternatives may help naswar supply chain actors to switch to other businesses. **Funding** The research was funded by the German Academic Exchange Service DAAD (project numbers 57403010 and 57523644) and by ASTRA Global Health Research Group, which is funded by the NIHR, using UK aid from the UK government to support global health research (program reference 17/63/76/ Global Health Research Groups).

POD15-7

A QUALITATIVE ANALYSIS OF SMOKING RESUMPTION AMONG FORMER ENDS USERS

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SIGNIFICANCE: If electronic delivery systems (ENDS) are to offer population health benefits, people who smoke must switch to exclusive ENDS use. Yet although studies suggest some ENDS users return to smoking, few have probed lived experiences of this process, particularly among people who have had a sustained period of exclusive ENDS use. **METHODS:** We conducted in-depth, semi-structured interviews with 20 people who had smoked at least 100 cigarettes in their lifetime, reported using ENDS to stop smoking cigarettes for at least 30 days (ideally, within the preceding six months), and were currently smoking tobacco at least weekly. We explored participants' experiences of ENDS use, probed critical return-to-smoking settings and triggers, and analysed strategies that could promote sustained smoking abstinence. We managed data using NVivo12 and used reflexive thematic analysis to interpret the transcripts. **RESULTS:** We identified two linked themes that explained participants' experiences: functionality and authenticity, and freedom and self-regulation. While ENDS replicated some aspects of smoking, ENDS use did not offer authentic social and affective experiences, particularly in common return-to-smoking situations, such as social settings where others smoked and times of stress. While participants welcomed the freedom ENDS offered from smoking restrictions, ENDS' lack of definition required greater self-regulation and came with the risk of increased dependence. Remaining smokefree felt precarious, challenging, and was ultimately unable to be sustained. **CONCLUSIONS:** Participants reported returning to smoking because ENDS use required effort and did not replicate the most valued elements of smoking. Although surveys show people who smoke do move successfully to exclusive ENDS use, those unable to make this transition require support. Measures that reduce the burden of self-management could foster substitution of ENDS for smoking. For example, limiting nicotine concentrations would reduce the risk of increased dependence while replicating smoking rituals, such as using ENDS outdoors only for limited breaks, could reduce the risk continuous usage practices will evolve.

POSTER SESSION 1

PS1-1

EMOTIONAL REGULATION, IMPULSIVITY, 5-HTTLPR AND TOBACCO USE BEHAVIOR AMONG PYSCHIATRIC INPATIENTS

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The long promoter repeat of the serotonin transporter (*SLC6A4*) gene, *5-HTTLPR*, is associated with smoking and sensitivity to social context. E.g., among adolescents in the general population, *5-HTTLPR* moderates the association between experiencing negative life events and smoking behavior. Less is known about interactions between other tobacco use risk factors and *5-HTTLPR* or about the role of 5-HTTLPR and tobacco use in psychiatric populations who have the highest rates of smoking. Therefore, we examined interactions between *5-HTTLPR* and emotional regulation in psychiatric inpatients. Participants (506 adults) were psychiatric inpatients between 2012-16, in Houston TX. Most were white (89%), male (55%), with a mean age of 32.3 years. Participants completed the Difficulties in Emotional Regulation Scale (DERS) at admission. We examined interactions between DERS subscales (impulse control, lack of emotional clarity, and emotional regulation strategies) and *5-HTTLPR*, controlling for gender, race and age. Significant interactions were observed. The three DERS subscales and demographic covariates were simultaneously entered into a logistic regression, stratified by *5-HTTPLR* genotype (L'L' vs. S'S' or S'L'). Overall, 40% reported ever using tobacco; smoking rates were higher among those with the 5-*HTPLR* L'L' genotype compared to peers carrying an S' allele (47.9% vs. 37.4%, respectively). Among participants with at least one S' allele, males had twice the odds of tobacco use than females (OR=2.03; 95% CI: 1.28-3.22). Age was inversely related to ever tobacco use; older people were at decreased risk (OR=0.97; 95% CI: 0.95-0.98). Impulse control difficulties (OR=1.09; 95% CI: 1.03-1.14) and lack of emotion clarity (OR=1.06; 95% CI: 1.00-1.11) increased risk for tobacco use, while accessing more ways to regulate emotion (OR=0.95; 95% CI: 0.92-0.99) offered a protective effect against tobacco use. Neither the demographic nor DERS covariates were associated with tobacco use among the L'L' group. Our results reveal that poor emotional regulation exerts a stronger influence on tobacco use among participants carrying an S' allele of 5-*HTTLPR* than peers with the L'L' genotype.

PS1-2

PAIN SEVERITY, CIGARETTE DEPENDENCE, AND WITHDRAWAL-RELATED COGNITIONS - INDIRECT ASSOCIATIONS VIA DEPRESSIVE SYMPTOMS

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An established reciprocal model posits that pain and smoking interact in the manner of a positive feedback loop, leading to worse pain and sustained tobacco dependence. Depression has been shown to mediate associations between pain severity and current smoking, and smokers with depressive symptoms/disorders tend to report greater cigarette dependence, more severe withdrawal, and greater difficulty abstaining. The goal of the current analyses was to test the hypothesis that past four-week pain severity would be positively and indirectly associated with cigarette dependence and withdrawal-related cognitions via depressive symptoms. Participants included 226 daily tobacco smokers (M_{CPD} = 22) who participated in a laboratory study of nicotine deprivation and pain reactivity (42.9% female; M_{age} = 41.4; 38.1% Black/African-American). Measures included past four-week pain severity (rated 0-5), depressive symptoms (CES-D total score), cigarette dependence (FTCD), intolerance of withdrawal symptoms (IDQ-S Withdrawal Intolerance), and withdrawal expectancies (SAQ Withdrawal). Indirect associations were examined using the PROCESS macro, employing 10,000 bootstrap re-samplings. Separate conditional process models indicated that pain severity was positively and indirectly associated with cigarette dependence scores, perceived intolerance of withdrawal symptoms, and expectancies for more severe withdrawal, via greater depressive symptoms (ps < .05). Although the current findings are consistent with a growing literature implicating depression as a mechanism in bidirectional pain-smoking

relations, it is important to note that these data are cross-sectional and thus preclude causal interpretation. Future longitudinal research (e.g., using ecological momentary assessment) will be needed to clarify the temporal precedence of pain, depression, and smoking-related experiences/cognitions, and to examine the interplay of these factors in the context of cessation.

PS1-3

SIMULTANEOUS QUANTITATION OF DELTA⁹-TETRAHYDROCANNABINOL, CANNABIDIOL AND THEIR METABOLITES IN HUMAN PLASMA COUPLED TO A HIGHLY SENSITIVE METHOD FOR QUANTITATION OF TRACE AMOUNT OF DELTA⁹-TETRAHYDROCANNABINOL

Guillaume Georges Marie Malik, Alan Dzerk, Kirk Newland, Timothy Sangster. Celerion, Lincoln, NE, USA.

The rise of cannabis legalization in several countries increased the development of new therapeutics to treat conditions such as epilepsy, anxiety disorders or chronic pain. It is then of high importance to develop reliable methods for the quantitation of cannabidiol (CBD), Delta⁹-tetrahydrocannabinol (Delta⁹-THC) and their phase 1 metabolites. Simultaneous quantitation of Delta⁹-THC, CBD, 11-hydroxy-Delta⁹-THC (11-OH-Delta⁹-THC), 7-hydroxy-cannabidiol (7-OH-CBD) and 11-nor-9-carboxy-Delta⁹-THC (11-COOH-Delta⁹-THC) from human plasma extract was initiated and is still ongoing. Additionally, a derivatization step allowed for the very low detection of Delta⁹-THC from plasma extract (down to 5 to 10 pg/mL). Results from these two methods will be shown and discussed in this presentation.

PS1-4

THE ASSESSMENT OF NICOTINE DEPENDENCE AMONG USERS OF ELECTRONIC NICOTINE DELIVERY SYSTEMS

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An increasing number of electronic nicotine delivery systems (ENDS) users are seeking to quit ENDS. A well-validated clinical instrument for assessing nicotine dependence among ENDS users is needed. This study examined the principal components that comprise 2 candidate instruments and their concurrent criterion validity with cotinine level, a biochemical measure of nicotine intake. ENDS users who contacted the New York State Smokers' Quitline (NYSSQL) seeking to quit ENDS were administered the 8-item ENDS Nicotine Dependence Scale (ENDS-NDS) and the 10-item Penn State E-Cigarette Dependence Index (PSE). Saliva samples were collected and analyzed using liquid chromatography. Principal component analysis (PCA) was conducted on both measures. Concurrent criterion validity with cotinine levels for the instruments and their principal components was calculated using Pearson correlation coefficients. Participants (n=209) were 52% male and 70% white, with a mean age of 37 yrs (SD 15). All were current or former cigarette smokers, smoking a mean of 16 cpd (SD 8) at baseline, seeking to quit smoking ENDS. Each instrument was composed of 4 components with eigenvalues >1.00. Mean cotinine level was 266 ng/ml (SD 173). The ENDS-NDS total score was significantly correlated with cotinine level (r=.22, p<.01), but the PSE total score was not (r=.12, p=.09). Component analysis revealed that the first component of the ENDS-NDS and the third component of the PSE were significantly correlated with cotinine levels: END-NDS r=.144, p=.038, How soon after you wake up do you vape?; How often do you vape?; How many pods, cartridges, or refills do you typically use each week?; Do you find it difficult to refrain from vaping in places where it is forbidden? PSE r=.228, p=.001, Do you use an electronic cigarette now because it is really hard to quit? On the days that you can use your electronic cigarette freely, how soon after you wake up do you use your electronic cigarette? While the END-NDS shows significant criterion validity, validity might be improved by incorporating items from the third component of the PSE and employing methods to reduce item redundancy.

PS1-5

BLACK/AFRICAN AMERICAN SMOKERS WHO ARE FAST NICOTINE METABOLIZERS EXHIBIT WORSE LUNG FUNCTION AND SYMPTOMOLOGY

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Significance: Racial differences in the genetically informed biomarker of nicotine metabolism/clearance are known: BAA smokers generally have a lower nicotine metabolism rate (NMR), and faster BAA metabolizers are less likely to compensate by smoking more than Whites. Chronic Obstructive Pulmonary Disease (COPD) is a leading smoking-related disease where BAA smokers experience earlier diagnosis, and faster disease progression than Whites. It is plausible that NMR may account for some variation in the COPD trajectory. To begin to address this question, we examined the variability in NMR within a single-race sample of BAA smokers, and, the independent association between NMR with COPD status and symptomatology. Methods: Cross-sectional data from 263 BAA current smokers, without sleep disordered breathing, and prodromal/early-stage COPD (GOLD stage 0-2) were analyzed. Clinical assessments of Forced Expired Ventilation in one second (FEV1; L), the ratio of FEV1 to Forced Vital Capacity (FEV1/FVC; %) and self-reported dyspnea [score range 0-4 (most severe)] were the study outcomes. The independent variable of NMR (i.e., ratio of 3'-hydroxycotinine (3HC):cotinine) was analyzed in quartiles (Q1= slowest metabolizers). Covariates included age, sex, measured body mass index (kg/m^2), and nicotine dependence (FTND). Separate multivariable linear regression models for each study outcome were generated. Results: The sample were 59% female, mean age was 55.00y (SD=6.10), and mean FTND was 3.62 (SD=2.15). Considerable variability in NMR was seen between slow (Q1: mean=0.22; range=0.09-0.30) and fast (Q4: mean=1.15, range=0.69-3.62) metabolizers. In fully adjusted models, BAA smokers who were fast metabolizers (Q4) reported a 8.35L lower FEV1 (SE=4.18, p<.05), a 6% lower FEV1/FVC (SE=2.0%, p<.05), and a self-reported 0.43 (SE=0.23, p<.05) higher (worse) dyspnea rating than slow metabolizers (Q1). Conclusions: Considerable heterogeneity in NMR within this sample of BAA smokers was observed. NMR may be a biomarker for COPD risk in BAA smokers since fast nicotine metabolizers had worse lung function and symptomology than slow metabolizers.

PS1-6

MOTIVATING SMOKING CESSATION AND RELAPSE PREVENTION AMONG LUNG CANCER PATIENTS QUALITATIVE INTERVIEW FINDINGS

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Background: Continued smoking following a lung cancer diagnosis has detrimental effects on treatment outcomes and quality of life. We conducted qualitative in-depth interviews to inform a smoking cessation intervention and relapse prevention program for lung cancer patients regardless of their motivation to quit. We report on findings from in-depth interviews with lung cancer patients to guide the adaptation of an empirically-based Motivation and Problem-Solving (MAPS) approach, a holistic behavior change framework which incorporates aspects of social cognitive theory, motivational interviewing, and wellness program development (Hoover et al., 2019; Vidrine et al., 2013). Methods: In-depth interviews were conducted with seven lung cancer patients who reported current smoking. Interviews were conducted via the phone and were audio-recorded. Topics included: cessation motivation, attribution of diagnosis to smoking, perspectives on how to maximize the impact of the intervention for lung cancer patients, and components to be included in a wellness program. Interviews were transcribed and multiple reviewers identified emerging topics and themes. Results: Most patients were motivated to quit and had attempted cessation post- diagnosis, but subsequently relapsed. Most patients did not attribute their diagnosis to smoking cigarettes as a primary cause. Reported challenges for quitting smoking included exacerbation of cancer-related stressors and overcoming the addiction. Suggestions regarding tailored treatment for lung cancer patients included: highlighting the effects of continued smoking on cancer prognosis and treatment, information on pharmacotherapy that is compatible with cancer treatment, managing smoking triggers, positive reinforcement, and social support. Most participants noted a desire to have other smokers with lung cancer involved in the cessation program. Suggested wellness areas included behavioral and cognitive coping skills, stress management, finances, diet, and physical activity. Conclusions: Findings

elucidate the distinctive needs and concerns lung cancer patients have regarding smoking cessation. These results will help to adapt the MAPS intervention for patients with lung cancer before testing it in a randomized controlled trial.

PS1-7

IT BLOCKS WHEN YOU CAN'T STOP, A PILOT STUDY OF NICOBLOC AS A NOVEL SMOKING CESSATION DEVICE

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Introduction: NicoBloc® is a novel non-pharmacological smoking cessation product made with natural, FDA-approved food-grade ingredients (e.g., corn syrup and citric acid). It acts as a filtration device in the form of a viscous fluid that is placed on the end of a conventional cigarette. Each drop of the fluid-based solution blocks 33% of tar and nicotine when the cigarette is smoked. In this manner, up to 99% of tar and nicotine can be blocked without smokers having to alter their smoking habits. **Methods:** In an initial pilot study, we examined the feasibility, acceptability, and initial treatment outcomes of NicoBloc® compared to nicotine replacement therapy (nicotine lozenge) in a smoking cessation intervention. Participants were a community sample of predominately Black (66.7%) men (71.1%) with a mean age of 49.7 years (SD=10.7) from the Birmingham Metro area. Both groups engaged in four weeks of smoking cessation therapy followed by two months of independent usage with check-ins at 8 and 12 weeks to assess medication adherence. **Results:** Overall, NicoBloc® was found to be comparable to nicotine lozenge in feasibility, symptom side effects, and acceptability at one month follow-up. Further, adherence to NicoBloc® was superior throughout the study. **Conclusion:** NicoBloc® presents a unique, non-pharmacological avenue for intervention that may be most effective in subpopulations where pharmacological approaches are restricted or in combination with established pharmacological methods such as nicotine replacement therapies.

PS1-8

INTEREST IN ELECTRONIC CIGARETTES FOR SMOKING CESSATION AMONG ADULTS WITH OUD IN BUPRENORPHINE TREATMENT: A MIXED-METHODS INVESTIGATION

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Significance: Individuals in treatment for opioid use disorder (OUD) have high smoking rates and limited success with FDA-approved cessation aids, suggesting a need for novel approaches. Electronic cigarettes (e-cigarettes) might benefit this population, but e-cigarettes' acceptability and efficacy for tobacco reduction or cessation among smokers in OUD treatment is not known. **Methods**: Cross-sectional mixed-methods study of 222 adults in OUD treatment with buprenorphine in the Boston, MA metropolitan area in 2020. We used quantitative and qualitative data to investigate individuals' experience with and interest in e-cigarettes and other methods for smoking cessation and assessed factors associated with interest in e-cigarette use. **Results**: 160/222 (72%) participants were past 30-day cigarette smokers. They most frequently reported having ever used nicotine-replacement therapy (NRT; 83%) and e-cigarettes (71%) for smoking cessation and most often indicated interest in using NRT (71%) and e-cigarettes (44%) for future smoking cessation. In multiple logistic regression, interest in using e-cigarettes for future smoking cessation was independently associated with having ever used e-cigarettes for smoking cessation, current e-cigarette use, and perceiving e-cigarettes to be less harmful than cigarettes (p's<0.05). In qualitative data, many current vapers/former smokers reported that e-cigarettes had been helpful for quitting cigarettes. For current smokers who currently or formerly vaped, commonly reported challenges in switching to e-cigarettes were concerns about replacing one addiction with another and e-cigarettes not adequately substituting for cigarettes. **Conclusions**: Use of e-cigarettes as smoking cessation aids was acceptable to current smokers in buprenorphine treatment for OUD. The efficacy of this approach warrants investigation.

PS1-9

IMPROVING ASSESSMENT OF TREATMENT OUTCOME EXPECTANCIES IN SMOKING CESSATION TRIALS - A PSYCHOMETRIC EVALUATION OF THE STANFORD EXPECTATIONS OF TREATMENT SCALE (SETS)

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SIGNIFICANCE: Patients' beliefs about the positive and negative effects of a treatment (i.e., treatment outcome expectancies; TOEs) can influence adherence, side effects, and clinical outcomes. However, TOEs are rarely assessed in the smoking cessation literature, in part because of the lack of validated measures. Therefore, we conducted a psychometric evaluation of a promising TOEs measure from the pain literature (Stanford Expectations of Treatment Scale [SETS]) in the context of a smoking cessation trial. METHODS: Participants were 243 adults enrolled in a randomized controlled trial of extended (4-week) vs. standard (1-week) pre-quit varenicline treatment for smoking cessation; all participants received behavioral counseling and 11 weeks of post-quit varenicline (clinicaltrials.gov ID: NCT03262662). We examined the factor structure, internal consistency, and mean-level change of the SETS (assessed via ecological momentary assessment; EMA) across the first 3 weeks of treatment. To assess divergent validity, correlations with abstinence self-efficacy (assessed via EMA) and positive/negative affect (assessed at in-person visits) were examined. RESULTS: Confirmatory factor analyses supported a 2-factor structure across weeks. Positive and negative TOEs were each reflected in 3-item subscales that exhibited acceptable internal consistency (Cronbach's alphas greater than or equal to .73). Evidence for divergent validity was generally strong, with positive and negative TOEs being modestly correlated with positive and negative affect (all |rs| less than .24). Positive TOEs were moderately to strongly correlated with abstinence self-efficacy (rs = .45 to .63 across weeks). Positive TOEs declined modestly from Week 2 to Week 3 (mean difference = .244, p = .02); negative TOEs did not significantly change across the first 3 weeks of treatment (linear F = .14, p = .708; quadratic F = 3.06, p = .082). CONCLUSION: The SETS offered a valid and reliable, brief assessment of TOEs in the current sample of adults enrolled in a smoking cessation trial. Thus, for future work examining the roles of patient beliefs in treatment adherence, side effects, and/or long-term smoking abstinence, the SETS appears to be an appropriate option.

PS1-10

BASELINE ASSESSMENT OF FACILITATORS AND BARRIERS TO IMPLEMENTATION OF TOBACCO CESSATION SERVICES FOR A DIVERSE CANCER PATIENT POPULATION

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Significance: Tobacco use by cancer patients is causally linked to increased mortality and poorer treatment outcomes, yet a relatively large proportion (47-60%) of tobacco-using cancer patients continue to use. We recently joined the NCI Cancer Center Cessation Initiative (C3I) to build capacity and infrastructure for tobacco cessation treatment for a diverse patient and survivor population in the greater Los Angeles region. *Methods:* We first assessed the quality of patient tobacco use screening data documented in the electronic medical records (EMR) within a large comprehensive cancer center in Los Angeles from Jan-Jun 2019 (N=26,030; ethnicity: 20% Hispanic/Latino; race: 14% Asian, 4% Black, 49% White, 33% Other). Then we interviewed a sample of health providers (i.e., physicians, nurses, medical assistants, clinic managers) in an ambulatory care clinic to understand the contextual system-level facilitators and barriers to systematic tobacco use screening and implementation of cessation services. Qualitative interviews were guided by the Consolidated Framework for Implementation Research. *Results:* EMR data revealed that approximately 47% of patients had missing tobacco use information, and levels of missingness varied by race (e.g., greater missing data in Asian Americans), gender (i.e., greater missing data in women), and insurance status (e.g., greater missing data in uninsured). While all providers reported that tobacco use screening for all patients was important (inner setting), stakeholders differed in

descriptions of who was responsible for screening (characteristics of individuals), how often the screening should occur (intervention), and the priority level (characteristics of individuals). Several barriers were noted, including limited time with each patient (inner setting), lack of training on smoking cessation principles (inner setting), language/cultural barriers for some patient subgroups (e.g., Chinese and Armenian) (outer setting), and insurance coverage for cessation services (outer setting). *Conclusion:* While stakeholders indicated high interest in assessment of tobacco use and providing tobacco cessation services, EMR data missingness analysis and qualitative interviews revealed that here was limited systematic screening for tobacco use. Implementing a system-level sustainable tobacco cessation program will require leadership support for change, clinic staff training on brief, low-burden screening, as well as intervention and referral strategies that meet the needs of diverse patients.

PS1-11

METHODOLOGICAL CONSIDERATIONS ASSOCIATED WITH THE DISTRIBUTION OF STUDY E-CIGARETTES IN A REMOTE RANDOMIZED CONTROLLED TRIAL

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Introduction: The COVID-19 pandemic has resulted in the need to convert in-person randomized controlled trials (RCT) to remote procedures. In e-cigarette trials, the distribution of study product is a major barrier to adopting remote procedures. In this poster we describe the development of remote procedures for an RCT of e-cigarettes and the resulting changes in recruitment. **Methods:** Our recent transition from in-person to remote procedures for an ongoing pilot RCT required distributing e-cigarettes by United States Postal Service (USPS). Given the 2021 Consolidated Appropriations Act, mailing e-cigarettes is subject to the same restrictions as combustible tobacco. Thus, mailing e-cigarettes required approval from 1) our State's Attorney General, 2) Department of Taxes, and 3) the USPS, in addition to 4) our Institutional Review Board (IRB). **Results:** Mailing e-cigarettes in small amounts in the absence of monetary exchange was determined to be acceptable for research purposes. We transitioned to remote procedures and began mailing e-cigarettes to consented participants on June 3, 2021. All e-cigarettes are mailed with USPS overnight shipping and tracked to monitor delivery. To date, e-cigarettes have been shipped to 16 participants. Most (15) shipments arrived within 24 hours and 1 shipment arrived within 48 hours. The transition to remote procedures resulted in continuation of the trial without participant contact. Additionally, remote procedures allowed for national online recruitment, which resulted in over 1,100 completed screens per month. **Conclusions:** This study demonstrates that mailing e-cigarettes to transition to remote procedures is feasible and an effective way to comply with social distancing requirements. Such remote procedures allow for compliance with COVID-19 restrictions and increased capacity to recruit participants using an online advertising campaign.

PS1-12

EFFECTS OF A NOVEL NICOTINE REPLACEMENT THERAPY SAMPLING INTERVENTION ON SMOKING CESSATION-RELATED PROCESSES

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Background: Although tobacco use prevalence has substantially reduced in the general population over the past five decades, smoking prevalence remains elevated among individuals with low income. Despite this higher smoking prevalence, there have been limited smoking cessation interventions tested with low-income smokers. Interventions that promote cessation-related processes (e.g., motivation, abstinence self-efficacy, desire to quit) and favorable attitudes toward nicotine replacement therapy (NRT) are needed for this vulnerable population. **Methods:** This is a secondary analysis of a pilot clinical trial that compared a novel, in session NRT sampling intervention (*In Vivo*) and standard care (SC) smoking cessation behavioral counseling with low-income smokers (*n* = 83). To assess the impact of in-person NRT use, changes in withdrawal symptoms and cravings observed within-session were examined using paired *t*-tests. Differences in cessation-related variables by treatment group across time (from baseline to end of

treatment) were examined with generalized estimating equations (GEE) using a time X group interaction while controlling for any demographic correlates identified. **Results:** The *In Vivo* treatment had an early, positive impact on withdrawal symptoms, cravings, and perceived advantages to NRT, with moderate to large effect sizes. These changes tended to fade after Weeks 4 and 5 (when in-session sampling ended). Results also showed the treatment had its intended effects on reducing withdrawal symptoms and cravings in-session, with small to medium and medium to large effect sizes, respectively. In-session reduction of withdrawal symptoms and cravings did not occur for the SC group, with the exception of decreased withdrawal symptoms occurring during Week 4. The *In Vivo* treatment did not influence quit goal, desire to quit, abstinence self-efficacy, perceived difficulty in quitting, motivational engagement, or perceived disadvantages to NRT. **Conclusions:** There is preliminary support for this NRT sampling intervention over SC behavioral counseling in reducing withdrawal and craving, as well as for promoting perceived advantages of NRT among low-income smokers.

PS1-13

EMOTION DYSREGULATION AND VAPING EXPECTANCIES AMONG COLLEGE STUDENT E-CIGARETTE USERS

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Significance: As nicotine is often used to regulate affect, interest in understanding the role of affective vulnerability factors in e-cigarette use has grown. Emerging work examining emotion regulation difficulties has found that greater emotion dysregulation is associated with greater e-cigarette dependence and perceived barriers to cessation. However, research has yet to examine associations between emotion dysregulation and motivations for e-cigarette use. Therefore, the current study sought to examine the unique predictive ability of specific emotion regulation difficulties in terms of vaping outcome expectancies. **Methods:** Participants were 184 college students who endorsed past 30-day e-cigarette use (M_{age} = 19.97, *SD* = 1.98; 71.7% female; 85.9% White). On average, participants' e-cigarette dependence score was 9.43 (*SD* = 5.12), and 43.5% of the sample were daily users. **Results:** After controlling for the effects of gender, race, and e-cigarette dependency, emotion dysregulation significantly predicted greater positive reinforcement (16.7% variance), negative reinforcement (14.3% variance), and appetite/weight control (8% variance) outcome expectancies, but not negative consequences. Specifically, greater difficulties engaging in goal-directed behavior (*t* = 3.09, *p* = .003) and controlling impulses (*t* = 2.11, *p* = .037) and fewer difficulties using effective regulation strategies when upset (*t* = -3.13, *p* = .002) were significant predictors for positive reinforcement, and emotional clarity significantly predicted appetite/weight control (*t* = 2.78, *p* = .006). There were no significant individual predictors for negative reinforcement, but impulse control approached significance (*t* = 1.98, *p* = .05). **Conclusion:** Several domains of emotion regulation difficulty are associated with the expectation that vaping will help with appetite and weight control, increase positive affect, and reduce negative affect. Targeting these difficulties may improve cessation interventions.

PS1-14

A SIBLING COMPARISON STUDY OF PRENATAL SMOKE EXPOSURE AND GLOBAL CHILD EXECUTIVE FUNCTION

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SIGNIFICANCE: Maternal smoking during pregnancy (SDP) has been linked to lower offspring executive function, but SDP does not occur independent of familial risk factors. The sibling-comparison design enables a rigorous test of the association between SDP and global child executive function while partially controlling for genetic and environmental variables that siblings share. **METHODS**: 344 children (Child 1 [older sibling] M_{age}=12.99; Child 2 [younger sibling] M_{age}=10.19) from 173 families were recruited based on birth record report that mothers changed their smoking behavior between two pregnancies. Mothers retrospectively reported on prenatal smoking and child-specific severity scores for SDP (based on the quantity of SDP and SDP by trimester) were derived. Mothers and children completed behavioral assessments of three executive functions: set-shifting, inhibitory control, and auditory working memory. Factor analysis was used to extract global executive function factor scores for children and mothers. The sibling comparison approach involved a series of hierarchical linear models to account for non-independence of data, as well as to assess the within- (potentially causal) and between-family associations between SDP and global child executive function,

controlling for mother executive function, child IQ, and other demographic factors. **RESULTS**: Factor analysis of global child executive function indicated one factor (RMSR = 0.00; item loadings: 0.57, 0.51, and 0.51 for set-shifting, inhibition and auditory working memory, respectively). One factor was also indicated for mothers' executive function (RMSR = 0.00; item loadings: 0.68, 0.59 0.65, for set-shifting, inhibitory control, and auditory working memory, respectively). Results from the hierarchical models suggested a within-family association between SDP and global child executive functioning that was robust to control for covariates. **CONCLUION**: SDP is associated with lower global child executive function. Future research should identify and target factors motivating smoking behavior change across pregnancies to reduce poorer executive function among SDP-exposed children.

PS1-15

INTERNALIZING SYMPTOMS AND AFFECTIVE VULNERABILITY IN E-CIGARETTE USERS AND NON-USERS

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Significance: Similar to findings for combustible cigarette use, there are significant associations between e-cigarette use and psychopathology, particularly internalizing problems (Prochaska et al., 2017; Versella et al., 2019). As a result, there has been growing interest in understanding the role of transdiagnostic affective vulnerability factors in e-cigarette use. This growing body of research indicates that daily e-cigarette users report higher anxiety sensitivity than non-daily users, and dual combustible and e-cigarette users report higher anxiety sensitivity and greater emotion regulation difficulties than exclusive e-cigarette users (Mayorga et al., 2019; McLeish et al., 2021). However, there has yet to be a comparison with non-users. This information would inform theoretical models of nicotine use and emotional vulnerability as well as allow for a more targeted approach to intervention efforts. Therefore, the current study sought to examine differences between exclusive e-cigarette users and non-users in depression, anxiety, anxiety sensitivity, distress tolerance, and emotion regulation difficulties. **Methods:** Participants included 435 undergraduates (M_{age} = 20.21, *SD* = 3.81; 72.2% female; 67.1% White) who were divided into two groups based on e-cigarette use history: Never Users (*n* = 306) and Current Users (*n* = 129). **Results:** After controlling for group differences in race and age, results of the multivariate analyses of covariance indicated that there were significant group differences in internalizing symptoms [*F* (2, 372) = 6.63, *p* = .001, η_p^2 = .034] and affective vulnerability [*F* (3, 336) = 5.38, *p* < .001, η_p^2 = .046]. Specifically, compared to non-users, current e-cigarette users reported significantly higher depression (*M* = 8.22 vs. *M* = 6.57) and anxiety symptoms (*M* = 6.71 vs. *M* = 4.57), greater anxiety sensitivity (*M* = 41.0 vs. *M* = 36.9) and difficulties with emotion regulation (*M* = 43.8 vs. *M* = 36.0), and lower distress tolerance (*M* = 3.00 vs. *M* = 3.25). **Conclusions:** These results suggest that e-cigarette users experience greater internalizing symptomatology and affective vulnerability, which could motivate continued e-cigarette use and should be targeted in cessation efforts.

PS1-16

RTMS DOSING FOR SMOKING CESSATION: PRE-COVID PRELIMINARY RESULTS

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Significance: High frequency Repetitive Transcranial Magnetic Stimulation (rTMS) is a promising treatment for smoking cessation, but the optimal dosing parameters for long-term cessation are unknown. While increasing intensity and duration might improve outcomes, this may also increase participant burden, negatively affecting outcomes. **Methods:** Preliminary results from an ongoing study aimed to determine optimal 20Hz rTMS (110% MT) dosing of the left dorsolateral prefrontal cortex for long-term smoking cessation are presented. We examined the effect sizes of two dosing parameters, duration (8, 12, or 16 days of stimulation) and intensity (900 or 1800 pulses per day) on delay discounting rate (the therapeutic target), latency to relapse, and 6-month abstinence rates among participants who received active rTMS (n=23) prior to the pandemic. We also examined research burden among participants who received active and sham rTMS (n=51) using the Perceived Research Burden Assessment (PeRBA).

We hypothesized that greater rTMS duration and intensity will result in lower discounting rates and greater latency to relapse, abstinence rates, and research burden. **Results:** Increasing the duration of rTMS showed a large effect size ($100 magnitude: F=4.50, p=.035, η2=.429; $1000 magnitude F=5.66, p=.019, η2=.485). Increasing intensity showed a small effect size ($100 magnitude: F=0.83, p=.78, η^2=.007; $1000 magnitude F=5.66, p=..88, η^2=.002). Increasing duration from 8 to 12 and 16 days showed a medium and large effect size respectively for latency to relapse. The odds ratios suggest that increasing duration increased the odds of long-term abstinence 7-8 fold, and increasing intensity nearly doubled the odds of abstinence. Increasing duration and intensity had a medium and small effect size, respectively, on participant burden (F=.376, p=695,η^2=.059; F=.008,p=.930,η^2=.001). **Conclusions:** These preliminary findings show promise that greater duration and intensity of rTMS will result in improved long-term smoking cessation without undue burden on participants.

FUNDING: Federal

PS1-17

SMARTPHONE-DELIVERED ATTENTIONAL BIAS MODIFICATION TRAINING FOR SMOKERS RESULTS IN SUSTAINED REDUCTION OF ATTENTIONAL BIAS TO SMOKING CUES

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Significance: Cigarette smoking is thought to be at least partially maintained by the attentional bias (AB) toward smoking-related cues that develops as a consequence of drug dependence. Attentional bias modification (ABM) training has been developed to directly reduce AB to smoking cues. This study evaluated the impact of smartphone-delivered, in-home ABM training to reduce AB to smoking cues and to reduce smoking behavior when used as an adjunct to conventional smoking cessation treatment. Methods: Participants (N=246) were treatment-seeking smokers who completed up to 13 days of either ABM designed to train attention away from smoking cues, using a modified dot-probe task, or sham training, followed by eight weeks of nicotine replacement therapy and counseling. Outcomes measured at baseline, 1-day post-ABM training, and 8-weeks post-ABM training included AB to smoking images and words using the dot-probe and smoking Stroop tasks, respectively, along with cigarettes per day, craving, and smoking abstinence. Results: We found that ABM training reduced AB to smoking stimuli on both the dot-probe task and the smoking Stroop task up to 8 weeks after ABM training, but did not concurrently decrease smoking behavior or craving. Conclusions: Thirteen days of smartphone-delivered ABM training, as an adjunct to smoking cessation treatment, reduced AB to both modality-specific and cross-modality smoking cues but did not impact smoking behavior. While ABM training can reduce AB to smoking cues across modalities, it is unclear whether it has therapeutic potential as an adjunct to conventional smoking cessation therapy.

FUNDING: Federal; Nonprofit grant funding entity

PS1-18

TOBACCO TREATMENT INITIATION IN CANCER PATIENTS-A SINGLE CENTRE EXPERIENCE

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Significance: Smoking post-diagnosis linked to multiple risks. Smoking cessation reduces risk of tobacco-related malignancies improving overall outcomes.**Methods:** Tobacco Health Program (THP) in cancer center: program director MD, epidemiology students, statisticians; Pulmonologist, CRNP, Tobacco Treatment Specialist (TTS) began during COVID-19 pandemic. *Patient intake*: THP conducted educational sessions for cancer providers/staff. TTS contacted 443 patients to offer services;24 patients enrolled on 6/1/21,began as telemedicine only, expanded to include office visits. **Results:** Access database established; EHR smart phrases made to standardize collection. Age/gender/race/Hispanic origin/insurance, Area Deprivation Index (ADI)collected. 57.9% Black, 68% lived in socioeconomically deprived areas (MD ADI rank 8-10); 87.5% Medicare/Medicaid insurance suggesting that THP reaches underserved minority cancer patients. Tobacco use history taken during intake visit. 20 patients current smokers, including 4 who were also vaping. 4 had recently quit. Patients' tobacco habits; cessation barriers assessed. Subsequent encounters assessed patients' progress; nicotine withdrawal via Minnesota Nicotine Withdrawal Scale (MNWS).Tobacco use assessed using Cancer Tobacco Use Questionnaire (C-TUQ). 25% current daily smokers, 44% cutting down, 12% quit 30+

days but relapsed, 19% quit. Patients followed for 6+ months. TTS outreached (233 attempts) patients by phone/text/emails to help obtain medication, reinforce education, advise on other matters (e.g. COVID-19). All patients prescribed pharmacotherapy/NRT. Pharmacotherapy compliance low; NRT (patch) compliance better. Popular reliever: nicotine inhaler. *Lung cancer screening* for eligible patients (USPSTF criteria). *Cardiovascular risk* calculated via Framingham score. Available pulmonary function test results reviewed; additional tests ordered if indicated. Comorbidity data collected using diagnosis, ICD10 codes.**Conclusion**: In the arid landscape of cancer, tobacco treatment makes significant difference. However it is challenging as patients have conflicted priorities which could be overcome by investment and prioritization by oncology.

PS1-19

PAIN INTENSITY AND INSOMNIA AMONG ADULTS WITH CHRONIC PAIN - THE MODERATING ROLE OF CIGARETTE AND E-CIGARETTE DUAL USE

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Significance: Chronic pain and insomnia are highly prevalent and frequently comorbid conditions that interact bidirectionally, leading to greater pain and increased sleep problems over time. Rates of dual nicotine product use (commonly cigarettes + e-cigarettes) and dependence are significantly higher among individuals with pain, and nighttime nicotine withdrawal has been associated with clinically significant insomnia. Although nicotine/tobacco use has been associated with increased pain and insomnia, the role of cigarette and e-cigarette dual use (vs. single-product use or non-use) in this relationship has not been explored. The goal of the present study was to test whether cigarette and e-cigarette dual use moderates the relationship between pain intensity and insomnia among adults with chronic pain. Specifically, we hypothesized that greater current pain intensity would be associated with increased insomnia symptoms, and that this relationship would be strongest among current dual users of cigarettes and e-cigarettes (vs. single product users and non-users). Methods: Participants included online survey respondents who endorsed past-month alcohol use and current chronic musculoskeletal pain (N =290; 65.2% male; M_{age} = 38). Results: Results indicated that pain intensity was positively associated with insomnia symptoms (p<.01), and that this association was moderated by cigarette and e-cigarette use status (p<.05). Specifically, the association between pain intensity and insomnia symptoms was strongest among dual users, followed by single-product users and non-users, respectively (ps<.01). Conclusions: This is the first study to examine the moderating role of cigarette and e-cigarette dual use in relation to pain intensity and insomnia symptoms among individuals with chronic pain. Given that dual use of nicotine/tobacco products and chronic pain have each been linked with greater nicotine dependence, dual users with co-occurring pain may be especially susceptible to increasing their total nicotine consumption over time, which in turn may contribute to greater sleep dysregulation.

FUNDING: Unfunded

PS1-20

THE ACUTE PHYSIOLOGICAL AND SUBJECTIVE EFFECTS OF FLAVORED CIGAR USE AMONG YOUNG ADULT CIGARETTE SMOKERS

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Background: Better understanding of the user behavior, toxicant exposure, and subjective effects of flavored cigars could inform regulatory efforts to reduce cigar abuse liability and associated harms through cigar flavor product standards. The present study compared the acute effects of four flavors of the popular cigar brand, Black & Mild, among young adult cigarette smokers. **Methods:** Young adult (ages 18-25) cigarette smokers (N=25) naïve to cigars attended five Latin-square- ordered lab sessions differing in tobacco product administered: own brand (OB) cigarette or a flavored Black & Mild cigar (original, wine, apple, and cream). During each session, participants completed two directed 10-puff bouts (30-second inter-puff-interval) with puff topography measured. Exhaled carbon monoxide (CO), saliva nicotine, and subjective measures of acceptability and flavor sensations were measured before and after each bout. Linear mixed models followed by pairwise Wald tests were used to test condition differences (p<0.05). **Results:** Relative to OB, participants took approximately 0.5 second longer puffs in all cigar conditions, and average puff volume was significantly greater in the

original, wine, and apple cigar conditions. Compared to cigars, OB resulted in a significantly higher nicotine boost (953 ng/mL vs. <300 ng/mL) and lower CO boost (4 ppm vs. 8-9 ppm) across bouts. Nicotine boost for the original cigars (283 ng/mL) was significantly higher than wine (190 ng/mL) across bouts. Overall, OB was rated more positively than all cigar conditions, with few differences in subjective effects observed between cigar conditions. Wine cigars received the highest 'dislike' ratings, and cream cigars had significantly higher ratings of flavor intensity and 'harsh as OB' than original cigars. **Conclusions:** Compared with OB cigarettes, young adult smokers generally took larger and longer puffs and had lower nicotine and higher CO exposure when using cigars. Cigar conditions had similar physiological and subjective effects with some exceptions, suggesting consistency in acute use behavior, toxicant exposure, and subjective effects across flavors.

FUNDING: Federal

PS1-21

PERCEIVED ABILITY TO HANDLE STRESS AND DEPRESSIVE MOOD WITHOUT SMOKING PREDICTS ABSTINENCE IN SOCIOECONOMICALLY-DISADVANTAGED YOUNG ADULT CIGARETTE SMOKERS

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SIGNIFICANCE: Socioeconomically disadvantaged young adult (SDYA) smokers report higher smoking prevalence than those without disadvantage and identify stress and difficulty coping without smoking as barriers to smoking cessation. The goal of the current study was to examine the effect of baseline perceived ability to handle stress and depressive mood without smoking on cessation outcomes in a randomized smoking cessation trial of SDYA smokers. METHODS: SDYA cigarette smokers (n=343) aged 18-30 with an interest in quitting in the next 6 months were randomized to receive either a 12-week web and tailored text based smoking cessation intervention (n=172) or referral to a quit line (n=171) in Spring 2020. At baseline and 12-week follow-up, participants completed a 1-item measure of perceived ability to handle stress and depressive mood without smoking (1=least to 10=most ability to cope without smoking) and were assessed for 7-day and 30-day point prevalence abstinence (PPA) at follow-up. Univariate and bivariate analyses examined mean perceived ability to cope by study group and change over time; multivariable logistic regression models assessed the association between baseline perceived ability and cessation outcomes, controlling for intervention group. RESULTS: At baseline, mean perceived ability to cope with stress and depressive symptoms without smoking was 4.8 (SD 2.5), with no difference between conditions. Mean change in perceived ability to cope without smoking from baseline to follow-up was 0.69 (SD 3.2), with an increase of 1.1 (SD 3.2) in the intervention condition compared with 0.26 (SD 3.1) in the control condition. Baseline perceived ability to handle stress and depressive mood without smoking was associated with both 7-day PPA (OR=1.15, 95% CI 1.04-1.28) and 30-day PPA (OR=1.22, 95% CI 1.09-1.38) when controlling for intervention group. CONCLUSION: Findings suggest that baseline perceived ability to cope with stress and negative mood without smoking predict 7-day and 30-day PPA at 12-week follow-up, and that these perceptions are modifiable for SDYA smokers through participation in a tailored text message cessation intervention.

FUNDING: Federal

PS1-22

DELAY DISCOUNTING IS ASSOCIATED WITH SMOKING CESSATION FOLLOWING DIAGNOSIS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Significance: Cigarette smoking is the leading cause of preventable death and disease in the US and plays a strong role in the etiology of many types of illnesses, including chronic obstructive pulmonary disease (COPD). *Delay discounting* (DD) describes the process of devaluing future outcomes. Cross-sectional research demonstrates that cigarette smokers grossly undervalue future rewards compared to non-smokers, suggesting DD may play an etiological role in cigarette smoking. No work has yet examined DD and its association with smoking cessation following diagnosis of tobacco-associated disease. This research tests the hypothesis that smokers diagnosed with COPD within the last five years who show lower rates of DD at time of investigation will be more likely to have quit smoking since diagnosis. *Methods:* This cross-sectional study recruited 348

participants to complete an online survey through Qualtrics. Inclusion criteria required that participants: 1) were diagnosed with COPD in the last five years, 2) were daily or almost-daily cigarette smokers at time of diagnosis, and 3) were at least 18 years old. Logistic regression was used to determine if DD was associated with smoking cessation (defined by 7-day point prevalence abstinence). *Results:* On average, participants were 44.68 years old (SD 13.52), 161 were men (46.3%), 300 were white (86%), 79 were Hispanic/Latino (22.7%), and 166 had at least a 2-year college degree (47%). Logistic regression showed DD indeed was associated with smoking cessation (p=.0005). Using BIC for best model selection from demographic and DD data, the logistic regression model demonstrated that increased age (OR 1.05, p=.00015), decreased discounting (OR 1.08, p=.015), and being Hispanic/Latino (OR 2.87, p=.0009) together were best associated with increased odds of smoking cessation after COPD diagnosis. *Conclusions:* This study demonstrates that DD is cross-sectionally associated with smoking cessation following COPD diagnosis. Future research should examine the longitudinal association between DD and smoking cessation after COPD and whether providing more targeted smoking cessation resources for patients with high DD may more effectively help these patients quit.

FUNDING: Academic Institution

PS1-23

EFFECTIVENESS OF TEXT MESSAGES BASED MOBILE PHONE INTERVENTION TO PREVENT SMOKING RELAPSE AMONG RECENT QUITTERS IN JAZAN REGION RANDOMIZED CONTROL TRIAL

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Background: Smoking cessation services can help smokers to quit; however, many smoking relapse cases occur over time. Initial relapse prevention should play an important role in achieving the goal of long-term smoking cessation.**Objective:** This trial aims to determine the effectiveness of text messages based phone intervention when used as an adjunct to the usual support provided to patients who wish to quit smoking, compared with usual care alone.**Methods:** This trial is a two-group, pragmatic, multi-center, individually randomized, controlled trial (allocation ratio 1:1), by comparing the 6-month the rate of continuous smoking abstinent between the recent cigarettes quitters. Participants allocation comparing usual care (ie, pharmacotherapy combined with multisession behavioral support) (the control group) with usual care plus text-messages program intervention. Participants were recruited through primary care clinics and talked to a smoking cessation counselor. Participants were randomized after 24 hour of abstinence, and those allocated to the intervention group received a 60 days of text messaging in addition to the standard support provided to all patients.**RESULTS:** A total of 140 male participants of smoking cessation clinic screened. Sample composed largely of middle aged (51.4%), married (63.6%) with highly educated level (57.8%) smokers. There was no statistically significant difference between intervention and control groups in last 7-day smoking abstinence at the 3-months primary end-point [(intervention 91.4%, 95% CI: 82.5-95.9), (control 84.1%, 95% CI = 73.6-90.8) p=0.184]. However, there was a significant difference between-groups in the last 30-day smoking abstinence at the 3 months primary end-point [(intervention 72.9%, %95 CI: 61.4-81.9) (control 53.6%, 95% CI = 41.9-64.9) P= 0.019]. Also, no significant differences were found for in last 7-day and 30-day smoking abstinence at 6-month. Although the abstinence rate was higher in intervention group at both 3 and 6 months (37.1% and 28.6%, respectively) compared to control group (34.8% and 23.2%), respectively, these differences were not statistically significant. The number of smoked cigarettes per day decreased significantly in the treatment group, with an average percent change of 26.37% from baseline compared to -91.21% in the control group, p=0.022. However, the change in the number of smoked cigarettes was not significantly changed from baseline at 6-months and from 3-months at 6-months of follow-up. **CONCLUSION:** Text messages provide a promising tool to help the recent quitters during post-quit period, thus making relative long-term abstinence of smoking more likely after a quit attempt.

FUNDING: Unfunded

PS1-24

ASSOCIATION OF SMOKING INTENSITY AND AGE OF SMOKING INITIATION WITH PREMATURE MORTALITY OF COPD PATIENTS

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Significance. Smoking is the most important modifiable risk factor for chronic obstructive pulmonary disease (COPD). It is associated with a premature decline in lung function scores, as shown in the classic Fletcher and Peto model. When assessing the

smoking status, the forecast traditionally takes into account the very fact of smoking and the smoking experience, measured by the index of pack-years. At the same time, the age of starting smoking is usually not taken into account. **Methods.** To confirm the significance of the smoking experience and the age of involvement in smoking, we conducted a 15-year monitoring of the course of COPD in 170 men. The average age of patients at the time of inclusion in the study was 60.09 ± 1.31 years. The pack-years index averaged 43.95 ± 2.09. The average age at the start of smoking was 14.73 ± 0.84 years. **Results.** The survival rate of patients during the observation period was 30%. The average age of smoking initiation in the group of patients who died before 60 years was 12.53 ± 0.58 years, while in the group of those who lived more than 75 years it was 15.15 ± 0.66 years (p <0.05). The analysis of the Kaplan-Meyer survival curves shows statistically significant differences (p<0.001) for patients with the index of pack-years up to 40 and more than 40, as well as in groups up to 30, 31-49 and more than 50 pack-years. The area under the ROC curve for the pack-years index was 0.731±0.041, p<0.001, which indicates a good diagnostic significance of the determined parameter for assessing survival. **Conclusion.** Thus, the index of pack-years and the age of starting smoking are factors of an unfavorable prognosis in COPD and should be taken into account when developing anti-smoking programs aimed at preventing early involvement in smoking.

PS1-25

ANHEDONIA: RELATIONS WITH WITHDRAWAL AND ABSTINENCE DURING A SMOKING CESSATION ATTEMPT IN A RANDOMIZED CONTROLLED TRIAL

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Significance: Evidence from both laboratory and clinical studies shows that nicotine abstinence following chronic exposure leads to diminished sensitivity to nondrug rewards (i.e., anhedonia). However, additional research is needed to evaluate whether anhedonia during a cessation attempt 1) reflects a withdrawal effect vs. an offset effect and 2) is related to a failure to achieve and sustain abstinence. Methods: We conducted secondary data analyses of a comparative effectiveness randomized controlled trial of three smoking cessation pharmacotherapies (12 weeks of varenicline, nicotine patch, or nicotine patch and lozenge) to examine: 1) whether the waveform of anhedonia across the quit attempt conforms to a curvilinear trajectory consistent with a withdrawal symptom (inverted u), and 2) whether pre- to postquit change in anhedonia during a quit attempt is associated with abstinence likelihood. Adults smoking cigarettes daily (N=1086; 52% female; 67% White; mean of 17 cigarettes smoked daily) completed an anhedonia assessment (Snaith-Hamilton Pleasure Scale) during four study visits (1 week prequit, target quit day, 1 week postquit, and 4 weeks postquit). Carbon monoxide-confirmed 7-day point-prevalence abstinence was assessed at 4, 12, and 26-weeks postquit. Results: Results showed that anhedonia increased sharply on the target quit day, peaked at 1-week postquit, and declined by 1 month postquit, consistent with a withdrawal effect. Males and those with higher levels of nicotine dependence reported especially large pre- to postquit increases in anhedonia. Logistic regression analysis showed that those who experienced a greater postquit increase in anhedonia were less likely to be abstinent at 4 and 26 weeks postquit (ps < .05 for the change score controlling for baseline level). Participants with higher mean prequit and postquit anhedonia were also less likely to be abstinent at 4, 12, and 26 weeks (ps < .05). The relations between anhedonia and abstinence remained significant when treatment was included in the models. Conclusion: Results provide additional evidence that anhedonia is a motivationally significant symptom of the tobacco withdrawal syndrome.

PS1-26

TOBACCO ASSESSMENT AND SMOKING CESSATION ASSISTANCE AMONG OLDER PRIMARY CARE PATIENTS BY ETHNICITY AND LANGUAGE PREFERENCE

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Significance: While smoking prevalence is lower among Latinos compared to non-Latino Whites, smoking remains a leading cause of preventable death among older Latinos.

Smoking cessation is a critical component of cancer prevention among older adults. Methods: Electronic health record data were extracted from the ADVANCE network of community health centers (CHCs) from patients 55-80 years of age with at least 1 primary care visit between 1/1/2017-12/31/2018. Binary outcomes included tobacco use assessment and, among those with at least 1 status indicating current smoking, having a smoking cessation medication ordered. The main independent variable combined ethnicity and language preference, categorized as non-Latino White (reference), Spanish-preferring Latino and English-preferring Latino. Patient covariates included age, gender, household income, insurance type, number of primary care visits during study period, medical and psychiatric comorbidities and body mass index. We also included clinic urbanity/rurality, state, and health system as covariates. Generalized estimating equation logistic regression was used to model odds of each outcome by ethnicity/preferred language.Results: Of the 116,328 patients with at least 1 visit to a study clinic, 96.0% had tobacco use assessed, and among those, 21.2% indicated current smoking. Non-Latino White patients had the highest smoking rate (27.6%) and Spanish-preferring Latino patients had the lowest (10.4%). Compared with non-Latino White patients, both Spanish-preferring Latino patients and English-preferring Latino patients had lower odds of having tobacco use assessed (covariate-adjusted odds ratio [aOR]=0.77, 95% CI=0.71-0.84; aOR=0.80, 95% CI=0.71-0.89, respectively). Among those with current smoking indicated, Spanish- and English-preferring Latino patients had lower odds of having a smoking cessation medication ordered (aOR=0.58, 95% CI=0.51-0.65; aOR=0.78, 95% CI=0.69-0.88, respectively) compared with non-Latino White patients. Conclusions: Tailored interventions may be warranted to mitigate tobacco-related disparities among both Spanish- and English-preferring Latino patients in CHC primary care settings.

PS1-27

THE RELATIONSHIP BETWEEN ETHNIC MINORITY STATUS AND SINGLE/DUAL/POLY USE OF E-CIGARETTES, ALCOHOL, AND TOBACCO

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Significance: Electronic vapor product (EVP) use has greatly increased over the years, especially among youth. Alcohol and tobacco use may be used concurrently with EVPs among youth; however, limited information exists about the relationship among EVP, alcohol, and tobacco, particularly among ethnic minority students and if there are any sex differences. This study examines recent data from a national youth survey that examines health behaviors and risks. Methods: Data are from the 2019 Youth Risk Behavior Survey (YRBS), a school-based survey of high school students (9th, 10th, 11th, 12th). Students with complete data on past 30 day use of e-cigarettes, tobacco, and alcohol, as well as complete data for race/ethnicity, were analyzed. The race/ethnicity variable was then recoded into the ethnic minority status variable. Descriptive and bivariate analysis was performed to help describe the study participants and to examine differences by ethnic minority status, while binary logistic regression examined the odds of product use by ethnic minority status. Results: The sample included 6571 students who identified as racial/ethnic minorities, and the majority were female (50.1%) with a mean age of 16 (S.D. = 1.25). When analyzing the percentage of students who use just EVP's, alcohol, and tobacco in the past 30 days, ethnic minority students had a lower percentages of product use. For example, single use of alcohol and EVP yielded an adjusted OR of 0.6 (95% CI = 0.5, 0.7). The same trend was also seen in dual use of products (dual use of EVP and alcohol yielded an adjusted OR of 0.5 (95% CI = 0.4, 0.6)), as well as poly use of all three products, when compared to non-ethnic minorities students (3.9% vs. 6.3%). Compared to non-ethnic minorities, ethnic minorities had lower odds of product use, including poly use (aOR = 0.6, 95% CI = 0.4, 0.8). Conclusions: While non-ethnic minorities were less likely to use e-cigarettes, tobacco, and alcohol, either in a singular, dual, or poly use fashion, this study highlights the need to further examine any factors that may contribute to the lower odds of use among ethnic minority students, such as protective factors at the familial, peer, school, or community level.

PS1-28

EXPLORING PERCEIVED ADDICTION TO CIGAR PRODUCTS AMONG BLACK YOUNG ADULT CIGAR SMOKERS: A SEMI-STRUCTURED IN-DEPTH INTERVIEW STUDY

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INTRODUCTION In the U.S., Black young adults have one of the highest cigar smoking prevalence rates. However, little is known about their perceived cigar addiction, which may influence long-term cigar smoking and cessation outcomes. This study aimed to understand perceived cigar addiction among Black young adult cigar smokers. **METHODS** Between May and July 2020, in-depth interviews were conducted with 40 Black young adult cigar smokers ages 21-29 (Female n=23) to explore perceived addiction to cigar products that they predominately smoked: blunts (n=18), cigarillos (n=16), large cigars (n=4), and filtered cigars (n=2). Interviews were audio-recorded, transcribed, and coded. Thematic analysis was used to assess emerging themes. **RESULTS** About half of the participants believed that they were addicted to cigar products that they predominantly smoked. Specifically, more than half of cigarillo smokers identified as addicted to cigarillos because they perceived smoking cigarillos as a habit that affects their quality of life. They also frequently described cigarillo addiction as a physical addiction because there is nicotine in them and they experienced various health problems (e.g., headaches) from nicotine withdrawal. The majority of blunt smokers believed that they were not addicted to blunts because there are no harmful or addictive chemicals in cannabis. Participants often described blunt addiction as a mental addiction because smoking blunts helps ease their anxiety and they enjoy the feelings associated with smoking blunts. Almost all large cigar smokers reported that they were not addicted to large cigars because they only occasionally smoked them or smoked them for recreational purposes. **DISCUSSION** Among Black young adults, perceived cigar addiction varied by cigar product, with cigarillos reported as the most addictive. Factors that influenced perceived addictiveness were health consequences from smoking, perceived harm, and frequency and purpose of smoking. Upon confirmation with future studies, public health messages may need to address perceived cigar addiction to promote smoking cessation and reduce cigar-related disparities among Black communities.

PS1-30

NON-SMOKING ADOLESCENTS' PERCEPTIONS OF DISSUASIVE CIGARETTES

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Significance: For the tobacco industry, cigarette sticks are an increasingly important means of differentiating and promoting their products. Dissuasive cigarettes may deter young people from smoking with unappealing colours and warnings. **Methods:** Two online surveys were conducted with non-smokers (not having smoked a cigarette at least once a month in the last six months) aged 12-17 to explore perceptions of cigarette appeal, harm and product trial. The first was a within-subject study which examined perceptions of four cigarettes with different coloured paper, and four cigarettes displaying a warning. In the second between-subject study, different respondents were randomized to one of four cigarettes: (1) regular cigarette; (2) least favourable colour from Study 1; (3) least favourable warning from Study 1; or (4) a combination of the least favourable colour and warning from Study 1. **Results:** In Study 1, a cigarette featuring the warning 'cancer, heart disease, stroke' and a drab dark brown cigarette were rated lowest on appeal and trial intentions, and highest on perceived harm. In Study 2, there were no significant differences in perceptions of appeal, harm or trial intentions between the regular and dissuasive cigarettes. **Conclusions:** Although dissuasive cigarettes may be less favourable than cigarettes without off-putting health warnings and colours, in the current study they do not appear to markedly reduce appeal or increase perceptions of harm compared to a regular cigarette.

PS1-31

NETWORK ANALYSIS OF VAPING INDUSTRY INFLUENCE AND MOBILIZATION ON FACEBOOK

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Significance: In response to recent policy efforts to regulate tobacco and vaping products, the vaping industry has been aggressive in mobilizing opposition using a network of manufacturers, trade associations, tobacco user communities, and appealing to the general public. One strategy the alternative tobacco industry uses to mobilize political action is coordinating on social media platforms, such as the social networking site Facebook. However, few studies have specifically assessed how platforms such as Facebook are used to influence public sentiment and attitudes towards tobacco control policy. This study uses social network analysis (SNA) to examine how the alternative tobacco industry uses Facebook to mobilize online users to influence tobacco control policy outcomes focused on the State of California. **Methods:** Data was collected from local and national alternative tobacco Facebook groups that had affiliations with activities in the State of California. Network ties were constructed based on users' reactions to posts (e.g., like, love) and comments to characterize political mobilization networks. **Results:** Findings show that alternative tobacco industry employees were more likely to engage within these networks and that these employees were also more likely to be influential (i.e., more active). Comparisons between sub-networks show that communication within the local alternative tobacco advocacy group network was less dense and more centralized in contrast to a national advocacy group that had overall higher levels of engagement among members. A timeline analysis found that a higher number of influential posts that disseminated widely across networks occurred during e-cigarette-related legislative events, suggesting strategic online engagement and increased mobilization of online activity for the purposes of influencing policy outcomes. **Conclusions:** Results from this study provide important insights into how tobacco industry-related advocacy groups leverage the Facebook platform to mobilize their online constituents in an effort to influence public perceptions and coordinate to defeat tobacco control efforts at the local, state and Federal level. Study results reveal one part of a vast network of socially enabled alternative tobacco industry actors and constituents that use Facebook as a mobilization point to support goals of the alternative tobacco industry.

PS1-32

AN INVESTIGATION OF INFLUENTIAL USERS IN IQOS PROMOTION AND MARKETING ON INSTAGRAM: A SOCIAL NETWORK ANALYSIS

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Significance: While an increasing body of literature has documented the exposure to emerging tobacco products including e-cigarettes and heat-not-burn products on social media, few studies have investigated the various stakeholders involved in the content generation. The goal of this study is to use techniques from social network analysis to identify and characterize influential users who play a key role in the promotion and marketing of IQOS, a representative heat-not-burn product, on Instagram. **Methods:** This study collected public Instagram posts that contained the hashtag #iqos between 1 January 2021 and 5 April 2021, along with associated user profile data including username, bio, followed/following relationships, and whether it was a business account. A directed social network was constructed where Instagram users who had IQOS post(s) were represented as nodes and their followed/following relationships were represented as directed edges. The degree centrality method was applied to identify influential users based on their structural positions in the IQOS network. **Results:** We identified 4,526 unique Instagram users (i.e., nodes) who had created 19,951 IQOS-relevant posts during the study period. A majority of the sample (74.9%) were users with less than 1k followers, followed by 21.72% with 1k-10k followers, 2.78% with 10k-50k followers, 0.56% with 50k-500k followers and 0.04% with 500k-1m followers. Almost half of the users are business accounts (42.05%), among which 58.95% belonged to the category of personal goods & general merchandise stores. Japanese users accounted for 29.21% of the sample, followed by English (19.62%), Italian (13.92%), and Russian (11.44%). Users with the top three in-degree centrality (i.e., the number of followers in the network) were all accounts that contained "iqos" in the username. **Conclusions:** Our findings suggest that while the marketing of tobacco products is prohibited on

social media platforms including Instagram, the spread of IQOS content on Instagram is largely driven by business accounts. Brand-relevant accounts act as key leaders in shaping the normative messages of IQOS.

PS1-33

THE PRESENCE OF PURCHASE, USE, AND POSSESSION (PUP) COMPONENTS IN US LOCALITIES WITH T21 POLICIES

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Introduction: Prior to the 2019 US federal Tobacco 21 [T21] policy, local communities raised the minimum legal sales age for tobacco from 18 to 21. Some local T21 policies prohibited the purchase, use, or possession (PUP) of tobacco products for those under a defined age (18 years or 21 years). PUP laws shift responsibility from retailers to youth and young adults. The current study examined the presence of PUP policy components such as age ID verification, appearance age exemption, and locality of T21 communities prior to the federal policy. **Methods:** US localities that adopted T21 policies before July 1, 2019 were identified through online searches and local clerk contacts. T21 policies (n=476) were independently coded by two trained coders using the Tobacco 21 Policy Assessment Tool, which identified positive and negative T21 policy components. Coding differences were resolved then reviewed by an attorney. Localities were paired with US census population categories from census.gov (2019 ACS 5-year) for locality size and coded using categories of Urban Area (UA > 50,000 residents), Urban Cluster outside of Urban Area (UC between 2,500 and 49,999 residents), and Rural (< 2,500 residents). **Results:** Among T21 policies that prohibited the purchase, use, or possession of tobacco products (n=97), 35 policies (36.1%) lacked policy language that ensured the verification of a purchaser's age. Furthermore, 34 policies (35.1%) did not explain that age verification was required for purchasers who appeared to be less than a predefined age, with 67.1% of all local T21 policies requiring retailers to verify the age of those who appeared to be 27 years or younger (n=220). Penalties for underage purchasers that violated PUP laws included, civil penalties that imposed a monetary fine (56.7%, n=55) and criminal penalties that included a misdemeanor offense (10.3%, n=10). At least one component (purchase, use, or possession) was present in 12% (n=25) of rural communities, 19.7% (n=339) of UCs, and 24.1% (n=112) of UAs. Additionally, 11 localities penalized only those who were younger than 18 years, exempting 18-20-year-olds from PUP penalties. **Conclusions:** T21 policies that include PUP components victimize youth and young adults who are targeted by tobacco industry marketing; local policymakers are encouraged to remove PUP previsions and focus enforcement on tobacco retailers instead. Some states, such as Colorado, now preempt localities from enacting PUP laws that penalize those less than 21 years of age.

PS1-34

BEYOND CROSS-PRICE ELASTICITY: WHAT ELSE CAN WE LEARN FROM THE CROSS-PRICE PURCHASE TASK?

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Significance: The cross-price purchase task is used to evaluate demand for concurrently available products. Cross-price elasticity is typically reported, but this measure may obscure important trends in preferences for the two products. We introduce two additional metrics to capture demand: cross-price crossover point and dual use liability. **Methods:** As part of a clinical laboratory experiment, 19 exclusive users of electronic nicotine delivery systems (ENDS) and 17 dual users of ENDS and cigarettes completed cross-price purchase tasks in which they reported demand for own-brand (OB) ENDS offered at variable prices ($0-$10.24 USD/10 puffs) and cigarettes offered at a fixed price of $1/10 puffs. We defined cross-price crossover point as the price at which demand for cigarettes overtakes demand for ENDS. We defined dual use liability as the percentage of total expenditure spent on cigarettes. We compared cross-price crossover point and dual use liability between dual and exclusive ENDS users using independent samples t-tests and used Pearson correlations stratified by dual user status to assess the relationship of the two outcomes. **Results:** Among exclusive ENDS users, 68% never purchased more cigarettes than OB ENDS. The mean cross-price crossover point was significantly higher among exclusive ENDS users ($8.42 [SD 3.09]) than among dual users ($2.95 [2.70]), *p*<0.001. Dual use liability was lower for exclusive ENDS users (11.38% [19.58]) than for dual users (60.85% [27.69]), *p*<0.001. Cross-price crossover point exhibited a strong negative correlation with dual use liability among both dual (r=-

0.82, *p*<0.001) and exclusive ENDS users (r=-0.98, *p*<0.001). **Conclusion:** Relative to dual users, exclusive ENDS users have significantly stronger preferences for OB ENDS when cigarettes are available and have lower liability for dual use. This observation contrasts with previously reported cross-price elasticity results indicating that cigarettes would serve as substitutes for OB ENDS similarly among exclusive and dual ENDS users. Researchers may consider examining cross-price crossover point and dual use liability when examining demand for concurrently available products.

PS1-35

KRATOM AVAILABILITY IN CALIFORNIA VAPE SHOPS

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Significance: Tobacco retailers are allowed to sell psychoactive products that are not regulated by the Controlled Substances Act or restricted by state/local policies. One example is products derived from kratom, a tree native to Southeast Asia. Kratom leaves contain an alkaloid that produces stimulant effects at low doses and opioid-like effects at higher doses. The leaves and leaf extracts can be smoked, vaped, drunk, or swallowed as pills/capsules. In an online survey of US adults, nearly half of past-year kratom users also used tobacco. Six US states (not California) and some localities (City of San Diego) prohibit the sale of kratom products. This study assessed their availability in California vape shops. Methods: This is a secondary analysis of a stratified random sample of vape shops that was designed to compare shops near and not near colleges, including both community colleges and 4-year universities. The population of vape shops was initially identified by querying Yelp and Google, then geocoded to determine straight-line distance to campus boundary shapefiles (within 3 miles or farther). A random sample of stores was drawn from the two groups. In summer 2019, trained data collectors recorded whether shops sold other tobacco products (vape-only vs. vape-and-smoke) and kratom (n=614; completion rate=93.0%). Inter-rater reliability (n=51) was k=0.94 for other tobacco and k=0.67 for kratom. Results: Kratom was sold in 62.3% (95% CI=58.5-66.1) of vape shops, including 81.1% (95% CI=77.2-84.4) of vape-and-smoke shops and 11.1% (95% CI=7.5-17.3) of vape-only. Overall, availability of kratom did not differ between stores near colleges (60.8%; 95% CI=55.2-66.0) and those farther away (64.0%; 95% CI=58.5-0.69.2). Compliance with City of San Diego's 2016 sales ban was approximately 50% (12 of 26 shops sold kratom). Conclusion: Retail availability of kratom, particularly in vape-and-smoke shops, suggests a potential for growing demand among tobacco users. Research should examine use prevalence and dual use with nicotine, investigate kratom advertising and cross-product promotion, and explore the regulatory potential of state and local tobacco retail licensing.

PS1-36

QUIT INTENTIONS AND USE OF CESSATION RESOURCES AMONG RESIDENTS OF LOW-INCOME HOUSING WHO SMOKE

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Significance: Smoke-free policies in low-income housing settings can create opportunities for cessation in a population that historically has experienced disparities in smoking rates. High quality, low-cost smoking cessation interventions can reduce smoking rates and are key to the success of smoke-free housing. We assessed smoking cessation behaviors and use of cessation resources among residents of low-income housing, pre- and post- adoption of a smoke-free policy. **Methods:**Adult smokers who were residents of 12 federally subsidized housing properties in Pennsylvania, Virginia, West Virginia, Kentucky, and Ohio completed surveys six months pre- and one month post-adoption of a smoke-free housing policy. Surveys were administered between May 2019 and February 2021. Participants were asked about their smoking behaviors, readiness to quit smoking, and use of cessation resources. **Results:**N=117 participants completed both surveys (74% female; 78% white). Mean cigarettes smoked per day decreased from 13.3 pre-policy to 9.0 post-policy (p<0.001). Participants who reported a cessation attempt in the past month increased from 41.9% to 58.8% (p<0.001). Participants who reported an active quit attempt doubled from 15.7% to 34.1% (p=0.028). Pre-policy, the most popular cessation pharmacotherapies were nicotine patch (23.0%), and gum (13.8%), and Chantix (11.2%). Counseling from a health professional (18.4%), help from friends or family (10.5%), and telephone quitline (7.9%) were the most cited behavioral strategies. **Conclusion:**Residents of low-income housing reported actively trying to quit with the introduction of a smoke-free policy. Systematic cessation support

should be applied as part of smoke-free housing policy implementation. Cessation pharmacotherapies, including low cost or free nicotine replacement therapies (NRT), and counseling options, should be made available to residents who are interested in quitting. Likewise, similar support should be provided to help residents who are not ready or able to quit to maintain compliance with the smoke-free rule by limiting smoking to certain times and places.

PS1-37

HAS TOBACCO REGULATORY SCIENCE EXPANDED INTEREST IN TOBACCO RESEARCH

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SIGNIFICANCE: Tobacco Regulatory Science (TRS) is a relatively new field of tobacco control that emerged with the passage of the 2009 Family Smoking Prevention and Tobacco Control Act granting FDA regulatory authority over tobacco products. A distinction between FDA-funded TRS and traditional NIH-funded tobacco research is that TRS grants must also be within scope of FDA regulatory authorities. As such, it is possible that TRS has attracted a new or different pool of investigators who might otherwise not have pursued tobacco-related research. In this analysis we explore if the emergence of TRS as a new field attracted investigators new to tobacco control research. METHODS: Using an internal NIH database of awarded grants, we identified investigators receiving 1) NIH-funded tobacco grants only 2) FDA-funded TRS grants only, and 3) both NIH tobacco and FDA-funded TRS research grants in fiscal years 2011-2020. Publications from all these grants were used to generate an investigator network. We then searched the 2001-2010 NIH research grant award histories of the FDA-only investigators. RESULTS: Between 2011-2020, there were 1227 new NIH-funded tobacco grants and 255 FDA-funded grants. Of these, NIH funded 1014 unique principal investigators (PIs), FDA funded 153 unique PIs and 91 PIs received funding from both NIH and FDA. Of the PIs receiving only FDA funding, 62% (n=95) had not received an NIH grant in the decade prior and 14% (n=21) were new or early stage investigators. More than half (52%, n=30) of the FDA-only PIs with previous NIH support had not received that funding for tobacco research. The network analysis indicated that investigators receiving both NIH- and FDA-funded grants scored highest on various centrality measures on average, indicating greater influence in the network. CONCLUSION: The emergence of TRS as a new field has expanded the cadre of investigators conducting tobacco research by engaging former NIH PIs to conduct TRS research and by FDA support of PIs new to research administered by NIH. PIs holding both NIH and TRS grants exhibit more collaborations than investigators conducting either TRS-only or NIH-only tobacco research.

PS1-39

EVALUATION OF THE RELATIONSHIP BETWEEN THE NICOTINE METABOLITE RATIO (NMR) AND LABORATORY ASSESSMENTS OF SMOKING REINFORCEMENT AND CRAVING AMONG ADULTS IN A SMOKING CESSATION TRIAL

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<u>Significance</u>: In general, people who metabolize nicotine more quickly smoke more cigarettes and are less successful at quitting. However, the behavioral mechanisms that link variation in the nicotine metabolite ratio (NMR), a phenotypic marker of the rate of nicotine clearance, to smoking outcomes are less clear. In the present work, we screened two candidate behavioral mechanisms, testing the hypotheses that faster metabolizers exhibit greater smoking reinforcement and greater cue-induced cigarette craving (see Butler et al., 2021; DOI: 10.1093/ntr/ntab064). **Methods:** Participants were 247 adult cigarette smokers enrolled in a randomized controlled smoking cessation trial (clinicaltrials.gov ID: NCT03262662). Participants were asked to abstain from cigarettes overnight before they completed a 36-trial laboratory choice paradigm (CBUCC; Gass and Tiffany, 2017) ~1 week before the first treatment visit, at which a saliva sample was collected for subsequent NMR (cotinine/3-hydroxycotinine) assay. On each trial, participants reported cigarette craving during cue presentation (cigarette, food, or water) and spent $0.01-0.25 to have a chance (5%-95%) to sample a cue (1 puff, bite, or sip). **Results:** Consistent with prior work, both spending and cigarette craving were greater for cigarette cues compared to water cues ($ps \le .001$), and female and Caucasian par-

ticipants demonstrated faster (log-transformed) NMR than male and African-American participants respectively (ps = .001 and .004). However, contrary to our hypotheses, faster nicotine metabolism was not associated with greater smoking reinforcement (i.e., spending for cigarettes relative to water; r = -0.12) or greater cue-reactivity (i.e., cigarette craving during cigarette cues vs. water cues; r = .03). **Conclusions:** The present study replicated basic experimental effects on reinforcement and craving, as well as expected relationships between the NMR and participant sex and race. Despite the large sample size and rigorous laboratory assessment of smoking reinforcement and cue-reactivity, there was no evidence that faster NMR is associated with greater smoking reinforcement or cue reactivity in treatment-seeking smokers.

PS1-40

BIORELEVANT IN VITRO RELEASE TESTING OF ALTERNATIVE NICOTINE DELIVERY SYSTEMS (ANDS)

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According to the Food and Drug Administration, each day over 800 youth will try smokeless tobacco (ST) or oral nicotine products (ONPs). Therefore, it is important to fully characterize these products for potential exposure and toxicity, and facilitate the regulator policy decisions to promote public health. Characterization can be considered in two approaches, 1) characterizing the product itself, or 2) biomarkers of exposure. Alternative nicotine delivery systems (ANDs) come in many forms but oral nicotine products are gaining popularity among youth are as of yet, not regulated as closely as traditional smokeless tobacco or combustible tobacco products. These oral nicotine pouches are available in many flavors, and according to referenced Nielsen data on the truth initiative site, sales increased 470% for Zyn nicotine pouches over the first part of 2020. Therefore, potential exposure (i.e., nicotine release) from noncombustible tobacco products will facilitate regulatory decisions. In vitro dissolution, release and permeation testing is a common practice during drug product research and development. We integrated a previously optimized bidirectional apparatus to evaluate the release of nicotine from ONPs and compared to smokeless tobacco (ST). This novel in vitro device, the bidirectional transmucosal apparatus (BTA), was designed and fabricated to simulate the oral cavity and its physiological variables to evaluate ONPs and ST in a more realistic fashion. The BTA was evaluated with various ONPs and Camel Snus. A validation was performed using high performance liquid chromatographic (HPLC) method with photodiode array (PDA) detection to assess in vitro nicotine release and permeation (Linearity: 0.4 - 500 µg/mL). Further, future studies of the apparatus will include different BTA parameters for their impact on in vitro rate of nicotine permeation that can be employed for the optimization of an in vitro in vivo relationship (IVIVR) for ONPs such as media temperature, adipose tissue simulation, artificial saliva versus hanks balanced salt solution. A multifactorial experimental design integrating these parameters alongside flow rate variations will be tested. The application of the bidirectional transmucosal apparatus for other types of ONPs including other flavors will also be further investigated.

PS1-41

EFFECT OF CIGARETTE SMOKING ON M1/M2 TYPE ALVEOLAR MACROPHAGE (AM) AND THE RESTORATION OF AM BY SMOKING CESSATION

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Introduction: Cigarette smoking is the most important risk factor for pulmonary disease. Alveolar macrophages (AM) are classified into M1 or M2 type. It's reported that immune functions of AM are suppressed by smoking. However, the restoration of AM after smoking cessation isn't fully understood. Therefore, we investigated the effect of cigarette smoking and the restoration of M1/M2 AM by smoking cessation. **Materials & Methods:** 8-weeks-old female C57BL/6N mice were used. KENTUCKY Research CIGARETTE were used. Mice were exposed to the smoke of twenty cigarettes per day for 10 days by MIPS smoking machine. AM were recovered by Broncho Alveolar Lavage (BAL) at 1day, from 1 to 8 weeks after smoking. Dot plots and expressions of cell surface makers (CD11c as M1 marker, CD206 as M2 marker) were analyzed by FACS. Ultrastructure of AM was analyzed by TEM and SEM. TNF-α mRNA expression was evaluated by RT-PCR. H_2O_2 production was measured by FACS using DCF-DA. **Results:** Number of AM was increased by smoking. Morphology and Dot plots of AM were changed by smoking. However, Dot plots were restored to the level of AM in non-

smoked mice at 8 weeks after smoking cessation. Ultrastructure of AM was changed by smoking and restored by smoking cessation. CD206 expression was significantly decreased by smoking, but it was restored by smoking cessation at 8 weeks up to the non-smoke level. CD11c expression was almost unchanged by smoking. TNF-α mRNA expression was significantly decreased by smoking. H_2O_2 production of AM was increased by smoking and was not restored by smoking cessation. **Conclusions:** Although morphology and number of AM were changed by smoking, these changes were restored by smoking cessation. CD206 positive cells as M2 type was strongly affected but not CD11c positive cells as M1 type AM by smoking. However, H_2O_2 production and TNF-αmRNA expression were not restored by smoking cessation. These results suggest that non-restoration of functions in M1 and M2 type AM by smoking cessation may be contribute to development in pulmonary disease by smoking.

PS1-42

CIGARETTE AND ENDS CUE REACTIVITY DURING A GLOBAL PANDEMIC: THE INFLUENCE OF COVID-19

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Significance: Electronic Nicotine Delivery Systems (ENDS) have evolved rapidly since their inception, and visual exposure to their use has been shown to act as a smoking cue. As the spread of COVID-19 has been determined to be largely by aerosol transmission, we examined whether the strength of ENDS as smoking cues would be affected by the pandemic. The current study examined whether visual exposure to ENDS use in a laboratory setting increased desire for cigarettes and e-cigarettes compared with a neutral and active control cue. **Methods:** The study included N=53 smokers [57% female, mean age 35 (range 19-59 yrs)] tested from September-December 2020. They attended two in-person sessions with an active cue (e.g., cigarette or ENDS use) or a neutral cue (bottled water drinking) delivered in each session. The cues were 5-minute videos showing product use (cigarette, ENDS, or water) that included identical settings and actors. Both participant and researcher wore personal protective equipment (e.g., masks, face shield, scrubs) and practiced social distancing. Main outcomes were pre-post cue changes in smoking urge, cigarette and e-cigarette desire, and smoking behavior as assessed using the Smoking Lapse Paradigm. **Results:** In contrast to findings from previous studies prior to the COVID pandemic, neither the cigarette or ENDS cue elicited smoking urge [$M_{increase}$ = 2.0 vs. 0.8 (water), p=0.60], cigarette desire [$M_{increase}$ = 2.5 vs. 2.4, p=0.15], or e-cigarette desire [$M_{increase}$ = -0.7 vs. 0.4, p=0.07]. Regarding smoking behavior, 70% of smokers choosing to smoke during the Smoking Lapse Paradigm [median latency = 19.0 minutes vs. 19.4 (post-water cue)]. **Conclusions:** In contrast to prior studies, cigarette smokers tested during the pandemic were not reactive to cigarette or ENDS cues. In light of COVID-19, changes were made to the original study protocol to adhere to COVID safety guidelines. We speculate that the lack of potency of ENDS, and even cigarette cues, in the study conducted during the pandemic may be due to the more sterile environment, societal concerns about respiratory aspects of virus transmission, and/or less frequent cues observed in everyday life.

PS1-43

COMPARISON OF DIFFERENT CYTOTOXICITY ASSAYS FOR THE ASSESSMENT OF TOBACCO RELATED PRODUCT TOXICITY

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Background: Electronic Nicotine Delivery Systems (ENDS), i.e., electronic-cigarettes (e-cigs) and Tobacco Heating Products (THPs), are rapidly growing in popularity. Nonetheless, comprehensive quality and safety requirements for regulatory purposes are still under development. Cytotoxicity studies are important preliminary steps in appraising the potential ENDS toxicity. Currently, neutral red uptake (NRU) is the most used assay for cytotoxicity evaluation in the context of tobacco and alternative products testing. The aim of the present study was to screen different *in vitro* cytotoxicity methods for the assessment of ENDS toxicity.**Methods**: We performed NRU, MTT, Annexin V apoptosis (AN-V), High-Content Screening (HCS) assays and Real-Time Cell Analysis (RTCA), to compare two e-cigs and two THPs with the 1R6F reference tobacco cigarette. Human bronchial epithelial cells (NCI-H292) were exposed to tobacco cigarette (1R6F) smoke and ENDS vapor at air-liquid interface.**Results**: All tests showed reduced cell viability following 1R6F smoke exposure, from no viable cells (by RTCA) to 61.03 ± 17.22 % of viable cells, at 24 hours. In comparison to 1R6F smoke exposure, vapor ENDS exposure showed an increased viability with all the methods, ranging from 26.64% to 100% cell viability, depending on the method, at 24 hours.**Conclusion**: Each method used to evaluate cytotoxicity has its own peculiarities. AN-V and RTCA exhibited a further significant reduction in cell viability following 1R6F exposure. AN-V allowed to discriminate viable cells from those in early/late apoptosis. RTCA and HCS being time-resolved analyses elucidate the kinetic dependency parameter for toxicity of smoke/vapor chemicals on cell viability. In conclusion, NRU assay may be considered a suitable test, especially when combined with a time-resolved analysis, for assessing the kinetic of cytotoxicity induced by these products. However, the use of AN-V, or similar methods to evaluate viable/necrotic/apoptotic cells, in addition to the classic NRU assay, can increase toxicological sensitivity.

PS1-44

MOTIVATING CHANGE IN OLDER ADULTS: MOTIVATIONAL CESSATION MESSAGE DEVELOPMENT FINDINGS

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Significance: 18 million American adults $\geq$45 years old smoke and are at elevated risk for the greatest age-related fear of older adults: dementia. Compared to younger adults, OAS are half as likely to make a quit attempt, but more likely maintain abstinence using evidence-based smoking treatments (EBSTs), illustrating the need for motivational messages to promote cessation EBSTs. A possible message is the association between smoking and dementia. Methods: 17 White adults, ages 50-73 years, 82.4% women, without dementia, who smoke *M*=16.2 CPD (SD=10.6) completed a 2-hour semi-structured interview and survey via telephone. We are working with community partners to collect data from non-white OAS. We used rapid analysis of transcribed interview recordings and descriptively analyzed self-report data to develop a motivational message for cessation in OAS. Results: Despite awareness of multiple health-related consequences of smoking and existing cessation ads, most OAS are unmotivated to quit due to desire for independence, imperviousness to listed conditions, delayed benefits of quitting, and uncertainty about how to cope with stress. Most OAS were unaware of the smoking-dementia relation, and after brief psychoeducation, some expressed frustration of this lack of information. OAS felt this message is important to disseminate and more motivational than past cessation ads. Most were aware of smoking cessation medication from personal/relations past use, but previous negative side effects, cessation failure, and cost were barriers to future use. Many had not considered cessation counseling and were unaware how to access it. Many OAS reported willingness to use at least 1 EBST in future quit attempts. Survey data supported qualitative findings: 11.8% agreed smoking increased dementia risk, 5.9% believed cessation decreased dementia risk; 58% of OAS were 'extremely likely' to use EBSTs while quitting, but only 17.6% reported EBSTs are 'extremely helpful' in quitting. Conclusion: Dementia is an important health consequence for OAS, but the impact of smoking on dementia is unknown to them; this relation should be disseminated as a motivating message for cessation.

PS1-45

PROMOTION OF CIGAR PRODUCTS IN INSTAGRAM "STORIES"

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SIGNIFICANCE: Cigar companies actively promote their products on Instagram, a popular social media platform among young people. Instagram's "stories" feature - which displays ephemeral content that disappears after 24 hours - presents challenges for tobacco marketing surveillance and regulatory efforts. We conducted a content analysis of stories posted by leading cigar brands to identify common marketing strategies. **METHODS:** In June 2021, we took daily screenshots of stories posted by 8 leading cigar brands in the US (n=104), which had "follower" counts ranging from 3,000 to 430,000 (median: 52,000). Stories were coded for features such as: warning statements, interactive engagement with users (e.g., polls, open-ended questions), promotion of various product features (e.g., flavors, packaging), and nature-related imagery. Analyses characterized popular marketing techniques and examined differences by brand.

RESULTS: Over half of stories were posted by the brands Dutch Masters (34%) and Backwoods (28%). Warning statements were present on 82% of stories; of these, most were displayed in small, floating boxes (75%) or written with the Instagram text function (11%). Two-thirds of stories (66%) included interactive engagement features, such as polls (35%) and quizzes (13%). Half promoted an explicitly-flavored product (e.g., Ripe Berry) and 12% featured an implicit flavor (e.g., Blue Dream Fusion). Nature-related imagery - such as beaches, mountains, and forests - was prominent in nearly a third (32%) of stories. Less common elements included branded merchandise (13%) and sweepstakes/giveaways (9%), although the brands Swisher Sweets, Cheyenne, and Al Capone more often employed these tactics. **CONCLUSION:** Cigar companies leverage Instagram stories to engage with consumers and promote their products - especially flavored varieties - to hundreds of thousands of platform users. Findings from this study provide insight into ephemeral tobacco brand content on Instagram and can help inform regulation of tobacco industry marketing on social media more generally.

PS1-46

ASSOCIATION OF ELECTRONIC CIGARETTE USE WITH RESPIRATORY SYMPTOM DEVELOPMENT AMONG US YOUNG ADULTS AGES 18-24 YEARS

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SIGNIFICANCE Electronic cigarette (e-cigarette) use is highly prevalent among young adults. However, longitudinal data assessing the association between e-cigarette use and respiratory symptoms are lacking. The study aimed to determine whether e-cigarette use is associated with the development of respiratory symptoms in young adults. METHODS Data are derived from the Population Assessment of Tobacco and Health (PATH) Study (Wave 2, 2014-2015; Wave 3, 2015-2016; Wave 4, 2016-2018; Wave 5 2018-2019), a nationally representative cohort of US adults. Young adults aged 18-24 years at baseline with no prevalent respiratory disease or wheezing symptoms were included in the analyses. Binary logistic regression models with a generalized estimating equation were tested to estimate time-varying and time-lagged associations of e-cigarette use during Waves 2 to 4 with respiratory symptom development about 12 months later at Waves 3 to 5. Main outcome assessments included self-reported respiratory symptoms in the past 12 months, including wheezing or whistling in the chest, wheezing during exercise, dry cough at night, and a composite outcome consisting of all three respiratory symptoms. RESULTS Of 6378 respondents included in the analyses, 3247 (49%) were women, 4076 (70%) were White, 1072 (15%) were Black, and 905 (15%) were from other racial groups. The per-wave prevalence of former and current e-cigarette use was 15.2% and 5.6%, respectively. Former e-cigarette use was associated with higher odds of developing any respiratory symptom (adjusted-Odds Ratio [aOR], 1.20; 95% CI, 1.04-1.39), and wheezing in the chest (aOR, 1.41; 95% CI, 1.08-1.83) in multivariable adjusted models. Current e-cigarette use was associated higher odds for any respiratory symptom (aOR, 1.32; 95% CI, 1.06-1.65), and wheezing in the chest (aOR, 1.51; 95% CI, 1.06-2.14). Associations persisted among participants who never smoked cigarettes. CONCLUSION In this nationally representative cohort of young adults, former and current e-cigarette use was associated with higher odds of developing wheezing-related respiratory symptoms, after accounting for cigarette smoking and other combustible tobacco product use. Our findings provide new evidence of a prospective association between e-cigarette use and respiratory symptoms, highlighting the potential respiratory risks of e-cigarette use, with or without concurrent combustible cigarette smoking.

PS1-47

SHISHA SMOKING AMONG MEDICAL AND DENTAL STUDENTS OF ISLAMABAD MEDICAL AND DENTAL COLLEGE; PREVALENCE, KNOWLEDGE AND PRACTICE

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SIGNIFICANCE: Shisha smoking has known harmful effects on both general and oral health; however, its prevalence is on the rise worldwide, particularly among college going youth. In order to design interventions aimed at curbing this unhealthy trend, we need to identify the factors that contribute to its propagation. More specifically, whether a lack of knowledge of its harmful effects is leading to the increase in its prevalence. Moreover, identifying patterns related to age of initiation, influencing factors and most popular location will inform intervention design as well as policy making. Thus, we studied the prevalence, knowledge and practice of shisha smoking among students of Islamabad Medical & Dental College. METHODS: A cross-sectional survey was conducted at IMDC in Mar-Apr 2021. A pilot tested, self-administered questionnaire was emailed to medical (n=500) and dental (n=200) students, consisting of questions on demographics, shisha smoking practice, shisha smoking & general health, shisha smoking and oral health, and its association with use of other tobacco products. RESULTS:Questionnaire was reliable (Cronbach's alpha of 2 subscales was 0.816 & 0.773). Overall response rate was 67.71%. The prevalence of shisha smokers was 22.6%; of whom 76.63% were from MBBS (p-value= 0.000). None of the first-year students reported smoking shisha. 52.34% of smokers started smoking at the age of 17 - 18 years. 94.73% of students believed that shisha was harmful to general health and 37.13% students considered it more dangerous than cigarette smoking. 87.12% of students believed shisha smoking to be a risk factor for oral cancer while 82.91% considered it to be associated with inflammation of gums. The most common symptoms experienced during shisha smoking included headache 16.75% and dizziness 17.48%. Twice as many MBBS students 11.78%) reported using cigarettes as compared to BDS students 4.28% (p-value = 0.023). CONCLUSION: Given the age of initiation and friends being the main influence, appropriate interventions based on health behavior models taking into consideration peer influences need to be implemented in order to curb this unhealthy trend.

PS1-48

ASSOCIATIONS OF RACE AND ETHNICITY WITH TOBACCO MESSAGING EXPOSURES AND TOBACCO USE AMONG BISEXUAL WOMEN

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Significance. Within the lesbian and bisexual (LB) community, bisexual women have the highest prevalence of tobacco use, and Black and Latina LB women are much more likely to use tobacco than their heterosexual peers. Research on tobacco use among bisexual women is limited to descriptions of prevalence in this population. We evaluated associations between race/ethnicity, exposure to pro- and anti-tobacco messages, and tobacco use outcomes among bisexual women. **Methods.** We recruited a sample of N=382 bisexual women in the United States using the online survey platform, Prolific, which has similar data quality to probability samples. Participants reported sociodemographics, exposure to pro- and anti-tobacco messaging, receipt of coupons, and ever and current use of cigarettes, e-cigarettes, and other tobacco products. We modeled associations between race/ethnicity, pro- and anti-tobacco messaging exposures, and tobacco use outcomes. **Results.** Unadjusted results indicated differences in prevalence of tobacco use by race/ethnicity, with White women having higher prevalence of ever using each product, but Black women having the highest prevalence of current cigar smoking and any tobacco use. Associations between race and tobacco use were attenuated in adjusted analyses. Receiving coupons was strongly associated with current use of cigarettes (aOR=8.02; 95% CI [3.55, 18.1]), e-cigarettes (aOR=7.26; 95% CI [3.55, 14.9]), and any tobacco (aOR=5.04; 95% CI [2.44, 10.4]). **Conclusions.** Unadjusted differences in prevalence of tobacco use across race/ethnic groups were attenuated after controlling for pro- and anti-tobacco messaging exposures. Receiving tobacco coupons was consistently associated with current tobacco use among bisexual women. Restrictions on coupons could promote equity.

PS1-49

KNOWLEDGES, PRACTICES, AND REASONS OF HOOKAH SMOKING IN THE UNITED ARAB EMIRATES

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Significance, Methods, Results, and Conclusion sections Significance: Hookah smoking has been increasing in the past few years in the United Arab Emirates (UAE) and has become a public health concern. The objective of the study was to assess the knowledge, practices and reasons of hookah smoking among UAE residents. Methods: A cross-sectional study design was implemented using a structured and validated self-administered survey. Results: A total number of 420 participations were included in the study, of which 54.5% (n = 229) were males. The prevalence of smoking hookah was 37.7% (n = 158) and more prevalent among people aged 18-29 years (n = 99, 41.6%), Arab non-Emiratis (n = 112, 42.6%) and cigarette smokers (n = 54, 49.1%), p < 0.05. The most common reasons for hookah smoking were enjoyment (n = 107, 67.7%), peer influence (n = 99, 61.4%, n) and as an aid of stress relief (n = 41, 25.9%). Hookah smoking was more likely to be carried out in cafés (n = 127, 80.4%), and with friends (n = 140, 88.6%). Compared to smoking cigarettes, only 23% (n = 97) of the participants thought that smoking hookah is more likely to cause addiction and 46.4% (n = 157) thought that hookah contains more nicotine. Conclusion: Enjoyment and peer influence were the most common reasons for hookah smoking, with cafes and restaurants being the most common places to share this practice. Hookah smoking was prevalent among young adults with misconceptions and poor knowledge of its, solidifying the need for health education and enforced implementations of laws to limit hookah smoking.

PS1-50

DIFFERENCES BETWEEN INTERMITTENT AND DAILY SMOKERS IN AN URBAN MULTI-ETHNIC ASIAN POPULATION: FINDINGS FROM SINGAPORE

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Significance: Whereas intermittent (nondaily) smokers are substantially different from daily smokers with respect to individual-level characteristics (e.g., demographics, nicotine addiction, health beliefs and quit attempts), little is known about social environmental characteristics of intermittent smokers in a multi-ethnic Asian population. This study assessed potential discrepancies in interpersonal communication, media exposure, social capital and social norms between intermittent smokers and daily smokers in Singapore, a multi-ethnic Asian urban state. **Methods:** Data from the 2019 Singapore Smokers Survey (N=2,015, ages 19 - 69 inclusive) were used to compare intermitted smokers (n=434) with daily smokers (n=1,581) in terms of various social environmental variables including interpersonal communication, media exposure, social capital and social norms. Multivariable logistic regression was carried out to examine the relationships of smoking status (intermittent smokers vs. daily smokers) to the social environmental variables. Using the forward entry approach (with entry probability fixed at $p < 0.10$), we built a parsimonious logistic regression model that estimated adjusted odds ratios (AOR) and 95% confidence intervals (CI). Variables were selected for entry and/or deletion based on the model fit comparisons by utilizing the likelihood ratio tests (LRT). **Results:** In this sample, 22% of adult smokers were intermittent smokers. In comparison to daily smokers, they were characterized by stronger perceived disapproval of smoking by their family members (AOR = 1.70; 95% CI: 0.96 - 3.02), lower perceptions of smoking prevalence (AOR = 0.51; 95% CI: 0.40 - 0.66), and more active social participation (AOR = 2.02; 95% CI: 1.53 - 2.58). In addition, intermittent smokers were more likely to engage in conversations about quitting (AOR = 2.10; 95% CI: 1.61 - 2.73). Our results also showed that they perceived lower risk of intermittent smoking compared to daily smokers (AOR = 1.60; 95% CI: 1.27 - 2.02). **Conclusion:** Intermittent smokers were found to differ from daily smokers in terms of interpersonal communication, social norms, social participation and risk perceptions. Findings from the study provide important implications for designing and implementing targeted cessation interventions and tobacco control policies in Singapore and the region.

PS1-51

USE AND RISK PERCEPTIONS OF LITTLE CIGARS AND CIGARILLOS DURING COVID-19 AMONG A NATIONALLY-REPRESENTATIVE SAMPLE OF YOUNG ADULTS

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Background: Understanding how the COVID-19 pandemic has changed young adults' perceptions and the use of little cigars and cigarillos (LCCs) can inform the development of policies and interventions to reduce LCC use. This study explored the association between changes in LCC behaviors during pandemic and risk perceptions of having COVID-19 due to LCC use among U.S. young adults. **Methods**: A nationally representative sample of 18-34-year-old (n=1,189) completed an online assessment as a part of the Wave 2 survey administration (October to November 2020) of the C'RILLOS Project. Weighted estimates assessed LCC use and COVID-19 risk perceptions. **Results:** Among past 6-month LCC users (n=418), 14.5% had only used LCCs "as sold" with tobacco (i.e., "CAI-only" users), 38.0% had only used LCCs as blunts (i.e., "CAB-only" users), and 47.4% were dual users who had used LCCs both as CAI and CAB. Dual users reported a significantly higher level of agreement to smoking more CAI and CAB than usual because of COVID-19 compared to CAI-only users and CAB-only users (ps <.05), respectively. Among CAI-only users, endorsing smoking less CAI than usual and trying to quit CAI because of COVID-19 were associated with having the perception that occasional LCC use increases the risk of having COVID-19 (ps <.05). Among CAB-only users, endorsing smoking less CAB than usual (p =.01) and trying to quit CAB because of COVID-19 (p < .01) were associated with having the perception that occasional LCC use increases the risk of having COVID-19. **Conclusions:** Changes in LCC behaviors among our sample of young adults during the pandemic were significantly associated with risk perceptions of having COVID-19. A focused communication targeting young adult LCC users should address the health risks of LCCs related to COVID-19. **Significance**: Study findings highlight changes in LCC use behaviors among a vulnerable subgroup during the COVID-19 pandemic. The impacts of the pandemic on LCC use should be considered and inform the development of tobacco regulatory policies and interventions to reduce LCC use and the burden of the pandemic.

PS1-52

A LONGITUDINAL EXAMINATION OF RACIAL DIFFERENCES IN THE EFFECT OF SMOKING HISTORY ON CHANGE IN SYSTEMIC INFLAMMATION IN OLDER ADULTS

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Significance: Although smoking cessation is associated with a decrease in c-reactive protein (CRP), a biomarker for systemic inflammation, CRP levels long term post-cessation remain higher compared to never smokers - suggestive of increased cancer risk despite cessation. African Americans have also been shown to have higher levels of inflammation compared to Whites in non-smokers, but the association of CRP and race has not been examined in adults with history of smoking. **Methods**: The current study examined the effect of race and cigarette smoking history on CRP in the Health and Retirement Study, a longitudinal cohort of older adults. CRP from dried blood spots, demographic variables, and smoking status were gathered at each assessment (2006, 2010, 2014). Linear mixed models were used to examine the effect of smoking and race on log-transformed CRP across timepoints, controlling for education, sex, year born, BMI, and cancer diagnosis. **Results**: Of the 2044 participants (*M*age=64.5±9.3 years old, 47.8% Female), 13.9% identified as non-Hispanic Blacks (NHB) and 86.1% as non-Hispanic Whites (NHW) with 37.8% and 23.7%, respectively, reporting cigarette use in 2006. NHB had significantly higher levels of CRP than NHW at baseline (p<.001). Overall, multivariable analyses found no significant effects of race (p=.499) or current cigarette smoking (p=.120); rather sex (p<.001), smoking history (p<.001), education (p<.001), and BMI (p=.012) predicted CRP levels, controlling for cancer status and age. When analyzing races separately, current cigarette smoking (p=.010), smoking history (p<.001), education (p<.001), sex (p<.001), and BMI (p=.008) were predictive of CRP levels in NHW. However, only sex (p=.001) and BMI (p=.044) were predictive of CRP levels in NHB. **Conclusion**: Race and smoking status did predict CRP levels of systemic inflammation overall, but when examining races separately, current cigarette

smoking was predictive of CRP levels in NHW but not in NHB. Our results suggest that sociodemographic (i.e., sex, BMI) may be especially important in explaining inflammation-related disease risk in NHB adults with a history of smoking.

PS1-53

USING INSTAGRAM TO REFER TEENS TO TEEN.SMOKEFREE. GOV

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Significance. After YouTube, Instagram is the platform most used by American teenagers (72 percent), according to the Pew Institute (2018). Teens are 2.5 times more likely to click through Instagram ads than on other social platforms (Fortune survey). Additionally, more teens say they use social media daily (63 percent) than watch TV (56 percent, often *sans* commercials, Common Sense Survey, 2019 data). In 2020, the National Institutes of Health (NIH) asked states to refer teens to their website: teen. smokefree.gov. The goal was not only to steer teens to the site but also to track whether the methodology was successful for an audience that can be challenging to reach via traditional media methods. **Methods.** The University of Wisconsin placed ads on Instagram. The ads featured still images and text; they linked to teen.smokefree.gov, which features a texting program known as SmokeFreeTXT. From May 5-12, 2020, Wisconsin teens saw one or more of three versions of the ad, created by NIH, featuring: 1) A teen looking at her phone with a printed testimonial, "I signed up for SmokeFreeTXT. I was skeptical, but it actually helped me keep going." 2) A view of a teen's phone playing music titled, "Smokefree Jams." 3) A vending machine depicting objects that resemble candy bars but are labeled, "SLIP," "Crave," and "Mood." **Results.** The vending machine ad generated the most overall clicks (802) but was least cost-effective ($7.17 per click). "Smokefree Jams" was the most cost-efficient ($6.30 per click) but had the second-most total clicks (734). The testimonial ad garnered by far the least clicks (335, $7 per click). Instagram costs-per-click are variable based on dynamic factors, so we report average cost-per-click. In all, more than 1800 teens clicked on the ads. The campaign reached a total of 180,096 teens and appeared on their screens a combined 2.1 million times. In all, the campaign cost $13,285, or $7 per click. That cost per click pales in comparison to $1,834—or the amount the University of Wisconsin estimates smoking costs one U.S. smoker every year in healthcare costs. **Conclusion.** Instagram appears to be a reasonably cost-effective way to quickly reach a lot of teens to steer them toward a public health intervention.

PS1-54

WHY DO SMOKERS USE E-CIGARETTES? A STUDY ON REASONS AND NICOTINE CONSUMPTION AMONG DUAL USERS

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Significance: There is minimal research that has measured motivations behind e-cigarette use and the relationship to dual use of cigarette and e-cigarette use. The aim of this study was to (1) examine extent to which motivations to use e-cigarettes varies among dual users and (2) examine whether e-cigarette motivations are related to e-cigarette and cigarette consumption among dual users. **Methods**: Adults residing in California were recruited through social media (n = 1,762, 68.9% males, 62.9% non-Hispanic White) to complete an online survey. Participants self-identified as combustible cigarette and e-cigarette dual users and reported their motivations for using an e-cigarette device, nicotine consumption, and nicotine dependence with both combustible cigarettes and e-cigarettes. **Results**: A greater proportion of people reported using e-cigarettes for enjoyment purposes than other motivations (34.2%). Motivations to use e-cigarettes to quit were positively related to monthly cigarette consumption (IRR = 1.12, 95% CI [1.04, 1.21]). Motivations to use e-cigarettes to quit smoking were also related to smoking the first cigarette within 30 minutes (IRR = 0.83, 95% CI [0.72, 0,95]) and first e-cigarette within 30 minutes (b = -0.69, 95% CI [-0.87, -0.51]). **Conclusions**: Compared to those who use e-cigarettes for enjoyment, smokers who are motivated to use e-cigarettes for cessation purposes are more likely to have greater nicotine dependence, cigarette consumption, and e-cigarette consumption. Future research needs to acknowledge that not all e-cigarette users are the same; motivations and use differ and are related to both consumption and dependence.

PS1-55

CIGARETTE SMOKING AFTER SURVIVING BREAST CANCER: A PILOT STUDY

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Background: Quitting smoking improves cancer survival and improves symptoms of cancer and its treatment. Cancer diagnosis presents a powerful motivation for leading a healthier lifestyle and embracing behavioral changes, such as quitting smoking. Many smokers quit after a cancer diagnosis, but some survivors continue to smoke. This study examined the characteristics associated with being a former rather than a current smoker among women treated for breast cancer. Methods: In this pilot, cross-sectional study, data were collected via postal surveys in women who had a history of smoking and breast cancer (N=69). Descriptive and logistic regression analyses were conducted to identify factors associated with smoking status. Results: Of this sample, 13 were current smokers and 56 were former smokers. Age, race, education, and employment status were not associated with smoking status. Women with a higher income were significantly more likely to have successfully quit smoking (former smoking OR= 5.94, p<0.05). Most women were light smokers and reported intentions to quit. Conclusion: The study attests to the addictive nature of smoking and the difficulty in achieving successful quitting even after breast cancer diagnosis. Results highlighted the role of low income as a barrier in smoking cessation. A follow up study is warranted to uncover potential barriers to smoking cessation in order to individualize tobacco treatment to meet the needs of motivated light smoking cancer patients. Implications for Practice: Intensive innovative tobacco treatment approaches are warranted, especially to cancer patients with lower income.

PS1-56

THE IMPACT OF DEMOGRAPHICS, DEPENDENCE, AND BIOMARKERS ON TRANSITIONS IN TOBACCO PRODUCT USE IN A COHORT OF SMOKERS AND DUAL USERS

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Significance: E-cigarettes have substantially altered patterns of tobacco product use. Understanding whether and how transitions between cigarette, e-cigarette, and dual use are associated with sociodemographics, dependence measures, and biomarkers may improve smoking cessation interventions. **Methods**: We applied a multistate transition model to data from 422 adult daily cigarette users and dual cigarette and e-cigarette users who were followed every 2 months for 2 years. We estimated transition rates between non-current, exclusive cigarette, exclusive e-cigarette, and dual use states. We estimated univariable hazard ratios (HR) and confidence intervals (CI) for demographic, dependence measures (including the Fagerstrom Test for Cigarette Dependence (FTCD), Wisconsin Inventory of Smoking Dependence Motives (WISDM), and their e-cigarette analogs), biomarkers, spousal behavior, and other measures. **Results**: Transitions from dual to exclusive cigarette use (i.e., discontinuing e-cigarettes) were positively associated with moderate-to-high NNAL (vs low, HR 1.4, 95%CI 1.1, 1.8), high or moderate cigarette WISDM score, using e-cigarettes on only some days compared to every day, and a high motivation to quit e-cigarettes; and were negatively associated with having a spouse who vapes (HR 0.6, 95%CI 0.4, 0.9), a high FTCD or e-FTCD score, vaping within 30 min of waking (HR 0.4, 95%CI 0.3, 0.5), and high e-WISDM score. Transitions from dual to exclusive e-cigarette use (i.e., discontinuing cigarettes) were positively associated with any psychiatric history (HR 2.8, 95%CI 1.4, 5.4) and a high motivation to quit cigarettes; and were negatively associated with having a spouse who smokes (HR 0.3, 95%CI 0.2, 0.7), moderate-to-high NNAL (HR 0.3, 95%CI 0.2, 0.6), smoking within 30 min of waking (HR 0.2, 95%CI 0.1, 0.4), smoking ≥10 cigarettes/day (HR 0.25, 95%CI 0.1, 0.6), and a high e-cigarette nicotine concentration. **Conclusions**: Measure of dependence, biomarkers, and spousal behavior are associated with tobacco use transitions and may inform who is likely to achieve smoking cessation by using e-cigarettes

PS1-57

ANATOMY OF TOBACCO PRODUCT USE AMONG US YOUTH: NATIONAL YOUTH TOBACCO SURVEY, 2011-2020

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Significance: Tobacco use, which typically begins during adolescence, continues to be the leading cause of preventable morbidity and mortality in the United States (US). Cigarette smoking was the most common tobacco product used by US youth until the last decade, when this quickly started to change following the introduction of new tobacco products, including e-cigarettes and hookahs. These changes in the youth's tobacco use landscape require proper documentation and understanding of tobacco use trends to devise effective strategies to address them. Therefore, this study examined temporal trends of exclusive and concurrent use of tobacco products among youth in the US between 2011-2020. **Methods**: We used multiple annual datasets from the National Youth Tobacco Survey from 2011 to 2020 (N=193,350) to examine trends of current (past 30-day) exclusive, dual, and poly use of tobacco products (i.e., cigarettes, e-cigarettes, cigars, hookahs, and smokeless tobacco). Joinpoint regression models were performed to calculate log-linear trends with annual percentage change (APC). For each time segment, joinpoint analysis provides an estimate of the APC in prevalence during that period. We performed stratified joinpoint regression analyses for all sex, race, and school level (high vs. middle) for tobacco use combinations. **Results**: During the past decade, exclusive use of any tobacco product decreased, except for e-cigarettes, which increased at an APC of 226.8 % during 2011-2014 and 14.6% during 2014-2020. This increase was more pronounced in high school students [APC: 336.6% (2011-2014); 15.7% (2014-2020)] compared to middle school students [APC:10.4%, 2014-2020], and in males [APC: 252.8% (2011-2014); 14.8% (2014-2020)] compared to females [13.6% (2014-2020)]. During 2011-2020, upward trends were also noticed for dual use of e-cigarettes and cigarettes for middle school students (APC: 14.9%) and high school students (APC: 18.2%); females (APC: 18.5%), males (APC: 13.1%) and all race subgroups except for non-Hispanic other (APC, White non-Hispanic: 15.5%; Hispanics: 15.6%; Black non-Hispanic: 22.5%). Poly use of e-cigarettes, cigarettes, and any other tobacco products increased significantly for high school students (APC: 53.2%), females (APC: 62.4%) and males (61.3%) during 2011-2014, and only for White non-Hispanic youth [APC: 48.4% (2011-2014); 3.6% (2014-2020)]. **Conclusion**: The emergence of new tobacco products like e-cigarettes in the US market has shifted the landscape of tobacco use among youth in the last decade towards poly product use, in which e-cigarettes are a prominent component. Our findings underscore the increasing complexity of tobacco use among youth in the US, and the need for strong policies and regulations adapted to the evolving trends in cigarette and non-cigarette tobacco products.

PS1-58

DELAY-DISCOUNTING DEMONSTRATES LOWER IMPULSIVITY LINKED TO A HIGHER LIKELIHOOD OF SUCCEEDING AT SMOKING CESSATION

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Significance: Although seven out of 10 smokers want to quit, 94% of those who attempt to quit relapse within one year indicating a need to better understand cessation failure. This study aims to explore the relationship between impulsivity and tobacco use through a delay-discounting task (DDT) incongruity with a smoking cessation attempt. We hypothesized that lower impulsivity will be positively associated with tobacco cessation success.Methods: Data are from a parent cessation trial. Subjects were screened, stratified by sex, and randomized to 12 weeks of placebo or progesterone (PRO) at baseline with a quit date one week afterward. At weekly visits subjects biochemically confirmed their smoking status via carbon monoxide with less than or equal to 5 ppm and no self-reported smoking as being considered abstinent. Subjects also completed a DDT at screening, week 4, and week 8 using a 27-item Monetary Choice Questionnaire. This provided subjects with decisions between a small immediate reward (SIR) and a larger delayed reward (LDR). The discounting rate k was calculated for each subject at each time point. A larger k indicated more discounting in which the time delays strongly decreased how much the delayed reward was valued by the participant. We analyzed the effective delay 50 (ED50), which is the delay at which the LDR loses half its value. A higher ED50 corresponds to a lower discounting rate. To estimate the association between ED50 and tobacco cessation success, a logistic mixed model with a subject random intercept was fit controlling for study week, randomization, sex, and age.Results:

For the 181 participants included in the analysis, a doubling of the overall ED50 was associated with a 1.9% increase in the odds of tobacco cessation (95% CI: 0.3-3.6% increase; p=0.02). This association was similar regardless of the size of LDR.Conclusion: In agreement with our hypothesis, lower impulsivity correlated to greater success with tobacco cessation. Further analysis should investigate how the introduction of different hormones on their own, i.e., PRO affects impulsivity and cessation success.

PS1-59

THE ASSOCIATION OF EXPOSURE TO AND ENGAGEMENT WITH TOBACCO-RELATED SOCIAL MEDIA CONTENT WITH INITIATION OF E-CIGARETTES AMONG USA YOUTHS IN 2013-2015

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Facebook, Instagram, and Snapchat updated their policies to prohibit brand advertisements for the sale of tobacco and e-cigarettes. Influencers and tobacco users can still upload their own posts, photos, or videos of themselves either using or promoting tobacco product (TP) use. Social media sites have the potential to expose youth to TP-related content as 51% of the USA teens (13-17 years) visit a social media site daily in 2018. We sought to evaluate if exposure to and engagement with tobacco-related content on social media increases the risk of reporting past 30-day e-cigarette and/or combustible TP use among youth one year later. Longitudinal analyses from the 2013-2016 Population Assessment of Tobacco and Health among youth were conducted. Youth never users of combustible TPs and e-cigarettes in 2013-2015 who reported having a social media account (ages 12-17; n= 5,576; N= 12,618,794) were followed-up in 2015-2016 to estimate if they initiated past 30-day (i) e-cigarette, (ii) combustible TP, and (iii) dual combustible TP and e-cigarette use (ages 12-17; n= 5,576; N= 12,618,794). In 2014-2015, two potential risk factors were assessed: (i) "In the past 12 months, have you seen any tobacco-related content on social media sites?", and (ii) "In the past 12 months have you posted content about tobacco products on any social media sites?". Odds ratios (OR) and 95%CI adjusting for covariates were estimated from weighted logistic regression models. Overall, 2.25% (N= 305,305), 1.81% (N= 246,943) and 2.75% (N=342,581) of youth reported initiation of past 30-day (i) e-cigarette, (ii) combustible TP, and (iii) dual combustible TP and e-cigarette use in 2015-2016, respectively. The odds of past 30-day e-cigarette use was 2.08 times higher in participants who had seen tobacco-related content on social media as compared to participants who had not seen tobacco-related content on social media (95%CI 1.44-3.03). Similar odds ratios were observed for past 30-day (ii) combustible TP use (1.65; 95%CI 1.10-2.46) and (iii) dual combustible TP and e-cigarette use (1.63; 95%CI 1.12-2.38). Stronger policy-based solutions are needed to reduce TP content on social media and its impact on TP initiation.

PS1-60

PERCEPTION OF HARM AND ADDICTIVENESS OF HOOKAH ON THE AGE OF INITIATION OF HOOKAH USE AMONG USA YOUTH

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Objective To examine if the interaction between perceptions of harm and addictiveness of hookah is associated with the estimated age of initiation of hookah use among youth, using the national PATH study. **Methods** Youth never hookah users at the first wave of PATH participation (2013-2017) were followed-up between 2014-2019 for the first report of three outcomes: (1) ever, (2) past 30-day, and (3) fairly regular hookah use. A lower bound of the latest age of never use and an upper bound age of the first report each outcome was estimated. Two exposures measured at the first wave of PATH participation were considered (a) perception of harm (high versus low/medium) and (b) perception of addictiveness (high versus low/medium). The effect of the interaction of both perceptions was evaluated with high perception of harm and high perception of addictiveness as the reference category. Sampling weights, 100-balance repeated replicate weights from participants' first wave of participation and Fay's factor of 0.3 were used. Weighted interval-censored survival methods were implemented to estimate the age of initiation of each hookah use outcome. Weighted interval-censored Cox regression models with a piecewise constant baseline hazard function were used to evaluate the association between the interaction of perceptions of harm and addictiveness on the age of initiation of hookah use outcomes. Adjusted Hazard Ratios (AHR) and 95%CIs are presented. **Results** After controlling for sex, race/ethnicity, and use of other tobacco products, youth who reported both low/medium perception of harm and low/medium

perception of addictiveness of hookah were 139% more likely to initiate ever hookah use (AHR=2.39 95% CI: 2.09-2.74), 125% more likely to initiate past 30-day hookah use (AHR=2.25 95% CI: 1.65-3.09), and 104% more likely to initiate fairly regular hookah use (AHR=2.04 95% CI: 1.27-3.28) at earlier ages. **Conclusions** Communication and education campaigns are needed to increase the perception of harmfulness and addictiveness of hookah in youth to prevent earlier age of initiation of this product.

PS1-61

E-CIGARETTE AND CIGARETTE EXPECTANCY PROFILES PREDICT FUTURE SMOKING AND VAPING AMONG DUAL USERS

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Significance Beliefs about the outcomes of using e-cigs (i.e., individual e-cig expectancies) are independently associated with quitting smoking. Examining e-cig and cigarette expectancy patterns simultaneously may provide a more complete understanding, as well as better predict outcomes of interest. We hypothesize that subpopulations with more positive beliefs about e-cigs relative to cigs will be more likely to continue to vape, but also more likely to quit smoking. **Methods** We conducted a Latent Class Analysis in Mplus using baseline data from a self-help smoking cessation trial of dual users of cigarettes and e-cigarettes who completed assessments both at baseline and 24 months later (N=1618). Secondly, we examined identified classes in relation to demographics, condition assignment, and vaping/smoking status 24 months post-assessment. We examined five expectancy items related to the domains of Positive Reinforcement (PR), Negative Reinforcement (NR), Weight Control (WC), Negative Consequences (NC), and Addiction (ADD). Each item was categorized based on scale assessment as e-cig preference, cig preference, or no preference. The R3Step approach was used to examine latent class associations with covariates. **Results** Mplus analyses revealed a 3-class solution provided the best fit as determined by sample-size adjusted Bayesian Information Criteria and Lo-Mendell-Rubin: Ambivalent (AMBV, n=894.1, 55.3%); E-cig preference (ECIG, n=382.2, 23.6%); and Cig preference (CIG, n=341.7, 21.1%). Compared to CIG, the ECIG class was more likely to indicate e-cig preference in every domain (e.g., NR Odds Ratio: 23.8, 95% Confidence Interval: 5.7-99.4), although the difference for NC was not significant. These baseline classes significantly predicted smoking and vaping status 2 years later, with ECIG significantly less likely than CIG to still be smoking, with or without adjustment for treatment condition and other covariates (Unadjusted OR: 0.3, 95% CI: 0.2-0.5; Adjusted OR: 0.3, 95% CI: 0.2-0.5), but more than 3 times the odds of vaping (OR: 3.2, 2.0-5.2, AOR: 3.1, 1.9-5.3). **Conclusion** Expectancy patterns are powerful predictors of future behavior. Positive e-cigarette expectancy patterns are related to higher continued e-cigarette use, but lower cigarette smoking. These nuanced outcomes highlight the need for careful balance in public health messaging. Future analyses will examine changes in expectancy patterns over time. **Funding**: This work was supported by the National Institute on Drug Abuse (R01DA037961) and the National Cancer Institute (P30CA076292).

PS1-62

TOWARDS MORE MEANINGFUL SOCIAL MEDIA ANALYSIS: CASE STUDY OF USING AN AGE PREDICTION ALGORITHM TO IDENTIFY AND CODE REDDIT POSTS ABOUT E-CIGARETTES BY YOUTH VS. ADULTS

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Significance. In social media research, segmenting by user demographics is often necessary to identify target audiences or assess differences between subgroups. However, manual identification can be time consuming and inefficient. Data science and qualitative methods can be combined to provide insights on particular audiences and populations. The current study combines these two approaches to 1) predict Reddit users' age into two categories (13-20, 21-54) and 2) qualitatively code Electronic Nicotine Delivery System [ENDS] related posts. **Methods:** An algorithm using Reddit metadata was developed to classify Reddit posts as being created by 13-20 or 21-54 year old users. Three separate ENDS related search queries were conducted to pull Reddit posts from 9/2019 to 6/2020: general vaping, Tobacco 21 minimum age laws, and flavor restriction policies. The age algorithm was then used to predict Reddit users' ages. The 25 posts with the highest karma score (# of upvotes - # of downvotes) for each query and each predicted age group were qualitatively coded (N = 150). **Results**. Across the three queries, there

were nine prominently coded themes: Tobacco 21 Policies, Flavor Restriction Policies, Harm Perceptions, Use, Products, Memes/Jokes, COVID-19, Motivations, and Access. Tobacco 21 Policy and Flavor Restriction posts were mentioned equally between the 13-20 and 21-54 groups. Opposition to flavor restriction policies was a prominent sub-theme for both groups, but more common in the 21-54 group. Access, in light of flavor restriction policies, was more likely to be discussed by the 13-20 group. Harm Perception and COVID-19 discussions were more prominent among the 21-54 group than in the 13-20 group. The 13-20 group was more likely to post images without text (often memes), post on non-tobacco subreddits, and have higher karma scores. The 21-54 group were more likely to mention a variety of brand names. **Conclusions**: Users predicted to be in the 13-20 age group and the 21-54 age group discussed different topics on Reddit. These findings suggest machine learning algorithms alongside qualitative coding can provide insights from target audiences using social media data.

PS1-63

MENTIONING SMOKING CESSATION ASSISTANCE DURING HEALTHCARE CONSULTATIONS MATTERS: FINDINGS FROM DUTCH SURVEY RESEARCH

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Background: Smoking cessation assistance can help smokers to successfully quit smoking. It is unclear to what extent hearing about smoking cessation assistance from a healthcare professional is associated with using smoking cessation assistance during a quit attempt. **Methods:** We used pooled survey data from the 2016, 2018 and 2020 Dutch Health survey; only smokers above 18 years old were included (N=5928). Multivariate logistic regression analyses were used to determine the association between having heard about smoking cessation assistance from one or more healthcare professionals in the last 12 months and the use of smoking cessation assistance during the most recent quit attempt in the last 12 months. Healthcare professionals included: GPs, medical specialists, dentists, and mental health professionals. Smoking cessation assistance included: counselling, pharmacotherapy (nicotine replacement therapy or medication), e-cigarette, online programme or app, or another method not mentioned here. We used two models: model 1 included any type of assistance, while model 2 included assistance typically recommended by clinical practice guidelines (i.e., counselling and pharmacotherapy). **Results:** Hearing about any type of smoking cessation assistance from a healthcare professional in the last 12 months was significantly associated with using any type of smoking cessation assistance during the most recent quit attempt (OR=3.56; 95% CI 2.30-5.50; p<0.001). We found the strongest association between hearing about any recommended type of assistance and using any recommended type of assistance (OR = 6.91; 95% CI 4.11-11.60; p<0.001). Interaction with long-term illness was not significant. The odds of using any type of smoking cessation assistance was not significantly greater for smokers who had heard about smoking cessation assistance from two or more healthcare compared to one healthcare professional (OR=1.38; 95% CI 0.79-2.42; p=0.26). **Conclusions:** Healthcare professionals can play an important role in stimulating the use of smoking cessation assistance, especially counselling and pharmacotherapy, by mentioning it in consultations with smokers.

PS1-64

POTENTIAL EXPLANATIONS FOR CONFLICTING FINDINGS ON ABRUPT VERSUS GRADUAL SMOKING CESSATION - A POPULATION STUDY IN ENGLAND

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Significance: Observational and trial evidence conflict on the efficacy of two contrasting behavioural approaches to quitting smoking - gradual and abrupt. Observational data suggests an abrupt approach to quitting is superior to a gradual approach, whilst trials show no difference. This study aims to investigate potential explanations, including self-selection, for these conflicting findings, for example, that people who find it harder to quit are more likely to attempt to quit gradually. Testing potential explanations could provide greater insight into how to maximise the potential of smoking cessation methods. This in turn could enrich the evidence-based options available to smokers wanting to quit. *Methods*: We used observational data from a nationally representative sample of adults aged 16+ in England from November 2006 to February 2020 who reported smoking in the past year and had made at least one quit attempt in the past year (n=21,542).

We used logistic regression models to assess the association between abrupt versus gradual quit attempts and quit success, adjusting for sociodemographic, smoking and quit attempt characteristics. *Results*: Abrupt attempts were associated with improved quit success, compared with gradual attempts in an unadjusted model (OR=2.02, 95% CI=1.86-2.19). This association remained after adjusting for a broad range of relevant confounders (OR=1.75, 95% CI=1.59-1.93). *Conclusions*: Among a representative sample of adults who had smoked and made a quit attempt in the past year, there was evidence of an association between abrupt quit attempts and quit success before and after adjusting for a range of relevant confounders. This suggests that the differences in quit success seen between abrupt and gradual quit attempt types are not completely driven by self-selection of gradual quitting by those less likely to quit or differences in the evidence-based aids used.

PS1-65

HOOKAH SMOKING AND SUBSTANCE CO-USE AMONG SEXUAL MINORITY ADULTS IN THE UNITED STATES

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Significance Nationally represented data show higher rates of hookah smoking among sexual minority (SM) adults, as compared to their heterosexual counterparts. While hookah smoking has been shown to correlate with substance use, little is known on substance co-use among SM hookah smokers in a national survey. **Methods** The current secondary analysis examined data from Wave 1 (2013-2014) and Wave 2 (2014-2015) of the Population Assessment of Tobacco and Health Study, a nationally representative sample of U.S. adults $\geq$ 18 years of age. Weighted analyses examined comparisons on hookah smoking patterns and substance co-use—including alcohol, marijuana, Ritalin/ Adderall, sedatives and tranquilizers, cocaine, stimulants and other drugs—among sexual minority adults versus their heterosexual counterparts. **Results** Findings revealed that current hookah smoking among SM adults (Wave 1: 4%; Wave 2: 3%) was higher than heterosexuals (Wave 1: 1%; Wave 2: 1%; P<0.05). As compared to heterosexual individuals, while alcohol and marijuana were the most commonly used substances among hookah smokers, SM adults had a higher prevalence of marijuana, Ritalin/Adderall, painkillers/sedatives, cocaine, and methamphetamine use than heterosexuals (p<0.05). Compared to heterosexual women, SM women hookah smokers reported higher rates of marijuana (odds ratio [OR], 2.28; 95% CI, 1.21-4.28), pain killers/ sedatives (OR, 2.66; 95% CI, 1.19-5.96) and methamphetamine use (OR, 7.35; 95% CI, 1.24-43.57; Wave 2). **Conclusions** In this population-based, representative sample of U.S. adults, hookah smoking patterns and substance co-use differed between SM and heterosexuals. Given hookah's rapid growth and co-use of substances among SM adults, our findings highlight the importance of further research on effective interventions for tobacco cessation and prevention approaches specific to SM hookah smokers.

PS1-66

ELECTRONIC NICOTINE DELIVERY SYSTEM DEVICES AND LIQUID CHARACTERISTICS - DIFFERENCES IN GENDER

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Significance: Men are more likely to use electronic nicotine delivery system (ENDS) devices compared to women, but little is known about how ENDS users' gender influences ENDS device/liquid characteristics. Prior to enacting ENDS regulations, it is important to understand users' ENDS device/liquid characteristics and subsequent health consequences of ENDS use among different gender groups. Methods: Data are from Wave 1 of a 3-year longitudinal study of adult ECIG users from a large Mid-Atlantic city. Participants included 114 5-7 day/week ENDS users who responded to a 2020-2021 survey that assessed demographics, cigarette and ENDS use history, and ENDS device/ liquid characteristics. Results: The sample was 45% female and 74% white; 40% were past 30-day cigarette smokers. For device type, 58% used a refillable tank-style, 28% used a pod-style, and 14% used disposables, with no significant differences by gender. There were no significant gender differences in nicotine concentration (M=30.7mg/ml, SD=22.3) or device power (M=24.9W, SD=25.5). However, men were significantly more likely than women to report having a device with adjustable settings [$X^2(1)$=5.25, p<0.05], a modifiable coil [$X^2(1)$=5.64, p<0.05], and a modifiable tank [$X^2(2)$=6.70, p<0.05]. Further, among both men and women, device power and liquid nicotine concentration

were correlated inversely (r=-0.52, p<0.001). Conclusions: Women in this sample were less likely to use devices with modifiable settings or features, suggesting that men may be more affected by policies that limit modifications available on devices. Thus, understanding gender differences regarding users' ENDS device characteristics can inform policy changes; however, nationwide data is needed to determine generalizability.

PS1-67

INEQUALITIES IN SMOKING AND QUITTING RELATED OUTCOMES AMONG ADULTS WITH AND WITHOUT CHILDREN IN THE HOUSEHOLD 2013-2019: A POPULATION SURVEY IN ENGLAND

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Significance: Smoking among those who live with children is an important influence on smoking initiation among children. This study assessed socioeconomic inequalities in smoking and quitting-related outcomes among all adults with and without children in the household. Methods: Monthly repeat cross-sectional household survey of adults (16+) from 2013-2019 in England (N=138,583). We assessed the association between cigarette smoking and quitting-related outcomes and having children in the household, and whether these relationships were moderated by occupational social grade (categories AB-E from most to least advantaged). Trends in smoking prevalence among adults with and without children in the household were explored. Results: In adjusted analysis, the association of having children in the household with smoking prevalence depended on social grade: smoking prevalence was between 0.71 (95%CI 0.66-0.77) to 0.93 (0.88-0.98) times lower among social grades AB-D with children in the household relative to those without. Conversely, it was 1.11 (1.05-1.16) times higher among social grade E. Yearly prevalence declined similarly among those with and without children (both PR: 0.98, 95%CI 0.97-0.99). Motivation to stop smoking was higher among those with children than those without, but lower among disadvantaged than more advantaged groups. Social grades D-E had greater heavy smoking, but higher prevalence of past-month quit attempts. Conclusions: Among the most disadvantaged social grade in England, smoking prevalence was higher in those with children in the household than without. To attenuate future smoking-related inequalities, there is an urgent need to target support and address barriers to quitting and promote longer term quit success.

PS1-68

PROSPECTIVE ASSOCIATION BETWEEN E-CIGARETTE USE, YOUTH SMOKING INITIATION, AND ADULT SMOKING ABSTINENCE: ACCOUNTING FOR TIME-VARYING EXPOSURE AND TIME-DEPENDENT CONFOUNDING

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Significance: To evaluate the public health impact of e-cigarettes, it is important to balance the benefit in helping adults quit cigarette smoking with the risk of increasing youth smoking uptake. We investigate the effect of e-cigarette use on youth cigarette smoking initiation and adult cigarette smoking abstinence accounting for time-dependent confounding and misclassification of self-reported e-cigarette use. **Methods:** The study used four waves of the Population Assessment of Tobacco and Health (2014-2018). We first examined the association between e-cigarette initiation and cigarette smoking initiation among 9,583 cigarette and e-cigarette naïve youth (12-17y) at baseline. We then examined the association between e-cigarette use frequency at two time-points and 12-month cigarette smoking abstinence among 5,699 adults (18y+) who smoked cigarettes at baseline. The analyses incorporated marginal structural models with inverse probability of treatment weights to adjust for time-dependent confounding. Bias analyses corrected for potential under- and over-reporting of self-reported e-cigarette exposure. **Results:** Between 2014-2018, 5% of youth initiated cigarette smoking, and 10% of adult smokers quit cigarette smoking. Youth who initiated e-cigarettes (vs. those who did not) were three times as likely to subsequently initiate cigarette smoking (OR=2.9, 95% CI: 2.4-3.4). Among adults, consistent daily e-cigarette use (vs. no e-cigarette use) was associated with four times the likelihood of 12-month combustible smoking abstinence (RR=3.8, 95% CI 2.6-5.6). Participants who reported consistent non-daily e-cigarette

use were 70% less likely to achieve smoking abstinence than non-users (RR=0.3, 95% CI 0.1-0.8). Bias analyses suggested that non-differential misclassification of e-cigarette exposure resulted in moderate bias towards the null. **Conclusions:** Findings indicate that vaping predisposes youth to initiate combustible cigarettes, and is differentially associated with smoking cessation depending on the frequency of use. In addition, this work demonstrates the application of analytic techniques for addressing methodological challenges when evaluating longitudinal e-cigarette exposures.

FUNDING: Federal

PS1-69

ADD HEALTH YOUNG ADULT ASTHMA AND E-CIGARETTE USE

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Significance: Chronic disease prevalence in young adults is increasing; 15-20% report 1 or more chronic disease, most commonly asthma. Smoking increases harmful outcomes of chronic disease. This study examined cross-sectional and prospective relationships between chronic disease and e-cigarette/cigarette use in young adults. **Methods:** Wave 4 (w4; ages 24-34, n=15,701) and wave 5 (w5; ages 33-44, n=12,300) of the nationally-representative Add Health Study were used. W4 and w5 cigarette use and w5 e-cigarette use were created by dichotomizing the question on past 30-day use. Presence of asthma diagnosed by a health care professional (yes/no) was assessed at w4 and w5. A second non-asthmatic chronic disease (NACD) composite variable was created using 7 additional chronic diseases measured by Add Health (diabetes, migraine, heart problem, hepatitis B/C, high blood pressure, epilepsy, and cancer). Logistic regression (controlling for age, race/ethnicity, and gender) was used to assess cross-sectional associations at w4 and w5, then prospective w4 chronic disease (asthma and NACD) associations with w5 cigarette and e-cigarette use. **Results:** Logistic regressions showed significant cross-sectional and prospective relationships between asthma and cigarette use, but not e-cigarette use. Asthmatics at w4 were significantly more likely than those without asthma to report w4 cigarette use (AOR = 1.12, p=.016, CI 1.02-1.23), and 7 years later at w5 (AOR = 1.15, p=0.02, CI 1.03, 1.29). At w5, asthmatics were significantly more likely than those without asthma to use cigarettes (AOR = 1.12, p =.048, CI 1.001, 1.253). Those with w4 NACD were significantly more likely to report w4 current cigarette use than those without (AOR = 1.20, p=.00, CI 1.11, 1.29). At w5, those with NACD were significantly more likely to report w5 cigarette use (AOR = 1.32, p=.00, CI 1.20, 1.45) and w5 e-cigarette use (AOR = 1.22, p=.02, CI 1.03, 1.45) than those without NACD. **Conclusion:** Current and long-term associations differed by type of chronic disease and tobacco product. The significant relationship across 7 years for asthma and cigarette use indicates a priority area for public health intervention.

FUNDING: Academic Institution

PS1-70

ENDS FLAVOR USE BY AGE GROUP IN THE US A LONGITUDINAL ANALYSIS

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Significance: Non-tobacco flavored tobacco products appeal to youth and young adults. However, there remains a paucity of nationally representative data on non-tobacco flavored electronic nicotine delivery systems (ENDS) use across age groups. This study investigated how the use of non-tobacco flavored ENDS varies for youth (12-17 years old), young adults (18-24 years old), and older adults (25+ years old) over time. **Method:** We used the Population Assessment of Tobacco and Health (PATH) Study wave 2 (2014-2015), wave 3 (2015-2016), and wave 4 (2016-2017) youth and adult data and assessed changes in current flavor use over time among ENDS users. **Result:** The percentages of fruit flavor use from wave 2 to 4 for youth were 70.5% (n=188), 71.2% (n=257) and 68.0% (n=272); for young adults were 64.1% (n=282), 58.4% (n=932) and 60.8% (n=931); and for older adults were 46.4% (n=398), 34.9% (n=832) and 37.2% (n=835), respectively. For youth and young adults, candy/desserts flavor was the most used flavor after fruit in all three waves. For older adults, menthol/mint in wave 2 and tobacco flavor in waves 3 and 4 were the most used flavor after fruit. Overall, 72.0% of fruit users, 55.6% of candy users, and 61.8% of menthol/mint users in wave 2 maintained use of the same flavor in wave 4. On average, approximately one third of fruit users used another flavor over time. **Conclusion:** The most used ENDS flavor was fruit

among all age groups, followed by candy for youth and young adults, and menthol/mint and tobacco flavor for older adults. A majority of non-tobacco flavor users maintained use of the same flavor over time.

FUNDING: Federal

PS1-71

COMPARISON OF NICOTINE DEPENDENCE BETWEEN SINGLE AND MULTIPLE TOBACCO PRODUCT USERS AMONG SOUTH KOREAN ADULTS

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Objective: The relationship between multiple tobacco products, including heated tobacco products (HTPs), electronic cigarettes (ECs), and combustible cigarettes (CCs), and nicotine dependence is not well investigated. This study aimed to compare nicotine dependence symptoms between single and multiple tobacco product users among South Korean adults. **Methods:** We did an online survey of 7,000 adults aged 20-69 years old (2,300 men, 4,700 women) in November 2018. We compared the nicotine dependency among single, dual and triple use of tobacco product use including HTP, EC, and CC. Nicotine dependence was measured by four of the measures of addictions in the National Adult Tobacco Survey and "time to first use of tobacco products within 5 min." Multivariable logistic regression analysis was performed, and odds ratios with 95% confidence intervals of nicotine dependence symptoms according to the number of tobacco products were estimated. **Results:** The prevalence of nicotine dependence symptoms tended to be greater among dual and triple users of HTP, EC, and CC than single users, except for "time to first tobacco products use within 5 min." Moreover, triple users of tobacco products showed greater nicotine dependence than dual users of tobacco products, including HTP, EC, and CC. **Conclusions:** Multiple tobacco product users reported significantly greater nicotine dependence symptoms than single users. High nicotine dependence of multiple tobacco product users may hamper the future cessation of tobacco products, and this can be challenging for future tobacco control policies in South Korea.

PS1-72

CIGARETTE BRAND USE AND SEXUAL ORIENTATION INTERSECTIONS WITH GENDER AND RACE/ETHNICITY

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Significance: Lesbian, gay, and bisexual (LGB) populations have higher cigarette smoking rates than heterosexuals. The tobacco industry has leveraged LGB, gender, and racial/ethnic identities to establish cigarette brand preference. Therefore, we examined cigarette brand use among smokers by sexual orientation, as well as the implications of gender and race/ethnicity for brand use. **Methods:** Using the 2015-2017 National Surveys on Drug Use and Health, we conducted weighted bivariate analyses of the prevalence of commonly used cigarette brands (n=5) among adult smokers by sexual orientation (n=24,310). We conducted weighted regressions to test relationships between sexual orientation and brand use and interactions between sexual orientation, gender and race/ethnicity. **Results:** Gay/lesbian and bisexual smokers were more likely to use Camel (OR=1.7 (95% CI=1.2-2.3), OR=1.8 (95% CI=1.5-2.2), respectively) and American Spirit cigarettes (OR=2.8 (95% CI=1.9-4.1), OR=3.2 (95% CI=2.5-4.1), respectively) than heterosexuals. Gay/lesbian smokers had higher odds of Marlboro cigarette use (OR=1.2; 95% CI=1.0-1.4) than heterosexuals. Bisexual smokers were more likely to use Newport cigarettes (OR=1.7; 95% CI=1.5-2.1) than heterosexuals. Interactions between LGB and female identities (vs. GB male) were positively associated with Camel, Marlboro, and Newport use. The interaction between gay/lesbian and Hispanic identities (vs. gay/lesbian White) was also positively associated with Newport use. **Conclusions:** LGB smokers may be more likely to use some commonly used cigarette brands than heterosexuals, and gender and race/ethnicity may have implications for brand preference. Future research may examine specific contributors to brand use in LGB smokers (e.g., tobacco marketing).

PS1-73

ELECTRONIC CIGARETTE USE AND COMBUSTIBLE TOBACCO USE BEHAVIORS INSIDE OF VEHICLES

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Significance: Research has shown that exposure to secondhand and thirdhand smoke can cause negative health effects. While many cigarette smokers avoid smoking inside of vehicles to prevent unwanted exposures, little is known about electronic cigarette (ECIG) users' behaviors inside of vehicles. The purpose of this study was to examine behaviors, attitudes, and beliefs related to ECIG use inside of vehicles. **Methods:** Adults (aged ≥18 years) who reported currently using ECIGs every day or some days in the past 30 days recruited from a Qualtrics panel (n=1002; mean age=32.8; 50.4% women) completed an online survey. Survey questions assessed demographics and tobacco use behaviors and history. Questions also assessed ECIG/tobacco use inside of vehicles including frequency of use inside of vehicles, ECIG/tobacco use when others were present in vehicles, behaviors to limit harm from or exposure to secondhand aerosol or smoke, and attitudes and beliefs regarding whether ECIG/tobacco use should be allowed indoors. **Results:** Nearly two thirds (61.7%) of participants reported ECIG use every day. Among participants who owned or leased a vehicle, 80.8% reported that they vaped in their vehicle almost always or sometimes. When other adults were present inside of vehicles, 79.2% of participants reported vaping inside of vehicles and 36.6% reported vaping when children were present. Participants typically vaped in their vehicles with the windows completely closed (25.5%) or partially opened (63.4%). Participants believed that ECIG use inside of vehicles should always be allowed or allowed under some conditions when other adults were present (88.9%) and when children were present (39.1%). Fewer participants felt that smoking cigarettes or other tobacco products should be allowed in vehicles when other adults (64.6%) or children were present (23.9%; ps<0.001). **Conclusion:** ECIG use inside of vehicles is common. ECIG users perceive that ECIG use is more permissible than other tobacco use in vehicles when others are present. Passengers of vehicles with ECIG users may have greater risk for secondhand and thirdhand ECIG exposure.

PS1-74

A PILOT STUDY COMPARING TWO E-CIGARETTE PRODUCT TYPES ON RELATIVE REINFORCEMENT VALUE AND TOBACCO USE PATTERNS AMONG CURRENT SMOKERS

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E-cigarettes (e-cigs) are rising in prevalence and are the most used non-cigarette tobacco product. They emit fewer harmful chemicals than cigarettes and they could serve as less harmful substitutes for current smokers who switch completely. Variation in e-cig characteristics could impact product appeal and reinforcement, which may have downstream effects on cigarette smoking patterns. Mod systems are refillable and offer a high level of customization, while Pod systems are non-refillable systems that operate at a low-wattage, commonly utilize salt-based nicotine e-liquids, and are not customizable. The goal of this pilot study was to compare these device types on reinforcement value and downstream effects on cigarette smoking. Current smokers with minimal e-cig experience (N=30) were randomized to receive a Mod e-cig (Evolv DNA 1.2% nicotine, variable wattage, n=11), Pod e-cig (JUUL 5% nicotine, n=13), or no product (n=6). E-cig groups completed a preference assessment task at Baseline and the Week 3 visit. Across 10 trials participants chose between taking 2 puffs of a cigarette, 2 puffs of their assigned e-cig, and taking no puffs. Participants took their assigned e-cig home with them for 3 weeks and were told to use the e-cig and smoke ad libitum. At the Baseline preference assessment, participants assigned to both e-cig groups chose to use the e-cig instead of smoke an equal number of times (4.3). At Week 3, participants assigned to the Mod e-cig chose to use the e-cig instead of smoke 2.4 times (SD= 2.1), while those assigned to the Pod e-cig chose to use the e-cig instead of smoke 4.6 times (SD=3.1), but this comparison failed to reach significance (p>0.05). At Week 3, reductions in CPD were largest for the Pod group (M=40.6%, SD=31.0), followed by the Mod group (M=33.4%, SD=42.6) and the control group (M=10.0%, SD=18.0). The reduction in CPD for the Pod group was significantly greater than for the control group, but all other comparisons failed to reach significance. These data suggest that Pod e-cigs may be more appealing and have a greater effect on cigarette smoking than Mod e-cigs, but a larger trial is needed to fully evaluate these differences.

PS1-75

SHORT AND LONG-TERM CIGARETTE AND TOBACCO ABSTINENCE AMONG DAILY AND NON-DAILY OLDER SMOKERS

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Introduction: There is mixed evidence whether older smokers are more or less likely to quit smoking than younger smokers. We examined age in relation to short- and long-term abstinence from cigarette and other tobacco products and the potential moderating effects of smoking frequency. Methods: Using data from 7,512 established smokers at Waves 1 and 4 of the Population Assessment of Tobacco and Health (PATH) study, weighted logistic regression models were used to examine the effects of age (18-24, 25-34, 35-44, 45-54, and 55+) on Wave 4 30-day and 12-month abstinence for cigarettes and for all tobacco products adjusting for sociodemographic and smoking-related covariates (e.g. past-year quit attempt). We also tested for interactions between age and cigarette use frequency (non-daily, light daily, heavy daily). Results: 21.6% of the sample were 55+ years old. Overall, 14.9% were nondaily smokers, 19.9% light daily, and 65.2% heavy daily, with older smokers having a greater representation among heavy daily smokers (p<.001). Older smokers were less likely to have a past-year cigarette quit attempt at baseline than younger smokers 18-24 and 25-34 (19.2% vs. 24.8%, 24.8%, respectively p<.01). At Wave 4, 16.2% of the sample reported 30-day and 10% 12-month cigarette abstinence, with 11.3% reporting 30-day and 9.3% 12-month all tobacco abstinence. For cigarettes, compared to older smokers, younger smokers 18-24, 35-44, and 45-54 were less likely to report 12-month abstinence (OR=0.57, 95%CI= [0.36-0.93]; OR=0.62 [0.42-0.90]; OR=0.63 [0.47-0.85], respectively), but there was no difference for 30-day abstinence. For all tobacco product use, similar results were observed for 12-month abstinence, but younger smokers 35-44 were less likely to report 30-day abstinence than older smokers. Light daily and non-daily smokers were more likely to report both 30-day and 12-month cigarette and tobacco product abstinence than heavy daily. There was a significant interaction between age and smoking frequency for 30-day cigarette abstinence, such that abstinence rates for non-daily smokers significantly decreased as age increased, whereas the abstinence rates for light daily and heavier daily smokers were similar across age groups. Conclusion: Older smokers were more likely to report 12-month cigarette abstinence, despite their lower frequency of quit attempts and greater frequency of heavy daily smoking compared to younger smokers.

PS1-76

SMOKING CESSATION IN CANCER CARE- AN ECONOMIC EVALUATION OF THE SMOKE-FREE SUPPORT STUDY

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BACKGROUND: Smoking cessation among individuals treated for cancer improves cancer treatment outcomes, quality of life, and life expectancy, but tobacco treatment is not consistently provided in this setting. The two-site Smoke-free Support Study found that an intensive treatment (IT) intervention delivered to smokers initiating cancer care improved cotinine-confirmed 7-day point prevalence abstinence at 6 months relative to enhanced standard care control (ST) (34.5% vs. 21.5%, difference 13.0%, 95% CI 3.0-23.3%). We evaluated the cost and incremental cost per quit (ICQ) of IT vs. ST, as well as IT vs. usual care (UC) from a health system perspective to guide implementation at cancer care sites considering the IT intervention. METHODS: IT consisted of up to 11 sessions of telephone counseling and up to 12 weeks of FDA-approved first line smoking cessation medication compared to ST which consisted of up to 4 sessions of telephone counseling, medication advice, and referral to the state quitline. UC was referral to quitline with efficacy assessed from pilot data only (abstinence rate: 14.3%). Costs included participant recruitment, counselor training and supervision, tobacco treatment medications (including shipping), record-keeping, communication materials, and office space. Costs reflected the programs as used, not as designed (e.g., no cost for unused counseling). RESULTS: Incremental costs per patient were $508 for IT vs. ST and $2018 for IT vs. UC. Contributions to IT cost were counselor training (5%), supervision of counselors (26%), participant recruitment (24%), counseling delivery (19%), medications (16%), and other resources (10%). ICQ for IT vs. ST was $3916. ICQ for IT vs. UC was $10010. Costs were higher at one site given staffing (nurse practitioner vs. dedicated tobacco treatment specialist without prescribing privileges)

and higher baseline quit rates. ICQs at the more efficient site were $2390 (IT vs. ST) and $5675 (IT vs. UC). CONCLUSIONS: While the overall ICQ for IT vs. UC was high compared to other health system-initiated cessation interventions, it can be delivered cost-effectively under some circumstances.

PS1-77

EDUCATIONAL DISPARITIES IN NICOTINE ADDICTIVENESS AND CANCER HARM PERCEPTIONS - A TEST OF THE KNOWLEDGE GAP HYPOTHESIS

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Significance: Recent research has found widespread misperceptions about nicotine. The knowledge gap hypothesis predicts that those with higher educational attainment will increase their level of accurate knowledge about an issue more quickly than those with less education. This study tests that hypothesis while distinguishing between nicotine misperceptions (i.e., an incorrect response) and a "don't know" (DK) response, indicating ambivalence, uncertainty or a lack of knowledge. **Methods:** Data were analyzed from the 2015, 2017 and 2019 cycles of the Health Information National Trends Survey. Weighted multinominal logistic regression models were conducted where nicotine addictiveness and cancer beliefs (DK, incorrect, and correct [referent] responses) were regressed on survey year, level of educational attainment and their interaction. Analyses controlled for race/ethnicity, sex, age, rurality, and tobacco experience. **Results**: Overall, there were lower odds of misperceptions about addictiveness (OR=0.57 [0.40, 0.82]), but higher odds of misperceptions about cancer harm (OR=1.41 [1.15, 1.74]) in 2019 compared to 2015. For addictiveness perceptions, those with a high school (HS) (OR=0.48 [0.31, 0.75]) and college education (OR=0.32 [0.20, 0.52]) had lower odds of a DK response than those with less than HS education, but there were no significant differences for misperceptions. For cancer beliefs, there were educational disparities for both DK responses (HS: OR=0.45 [0.25, 0.81]; College: OR=0.22 [0.12, 0.40]) and misperceptions (HS: N/S, College: 0.26 [0.14, 0.45]). Survey year did not moderate the relationship between education and nicotine addictiveness or cancer harm perceptions. **Conclusions:** For nicotine addictiveness perceptions, educational disparities remain, but have not become more pronounced over time. These disparities may exist due to a lack of knowledge or ambivalence (not established *mis*perceptions) that may be a result of differences in motivation and ability to acquire health information. There are educational disparities for both DK responses and misperceptions about cancer beliefs, underscoring a need for future targeted intervention efforts detailing the role of nicotine in tobacco-related cancer.

PS1-78

A QUALITATIVE ASSESSMENT OF THE IMPACT OF COVID-19 ON YOUNG ADULT TOBACCO USE

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Early studies have suggested that self-reported vaping and tobacco use among youth and young adults decreased during the COVID-19 pandemic. The general decline in use, however, may obscure other transitions among products and product types. To understand shifting patterns and pathways of tobacco use during COVID-19, 16 focus groups (n=114) and 21 interviews were conducted with current and former tobacco users age 18-29 in California from April to May 2021 to discuss changes in tobacco and cannabis use during the COVID-19 pandemic. Participants were generally unaware of any increased risk for acquiring COVID-19 or more severe symptoms as a result of smoking or vaping, and some reported hearing that cannabis use was protective against COVID. Changes in use patterns were a function of vaping patterns prior to COVID-19. Those who usually smoked or vaped in social settings prior to COVID-19 reduced their use because they found themselves in those situations less often as they adhered to quarantine requirements. Those accustomed to smoking or vaping in small groups or by themselves prior to COVID-19 reported increasing use because of stress, anxiety, and boredom. Overuse was a greater concern among individuals who increased their use of nicotine vapes as opposed to increased use of cannabis products. As COVID-19 quarantine restrictions are lifted, tobacco use prevention and cessation efforts among young adults should be strengthened to preserve the declines in reported tobacco use during the pandemic.

PS1-79

UNDERSTANDING ADVERSE EXPERIENCES WITH VAPING AMONG YOUNG ADULTS

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E-cigarette, or Vaping, Product Use-Associated Lung Injury (EVALI) raised public awareness of potential dangers associated with nicotine vaping. EVALI, however, may have overshadowed other adverse symptoms that accompany e-cigarette use. To better understand nicotine vaping-related adverse symptoms, 16 focus groups (n=114) and 21 interviews were conducted with current and former young adults (18-29 years) e-cigarette users in California to discuss experiences with adverse symptoms attributed to nicotine vaping. The most commonly reported adverse symptoms included headache, nausea, dry or sore throat, lightheadedness, coughing, and dizziness. The most common response to adverse symptoms was to temporarily cut back, which was reported with headaches, nausea, dry or sore throat, and dizziness. No behavioral modification was most common with lightheadedness, coughing, and throat pain; participants considered quitting or quit most often after experiencing shortness of breath and chest pain. Amongst infrequent e-cigarette users, those who did not experience adverse symptoms did not express a desire to quit while those who did were likely to experiment but not adopt e-cigarettes. Among regular e-cigarette users, those who did not experience adverse symptoms also did not consider quitting while those who did experience adverse symptoms expressed a desire to or had quit vaping. Adverse symptoms attributed to e-cigarettes vary in their perceived severity and may play a role in uptake and cessation of e-cigarettes.

PS1-80

SYNERGISTIC EFFECT OF E-CIGARETTE AND CANNABIS USE ON CIGARETTE UPTAKE IN YOUNG ADULTS

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Introduction: E-cigarette use is a known risk factor for smoking, which has underscored the need to regulate e-cigarette to reduce the public health burden of tobacco that is predominately due to combustible cigarette. Among high-school children, cannabis is increasingly co-used with e-cigarette that might increase tobacco dependence leading to combustible cigarette use in young adults. It is important to understand the extent to which e-cigarette related risk of smoking is due to vaping alone and jointly with cannabis use to provide additional evidence as to whether targeting e-cigarette in regulation might reduce smoking burden. **Methods:** Data were drawn from a prospective cohort study of respondents in Los Angeles, CA (N=1,164) who completed surveys in 12th grade [(T1; Fall, 2016; Mean age[yrs]=17.5) and in October 2018-October 2019 (T2) and May-October 2020 (T3)] after high school graduation. Past 30-day use of e-cigarettes and cannabis was assessed at T1. Nicotine dependence (Range=0-2) and number of days smoking cigarettes (Range=0-30) were assessed at T1 and each follow-up. Path analysis on the mediational process linking baseline joint e-cigarette and cannabis use to increased combustible cigarette use at follow-up via nicotine dependence was performed. **Results:** In 12th grade, 7.6% of participants reported joint use of e-cigarette and cannabis (26.1% for cannabis use only; 2.5% for e-cigarette use only; 64.0% for no use). After adjusting for sociodemographic characteristics and baseline cigarette use, we observed that use of e-cigarette (RR[95%CI]=2.61[1.04, 13.07]), cannabis (RR[95%-CI]=2.58[1.43, 4.98]), and dual-use (RR[95%CI]=5.84[3.16, 12.81]) were associated with increases in cigarette use at T3. In the mediational path analysis, cannabis use and dual use were associated with increased nicotine dependence and cigarette use at T2, which were associated with increases in past 30-day combustible cigarette use at T3. Increased levels of nicotine dependence at T2 mediated 10.5% and 23.2% of the total effects, respectively. **Discussion:** Here we present evidence that e-cig use alone or with cannabis during the high-school years leads to increased cigarette uptake in early adulthood and this is mediated by increased nicotine dependence, noting potential causal mechanism between e-cig use and cigarette uptake.

PS1-81

COMBINING AGE PREDICTION ALGORITHMS AND SOCIAL MEDIA LISTENING TO SEGMENT AND ANALYZE REDDIT AND TWITTER CIGARETTE CONVERSATIONS AMONG YOUTH AND ADULTS

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SIGNIFICANCE: Social media data can provide insights into tobacco-related perceptions and behaviors. However, being able to segment social media data by key audiences of interest is crucial for informing campaign development. Machine learning algorithms that predict social media user features (e.g., age) based on publicly available data can aid in segmentation. The objective of this study was to apply an age prediction algorithm to a sample of cigarette conversations to segment Reddit and Twitter users by age (youth: under 21; adults: 21 and over), and explore conversation themes between the two groups. METHODS: We developed a search boolean with cigarette terms (e.g., general terms, cigarette brands and slang) and used this to identify a random sample of Twitter (N= 17,707) and Reddit (N= 23,364) accounts posting about cigarette smoking from Jan-Feb 2021. We then ran age prediction algorithms (previously developed) on public Twitter and Reddit, non-deleted user accounts identified using the boolean. We restricted the sample to users with predicted probabilities greater than 0.7 of being classified into the two age groups, resulting in a final sample of 5,598 youth and 6,347 adults on Twitter, and 5,417 youth and 6,131 adults on Reddit. We analyzed conversations from this final sample to compare key themes about cigarettes between predicted youth vs. adult Twitter and Reddit users. RESULTS: Overall, adults posted more frequently about cigarettes than youth in our sample (Reddit: 79,600 vs. 59,160; Twitter: 25,072 vs. 9,672). Key themes identified in conversations included smoking initiation, smoking cessation, and humor/memes. Smoking initiation was discussed by both age groups on both platforms; predicted adults mentioned how their relationship with smoking has changed since they initiated and predicted youth more often discussed initiation among other people, often exhibiting confusion about why one would start smoking. Predicted adults on both platforms were more likely to discuss cessation than predicted youth; predicted adults framed cessation as a recovery story whereas predicted youth more commonly sought cessation help, motivation or support. Predicted youth were more likely than predicted adults to use humor or share memes in smoking conversations. CONCLUSION: These results suggest that applying algorithms to predict user characteristics (e.g., age) can aid researchers in segmenting social media analyses by audience to provide more meaningful insights to inform campaign development.

PS1-82

CROSS SECTIONAL ASSOCIATIONS OF CIGARETTE, ECIGARETTE, AND ORAL TOBACCO PRODUCT USE WITH SELF REPORTED ADVERSE ORAL HEALTH OUTCOMES RESULTS FROM WAVE 4 OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY

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Significance: Associations between the use of alternative tobacco products and oral health outcomes are not well understood, and few studies have evaluated associations separately for distinct oral tobacco subtypes. This study examined cross-sectional associations of self-reported adverse oral health outcomes with cigarette, e-cigarette, snus and smokeless tobacco use. Methods: Data was analyzed for 16,710 Wave 4 (data collected Dec 2016-Jan 2018) PATH Study respondents (18+ years old) who visited a dentist in the past year and were not current-established users of cigars, pipe tobacco, or hookah/waterpipes. Survey-weighted multivariable logistic regression models estimated associations of current-established use of cigarettes (n=3,380), e-cigarettes (n=787), snus (n=82) and smokeless tobacco (n=452) with self-reported adverse oral health outcomes (gum disease, bone loss around the teeth, precancerous oral lesions) while controlling for demographic, lifestyle and medical history variables. Results are reported as '(adjusted odds ratio [95% confidence interval])'. Results: Current cigarette smoking was significantly associated with self-reported gum disease (1.61 [1.38-1.88]), bone loss around the teeth (1.90 [1.63-2.21]), and precancerous oral lesions (1.63 [1.05-2.51]). Current smokeless tobacco use was significantly associated with self-reported precancerous oral lesions (3.48 [1.62-7.45]) but not gum disease (0.95 [0.63-1.42])

or bone loss around the teeth (1.09 [0.70-1.72]). Neither current e-cigarette (gum disease: 1.13 [0.90-1.43]; bone loss around the teeth: 1.28 [0.98-1.66]; precancerous oral lesions: 1.16 [0.66-2.05]) nor current snus use (gum disease: 1.01 [0.40-2.58]; bone loss around the teeth: 1.16 [0.42-3.25]; precancerous oral lesions: 1.44 [0.28-7.28]) were significantly associated with adverse oral health outcomes. Conclusion: Cigarette smoking was consistently associated with self-reporting adverse oral health diagnoses, and smokeless tobacco use was associated with self-reporting precancerous oral lesion diagnosis. By contrast, no significant associations with adverse oral health outcomes were observed according to e-cigarette or snus status.

PS1-83

SOCIAL ISOLATION AND NICOTINE AND MARIJUANA VAPING PRACTICES: PERSPECTIVES FROM YOUTH DURING THE COVID-19 PANDEMIC

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Significance: COVID-19 safety protocols urge physical and social distancing, resulting in isolation and minimal contact with others. As social contexts are central to the experiences of vaping among youth, this study explored the vaping practices of Kentucky youth during the pandemic. Methods: Semi-structured, telephone interviews were conducted in August 2020 with current and past Electronic Nicotine Delivery System (ENDS) users (N=22; ages 16-19; 63% female) recruited from a parent study. Interviews focused on the influence of COVID-19 on vaping and smoking beliefs, behaviors, and health perceptions. Inductive and deductive coding approaches were used to analyze transcripts. Results: Most participants identified the ongoing pandemic as shaping their current vaping practices. Frequency of vaping varied during the pandemic, where some noted increases while others noted use remaining the same or decreasing. However, notable differences emerged between nicotine and marijuana use related to health measures adopted to mitigate COVID-19 spread. Nicotine-vaping was largely reduced due to restrictions limiting social gathering and encouraging self-isolation. Specifically, participants indicated the absence of social interactions as contributing to less use, citing reasons including lacking personal vaping devices, hesitating to share vaping devices due to COVID-19 risks, and facilitating prior intentions to quit. Similarly, marijuana-vaping was attributed to social isolation but, in contrast to nicotine, participants often reported greater use driven by intrapersonal factors associated with managing boredom, desiring an escape, alleviating stress, and having more free time at home. Participants, likewise, linked increases in vaping nicotine and marijuana together to pleasure-seeking motives, describing the heightened sense of euphoria and escape produced via simultaneous use. Conclusion: Findings suggest social isolation and attentiveness to health emerging from pandemic-control measures had differential impacts on vaping nicotine and marijuana. Public health efforts to address vaping may require greater attention to socio-environmental contexts of vaping that may vary by substance.

PS1-84

"REAL-WORLD" JUUL EMISSIONS LIKELY EXCEED LABORATORY GENERATED EMISSIONS

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Introduction: Standard puffing protocols are used to examine tobacco product emissions. The tobacco industry has undermined these protocols and real-world cigarette smoking can generate more emissions than generated from laboratory protocols. Electronic cigarette (ECIG) emissions from standard protocols may also differ from real-world emissions. This study compared particulate matter (PM) and volatile organic compounds (VOCs) from a popular ECIG device using two procedures. **Methods:** We generated ECIG aerosol using a diaphragm pump to puff a JUUL ECIG device. ECIG aerosol was captured in a 0.5 m³ exposure chamber in two experiments. For experiment 1, we used a single JUUL device with puffs at 1.5 L/min, 5 second duration, and 30 second inter-puff interval (IPI) for 60 minutes. For experiment 2, we used a single JUUL pod, but alternated between two JUUL devices after every two puffs. This represented "real-world" puffing behaviors in which many users' bouts tend to be less than 4 puffs. For experiment 2, we puffed the JUUL devices at 1.5 L/min, 4 second duration, and 30

second IPI for 30 minutes. PM 2.5 µm in diameter and smaller ($PM_{2.5}$) was captured and weighed using gravimetric analysis and real-time VOCs were measured using a VOC sensor. Experiments were repeated three times. **Results:** In experiment 1, 630 µg/m³ (SD=350) of filter $PM_{2.5}$ mass concentration was collected and mean real-time $PM_{2.5}$ concentration was 466 µg/m³ (SD=475). $PM_{2.5}$ concentration was 2118 µg/m³ (SD=990) during the first 4 puffs and 422 µg/m³ (SD=318) for the final 116 puffs. In experiment 2, 1390 µg/m³ (SD=250) of filter $PM_{2.5}$ mass concentration was collected and mean real-time $PM_{2.5}$ concentration was 1189 µg/m³(SD=743). Mean real-time $PM_{2.5}$ concentration in experiment 2 was 2.6 times higher than during experiment 1. Mean VOC concentration was almost 2 times higher during experiment 2 (12.0 ppm, SD=3.0) than during experiment 1 (6.3 ppm, SD=2.0). **Conclusions:** Real-world JUUL emissions likely exceed those from standard protocols. It is unknown if this difference results from an intentional design feature. Regulators and researchers should examine ECIGs based on users' real-world behaviors.

PS1-85

PERCEIVED BARRIERS TO PROVIDING SMOKING CESSATION ADVICE IN SIX LATIN AMERICAN CANCER INSTITUTIONS

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Significance: Comprehensive treatment of tobacco use within cancer care has proven to be cost-effective in the United States of America and Canada. However, the benefits related to smoking in the context of oncology treatment, tobacco screening, and cessation have not been fully recognized by the rest of the Western Hemisphere. Understanding cancer care professionals' experiences of providing smoking cessation support in oncology settings in Latin America can help to inform the design of interventions, as well as to improve prognosis in cancer care. The aim of the study was to assess perceived barriers to providing smoking cessation advice in six Latin American cancer institutions. **Methods:** A cross-sectional study was conducted among 996 cancer care providers (CCPs) in six cancer institutions located in Colombia, Mexico, Argentina, Brazil, and Peru. An online survey consisting of 28 close-ended questions adapted from the 2012 International Association for the Study of Lung Cancer survey and the Global Adult Tobacco Survey was administered. **Results:** The majority of CCPs, ranging from 86.1% in Mexico to 95.9% in Brazil, agreed that smoking cessation should be integrated into cancer treatment. However, inadequate training on smoking cessation was reported by 66.9%, 69.4%, 70.4%, 72.9%, 85.8%, 86.4% in Mexico, Colombia (Bucaramanga), Argentina, Peru, Brazil, and Colombia (Medellin) respectively and this difference was statistically significant (p < 0.001). Moreover, current cigarette smoking prevalence among CCPs was 2.5% in Brazil (Barretos), 4.6% in Peru (Lima), 6.3% in Colombia (Bucaramanga), 10.4% in Colombia (Medellin), 11.5% in Mexico (Mexico City), and 15.1% in Argentina (Buenos Aires) showing a statistically significant difference (p<0.001). Prevalence of current and former e-cigarette use among all CCPs was 1.4% and 8.1% respectively. Secondhand smoke exposure at work was reported by 6.5% of all CCPs ranging between 2.3% in Colombia (Bucaramanga) and 25.5% in Argentina. **Conclusion:** Given the significant impact of smoking on cancer prognosis and survival, educating Latin American CCPs to provide smoking cessation assistance to their patients or linking them to cessation services and/or resources will improve patients' overall quality of life and potentially reduce the cost of oncology treatment.

PS1-86

SEX DIFFERENCE IN THE ASSOCIATION BETWEEN SELF-REPORTED HYPERTENSION INCIDENCE AND E-CIGARETTE USE - LONGITUDINAL RESULTS FROM THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH), WAVES 1-4

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Significance: Longitudinal investigation on the association of e-cigarette (e-cig) use with hypertension are lacking. **Methods:** Data from adults who were free of hypertension at the PATH Wave 1 and completed surveys of Waves 1-4 were analyzed. Weighted

Cox regression models were used to examine the association of established e-cigs and/or cigarettes use at Waves 1-3 (as a time-varying and time-lagging regressor) and subsequent self-reported hypertension development across Waves 2-4. Variables such as age, sex, race/ethnicity, education, BMI, physical activity, alcohol consumption, diabetes mellitus, hypercholesterolemia, cardiovascular diseases, and family history of hypertension were controlled in adjusted models. **Results:** Of 16,434 adult participants, 8,792 (53.5%) were female. The mean per-wave prevalence of exclusive e-cig users, exclusive cigarette users, dual users, and non-users at Waves 1-3 was 2.0%, 28.7%, 2.9%, and 66.5%, respectively. The cumulative incidence of self-reported hypertension by Wave 4 was 16.4% (female) vs 7.9% (male) among exclusive e-cig users, 13.2% (female) vs 13.5% (male) among exclusive cigarette users, 15.6% (female) vs 8.1% (male) among dual users, and 8.3% (female) vs 10.4% (male) among non-users, respectively. Among females, exclusive e-cig use vs non-use (hazard ratio, 1.70; 95%CI, 1.03-2.78; $P = .03$) and exclusive cigarette use vs non-use (hazard ratio, 1.56; 95%CI, 1.20-2.01; $P < .001$) were significantly associated with subsequent self-reported hypertension development. However, among males, hazard ratios of hypertension between exclusive e-cig use vs non-use (1.25; 95%CI, 0.55-2.87) and between exclusive cigarette use vs non-use (1.20; 95%CI, 0.97-1.48) were attenuated and non-significant. Crude models and sensitivity analyses supported the associations with similar results. No disparities were found among different age groups or race/ethnicity groups. **Conclusions:** Established exclusive e-cig use among females was prospectively associated with subsequent self-reported hypertension development.

PS1-87

ENGAGEMENT AND QUIT SUCCESS AMONG UNINSURED TOBACCO USERS REGISTERING FOR QUITLINE SERVICES

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Significance: Uninsured adults have high rates of tobacco use and face more barriers to quitting than those with access to healthcare resources. While the Oklahoma Tobacco Helpline (OTH) offers a robust set of services to uninsured tobacco users, they often choose to register for less intensive services. Quit outcomes and factors related to engagement by this priority population have not been systematically evaluated. **Methods**: OTH registrants identifying as uninsured from July 1, 2019 - June 30, 2021 were included in this analysis to determine the extent to which they engage with the quitline, factors associated with intensity of service utilization, and quit outcomes. Chi-square tests and multiple logistic regression were used to analyze differences in demographics, tobacco use behaviors, service utilization, and cessation outcomes among uninsured tobacco users by OTH program. P-values less than 0.05 were considered statistically significant. **Results**: Among the 17,594 uninsured tobacco users registering for services, 43.9% registered for the full benefit available to them. The full benefit includes up to five calls with a quitline coach, 8 weeks of NRT, and text/email support (multiple call program, MC). The remaining 56.1% received less intensive services (any combination of a 2-week NRT starter kit, web support, text and email messages). Factors associated with selecting the MC program, while controlling for all other factors, included female (OR=1.16; 95% CI 1.1-1.3), Hispanic ethnicity (OR=1.2; 95% CI 1.0-1.5), registration via phone (OR=2.8; 95% CI 2.5-3.0), and reporting one or more mental health or substance abuse disorder (OR=1.3; 95% CI 1.2-1.5). At the 7-month follow-up, 35.2% of MC participants reported 30-day abstinence, compared to 33.7% of those registering for less intensive services. MC program participants were also less likely to be using an e-cigarette at the 7-month follow-up, 9.6% compared to 15.5% among those using less intensive services (p=0.02). **Conclusions**: There is opportunity for quitlines to better serve uninsured, typically low SES, tobacco users by ensuring they receive the most robust level of cessation support available to them. As demonstrated here, increasing engagement and utilization of services has the potential to improve quit success, and ultimately reduce disparities in tobacco use.

PS1-88

DEVELOPING AN E-CIGARETTE CESSATION SCALE TO INFORM EFFECTIVE QUIT MESSAGING AMONG YOUTH AND YOUNG ADULTS

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Significance: The truth campaign has been proven effective as a preventive tobacco campaign for youth and young adults. In recent years, use of e-cigarettes by youth and

young adults has increased, leading to a growing need for public health campaigns to address cessation efforts. To inform potential messaging surrounding e-cigarette cessation, we first need to determine what attitudes and beliefs are associated with the increased intention to quit e-cigarettes. **Methods:** Two national surveys of past 30-day e-cigarette users ages 15-24 (n=523, n=510) were conducted in May 2021 to evaluate agreement with 148 possible items assessing knowledge, attitudes, and beliefs on cessation of e-cigarettes. Items were eliminated if they already had high endorsement of the desired attitude (>60% agreement on a 3-point scale). Then, using chi-square and correlation analyses of each item agreement with the outcome of e-cigarette quit intentions, items that did not show association for both were eliminated. A total of 27 items remained and were subjected to chi-square analysis with e-cigarette use frequency, and correlation analysis between items with a cutoff of R=0.25. A confirmatory factor analysis (CFA) was conducted for the final items according to 3 expected factors: 1) attitudes toward policy (attitudes), 2) identity, and 3) extrinsic motivation. **Results:** Correlations showed increased agreement with each construct was associated with increased quit intentions (attitudes: 0.49, identity: 0.64, extrinsic motivation: 0.52). Fit indices confirmed a 3-factor solution. The comparative fit index (CFI) = 0.94, the Tucker-Lewis fit index (TLI) = 0.88, and the RMSEA = 0.08. **Conclusion:** Developing message constructs that are most correlated with increasing quit intentions is important in developing effective e-cigarette cessation messaging. The e-cigarette cessation scale can help focus mass media campaigns on messaging including attitudes towards policy, product use identity, and extrinsic motivation that may inspire youth and young adult e-cigarette users to quit. Future longitudinal research is needed to measure the causal impact of public health messaging on quitting e-cigarette use.

PS1-89

PANDEMIC-RELATED STRESS, SUBSTANCE USE AND GENDER IDENTITY; A BEHAVIORAL STUDY OF COLLEGE STUDENTS IN THE SOUTHEASTERN U.S.

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Significance. The study goals were to evaluate potential disparities in pandemic-related stress associated with gender identity and determine whether pandemic-related stress was associated with current use (in the last three months) of tobacco, alcohol and non-medical cannabis among college students. **Methods.** We used the 2021 Spring American College Health Association-National College Health Assessment data collected at one large, southeastern university. Data collection was conducted during the first two weeks of March of 2021. The sample (n=659) included 18-32-year-old students. **Results.** About 43% of students reported that the pandemic significantly increased their overall stress, and 29% of students reported that the pandemic made their financial situation a lot more stressful. The model-assisted odds of reporting that the pandemic significantly increasing the level of stress (Odds Ratio=2.5, 97.5%CI=1.6:3.9) and that the financial situation became a lot more stressful (Odds Ratio=1.7, 97.5%CI=1.1:2.8) were significantly higher among cisgender women relative to cisgender men. While the odds for both measures of stress were higher for transgender/gender non-binary students relative to cisgender men, the odds ratios were not significant after adjustments for multiplicity. Current tobacco use was not significantly associated with increased overall stress or financial stress due to the pandemic. However, both current use of alcohol (p=0.003) and cannabis (p=0.002) were significantly more common among students who reported that the pandemic made their financial situation a lot more stressful (71% and 30% respectively) relative to those students who reported that the pandemic did not make their financial situation a lot more stressful (59% and 17% respectively). These disparities were most pronounced among cisgender women. **Conclusion.** The findings reinforce the importance of future monitoring of well-being and facilitating cessation of substance use among U.S. college students, especially cisgender women, who are more likely to be severely impacted by the pandemic (relative to the general population).

PS1-90

EXPLORING ENDS PREVENTION MESSAGES AND CONCEPTS WITH YOUTH AND YOUNG ADULTS

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Significance: In 2014, FDA launched its first youth tobacco prevention campaign targeting at-risk youth aged 12-17 called The Real Cost (TRC). In 2018, the FDA expanded its public education campaigns to focus on the prevention of youth electronic nicotine delivery systems (ENDS) use. To support the next wave of the campaign, FDA's Center for Tobacco Products conducted a study to develop appropriate messaging to prevent ENDS use among youth and young adults. **Methods:** Focus groups were completed remotely across the United States, with a sample of 231 consisting of youth (13-17) and young adults (18-20). Participants qualified for the study if they were identified as (1) at risk of initiating ENDS use (susceptible) or (2) have experimented with ENDS (including current and ever ENDS users). Recruitment also considered participant race/ethnicity, gender, and geographical location. Nine of the focus groups included only participants who reported Hispanic/Latino ethnicity. We conducted a qualitative content analysis of focus group transcripts using NVivo along with quantitative analysis of pre-discussion poll questions using Chi-square tests to examine differences in responses across segments to assess message effectiveness. **Results:** Focus groups identified promising messages, which included statements about addiction, toxic metals (i.e., "vape aerosols contain toxic metals"), lung damage, and DNA damage (i.e., "vape aerosols can contain toxic chemicals that may damage your DNA"). Insights related to segments found current users and 15-17-year-olds (compared to their younger and older counterparts) to be more critical of stimuli. For certain messages there were no differences between some subgroups suggesting that some messages resonate across subgroups. A majority (85.2%) of respondents reported campaign awareness, and (82.6%) considered TRC to be a trusted/ credible source. **Conclusions:** Focus group participants offered insight for developing appropriate messaging to prevent ENDS use among youth and young adults. Results deepen our understanding of the target audience relationship to ENDS, including perceptions and behaviors.

PS1-91

E-CIGARETTE USE IN THE WILD. NICOTINE FORMULATION AND NICOTINE CONCENTRATION, BY DEVICE TYPE

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Significance: E-cigarette device characteristics and liquid nicotine concentration affect e-cigarette user nicotine exposure. We examined characteristics of devices and liquids used by regular e-cigarette users in 2020. **Methods:** U.S. adults (21+) using e-cigarettes at least five days per week (n=1209) were recruited for an online survey; many sample and data integrity strategies were implemented. Participants were asked about the device and liquid used most often the past week and uploaded photos of their most used device and liquid. When device or liquid characteristics were not available from the coded photos, we used self-report data. The most prominent device/liquid combinations of regular e-cigarette users are described. **Results:** The vast majority of participants (90.7%) used devices with a rechargeable battery (n=1096). Among users of rechargeable devices, just over half (56.3%) used devices *with* adjustable settings; almost all of these (97.4%) used liquid from a refill bottle and most (77.9%) of these used a liquid with free-base nicotine (median nicotine concentration (med_nic_conc)=6mg/mL). Among those who used a rechargeable device *without* adjustable settings (42.8%), 61.0% used a pre-filled cartridge/pod, mostly (92.7%) with a nicotine salt liquid (med_nic_conc=50mg/mL). Others who used a rechargeable device *without* adjustable settings used liquid from a refill bottle (39.0%), half of which had a nicotine salt formulation (51.4%; med_nic_conc=36mg/mL) and just under half had a free-base formulation (45.4%; med_nic_conc=6mg/mL). Among users of disposable devices (n=113), almost all used a nicotine salt liquid (95.6%; med_nic_conc=50mg/mL). **Conclusion:** Among this sample there is much heterogeneity in the characteristics and combinations of devices and liquids used by regular e-cigarette users. Many e-cigarette users are able to manipulate device power and choose liquid nicotine concentration, resulting in challenges for regulating e-cigarette users' nicotine exposure. These challenges have implications for understanding e-cigarette toxicity, addiction, health effects and use behaviors at the individual and population level.

PS1-92

TOBACCO COMPANY AGREEMENTS WITH TOBACCO RETAILERS FOR PRIME PLACEMENT AND PRICE DISCOUNTS, A SCOPING REVIEW

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SIGNIFICANCE. Often, the promotion of tobacco products is spurred on by secretive contractual agreements between international tobacco manufacturers and tobacco product retailers. These contracts ensure that tobacco products are heavily marketed in the retail setting through placement, promotion, price, and products. We conducted a scoping review to explore the state of the existing research and to understand the provision in contracts between tobacco manufacturers and retailers. **METHODS.** The systematic search was conducted in PubMed/MEDLINE, Web of Science, Scopus, ProQuest Political Science Database, Business Source Premier, ProQuest Agricultural & Environmental Science Collection, and Global Health through December 2020. We included studies that collected and analyzed empirical data related to tobacco contracts, tobacco manufacturers, and tobacco retailers. Two reviewers independently screened all 2,786 studies' title and abstract and 65 studies' full text for inclusion. Study characteristics, contract prevalence, contract requirements and incentives, and the influence of contracts on the retail environment were extracted from each study. We created an evidence table and conducted a narrative review of included studies. **RESULTS.** Our review resulted in 27 (0.97%) included studies. These confidential contracts are common around the world and handsomely incentivize tobacco retailers in exchange for manufacturer control of tobacco product availability, placement, pricing, and promotion in the retail setting. Contracts allow tobacco companies to promote their products and undermine tobacco control efforts in the retail setting through discounted prices, promotions, and highly visible placement of marketing materials and products. We present examples from prior research and sample contracts to illustrate the power contracts have over shaping the retail environment. **CONCLUSIONS.** Policy recommendations include banning tobacco manufacturer contracts and retailer incentives along with more transparent reporting of contract incentives given to retailers.

PS1-93

STRUCTURED ONLINE TRAINING FOR UNIVERSITY STUDENTS TO DELIVER PEER-LED SMOKING CESSATION COUNSELLING FOR YOUNG SMOKERS IN CHINA: EFFICACY ON IMPROVING KNOWLEDGE, ATTITUDE, CONFIDENCE, AND SKILLS

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Significance The majority of smokers started to smoke cigarettes before 30 years old. The harmful effects of smoking on youth can be severe and long-lasting, including reduced lung growth, brain development, and early cardiovascular damage. Youth who are daily cigarette smokers are less likely to quit on their own, seeking smoking cessation support and receive advice to quit from healthcare providers. Peer support counselling offers peer counsellors and youth smokers a common ground to share and resonate with one another's personal experiences. However, peers are often lack skills and knowledge in delivering smoking cessation support to smokers. It is essential to provide smoking cessation training for peers to be smoking cessation counsellors. **Methods** A structured training program was designed for university students who have the intention to provide support for public health. Pre-and post-training evaluations were conducted for 94 university students who completed the training program. **Results** After training, the participant's mean score for knowledge about tobacco use (pre:7.22, SD=1.88 VS post:8.24, SD=2.41; P=0.002), attitudes towards smoking cessation and tobacco control (pre: 3.06,SD=0.64 VS pre: 3.44, SD=0.59; P<0.001) increased significantly. Their perceived confidence (pre: 2.89,SD=0.41 VS post:30.4, SD=0.45; P=0.024) and importance(pre:3.19,SD=0.48 VS post: 3.34,SD=0.48;p=0.049) increased in delivering smoking cessation counseling. Also, their perceived effectiveness of quitline (pre:6.65,SD=1.27 VS post:7.51,SD=1.30;p<0.001) and perceived importance of peer counselling(pre:7.71,SD=1.14 VS. post:8.21,SD=1.11;p<0.001) in helping smokers quit smoking increased significantly. The training program had a medium effect on improving participant's knowledge of and attitude towards tobacco use(Cohen's d=0.500), a large effect on improving perceived effectiveness(Cohen's d=1.156) and importance(Cohen's d=1.107) towards quitline in smoking cessation, a medium effect on enhancing their confidence, perceived importance, and reduced in delivering smoking cessation counselling. Most of the trained participants demonstrated good counselling skills in the simulated standardized case scenario. The participant's mean score for the practical exam was

14.42 (SD=1.99[maximum score=19]). **Conclusion** The online smoking cessation training programme significantly improved participants' knowledge of and attitudes towards tobacco use. It also enhanced the confidence and skills of peer counsellors in delivering counselling to youth smokers.

PS1-94

EFFECT OF HARM PERCEPTION ON ENDS INITIATION AMONG US ADOLESCENTS AND YOUNG ADULTS: FINDINGS FROM THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY, 2013-2018

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Background: Electronic Nicotine Delivery Systems (ENDS) have become the most popular tobacco products among youth in the United States (US). This study aims to investigate how ENDS harm perception predicts ENDS initiation among never ENDS users. **Methods:** Data were from the youth and adult sample of the Population Assessment of Tobacco and Health (PATH) Study conducted from 2013-2018. Cox proportional hazards regression models were used to assess the relationship between harm perception and ENDS initiation among adolescents and young adults separately. Weighted adjusted hazard ratios (HRs) with 95% confidence intervals (CIs) were reported. **Results:** 17.1% of the 11,633 adolescents and 25.5% of the 5,089 young adults from baseline initiated ENDS use across four waves. Among adolescents, perceiving ENDS as less harmful than cigarettes (HR=2.69; 95%CI: 2.21-3.27) and ENDS as no or little harm (HR=2.78; 95%CI: 2.31-3.34) significantly increased risks of ENDS initiation. Young adults who perceived ENDS as less harmful than cigarettes were more likely to initiate ENDS (HR=2.04; 95%CI: 1.73-2.41). Additionally, adolescents and young adults who ever used any other tobacco products or substance were associated with an increased risk of ENDS initiation. **Conclusions:** Among a representative longitudinal cohort of adolescents and young adults who had never used ENDS, perceiving ENDS as a reduced or low-harm product significantly predicted ENDS initiation across four waves. These findings underscore the need for appropriate ENDS prevention projects such as risk communication interventions targeted to young people to help curb ENDS initiation and diminish ENDS use in the US.

PS1-95

"WHY BAN MENTHOL CIGARETTES WHEN YOU CAN SMOKE REGULAR CIGARETTES?" - INTERVIEWS ABOUT A MENTHOL BAN WITH PEOPLE WHO SMOKE MENTHOL CIGARETTES

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Significance: The US Food and Drug Administration recently announced its intention to pursue a federal ban on menthol cigarettes. The purpose of this qualitative study was to examine reactions to a potential menthol cigarette ban among people who smoke menthol cigarettes. **Methods:** As part of a laboratory study examining menthol flavor regulations, we conducted interviews with participants who smoke menthol cigarettes (N=35). We examined the following topics: (1) risk perceptions of menthol cigarettes; (2) knowledge, attitudes and perceptions of menthol cigarette regulations; and (3) anticipated behavior if menthol cigarettes were banned. Interviews were audio-recorded, transcribed verbatim, double-coded, and analyzed using reflexive thematic analysis. **Results**: Overall, the majority of participants (n=29) said they would use other tobacco products, including non-menthol cigarettes (n=16) or e-cigarettes (n=23), if menthol cigarettes were not available to purchase. However, many also said a menthol cigarette ban could motivate them or others to quit smoking. Several voiced skepticism or resentment about banning only menthol cigarettes rather than all cigarettes, including non-menthols. Some felt the policy would be ineffective because people will find a way to obtain menthol cigarettes or simply switch to non-menthol cigarettes. Others said banning menthol cigarettes would be good for public health because fewer people, particularly youth, would smoke. Some participants stated that regulators wanted to ban menthol cigarettes because they appeal to youth or because they believed that menthol cigarettes are more harmful or addictive than non-menthol cigarettes. **Conclusions**: Our findings may help to explain why many surveys report minimal support for banning menthol cigarettes. People who smoke menthol cigarettes may not understand

the policy's purpose, resulting in the perception of being unfairly targeted or that the policy with be ineffective. As regulators move forward with banning menthol cigarettes, communication campaigns explaining the public health benefits, potentially focusing on the benefits for youth, should be part of the policy implementation plan.

PS1-96

COSTS AND COST-EFFECTIVENESS OF A SMOKING CESSATION PROGRAM FOR INDIVIDUALS HOSPITALIZED WITH PSYCHIATRIC DISORDERS

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BACKGROUND. The HelpingHand3 smoking cessation randomized trial established that among smokers discharged from a hospital after treatment for a psychiatric disorder, a sustained care (SusC) intervention increased 7-day point prevalence smoking abstinence at 6 months for those receiving SusC compared to usual care (UC) control (8.9% SusC vs. 3.5% UC, difference 5.4% [95% CI, 0.3%-10.4%]). The present study estimated the cost per participant and incremental cost per quit (ICQ) of implementing the SusC intervention relative to UC. METHODS. Participants in the SusC arm were offered the following intervention: 1) a 40-minute, in-hospital smoking cessation motivational interviewing (MI) counseling session from a trained social worker, 2) a 4-week supply of free nicotine patches, 3) an optional additional 4-week course of nicotine patches, 4) up to 8 automated outreach messages on smoking cessation delivered by a choice of either interactive voice recognition (IVR) or text (SMS) message according to participant preference, 5) referral to Tobacco Quitline for cessation counseling if interested. Costs, measured from a health system's perspective, included MI counseling (counselor training/oversight, inpatient counseling delivery), medications (with shipping), and technology (IVR, SMS, quitline connection). Unused optional services incurred no cost. In practice, few participants chose/engaged with IVR so an alternate cost scenario was simulated with SMS technology only, streamlined connection to the Quitline, and 8 weeks of nicotine patches provided at discharge (necessary because IVR was used in triaging the second 4 weeks of nicotine patches) (SusC-alt). RESULTS: The cost of SusC as provided in the trial was $1,439/participant (5% counseling, 7% medications, 88% technology); the ICQ was $26,602 (95%CI $11,086, $168,838). SusC-alt would cost $248/participant (32% counseling, 52% medication, 17% technology) with an ICQ of $4,587 (95%CI $1,844, $28,980). CONCLUSION: As implemented in an RCT, SusC was costly. However, in real-world practice, technology costs could be significantly reduced yielding ICQ values similar to other health system-initiated cessation interventions.

PS1-97

SIMULATION MODELING OF SMOKING AMONG PEOPLE WITH AND WITHOUT SERIOUS PSYCHOLOGICAL DISTRESS IN THE US 1997-2100

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Significance: People with serious psychological distress (SPD) continue to be disproportionately harmed by smoking-related disease and death. It is unclear how this disparity could change over time. **Methods:** We developed separate deterministic smoking simulation models for the SPD and non-SPD populations with compartments for never, current, and former smokers. Using the 1997-2018 National Health Interview Surveys (NHIS), we calibrated parameters for annual probabilities of smoking initiation and cessation for SPD and non-SPD populations. Mortality estimates were specific to smoking status, age, gender, and SPD status. Baseline projections assume that current smoking initiation and cessation probabilities remain constant 2018-2100. **Results:** Simulation models correspond closely with 1997-2018 NHIS data. In the SPD population, smoking prevalence declined from 52.3% to 35.1% among men (women: 43.7% to 30.1%). In the non-SPD population, smoking prevalence dropped from 26.1% to 14.5% among men (women: 20.2% to 11.5%). The smoking prevalence ratio between men with and without SPD from 1997-2018 increased from 2.0 to 2.4 (women: 2.2 to 2.6) By 2100, the ratio increased to 3.1 for men (12.3% vs. 4.0%) and 3.3 for women (10.5% vs. 3.1%). The model estimates that under a baseline scenario, the total number of smoking-attributable deaths among people with SPD from 2020-2100 is 873,354. The

proportion of all deaths attributed to smoking among people with SPD decreased from 14.4% in 2020 to 4.5% in 2100 for women and from 18.8% to 8.3% for men. Among people without SPD, it decreased from 8.4% to 1.7% for women and 18.9% to 4.4% for men. By 2100, smoking-attributable proportions of death were 1.9 times greater for men with SPD than for men without SPD (women: 2.6 times greater). From 2020-2100, people with SPD lost an estimated 9.7 million years of life attributed to smoking. **Conclusion:** Although smoking rates are projected to decline for people with and without SPD over time in the absence of intervention, smoking disparities by SPD may widen, with differences by gender. Future research can evaluate interventions with potential to reduce tobacco-related disparities.

PS1-98

PATTERNS OF USE AND THE CARDIOPULMONARY HEALTH RISKS OF CIGAR PRODUCTS - A SYSTEMATIC REVIEW

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Background: A systematic review was conducted to identify reported and perceived cardiopulmonary health effects of cigar products. **Methods:** PubMed and Google Scholar were searched for articles published between June 2014 and February 2021. Search keywords included cigars, cigarillos, little cigars, and cardiopulmonary health outcomes. Of the 782 papers identified, we excluded non-English articles, review articles, commentaries, and those without empirical data on cigar products. 90 studies met inclusion criteria and were included in the paper. Three coders independently reviewed all articles and compared codes to resolve discrepancies. **Results:** Cigars have evolved from large cigars to encompass little cigars and cigarillos (LCCs). LCCs are more frequently used by youth, young adults, and Blacks and are often used in combination with other tobacco products, alcohol, and marijuana. LCCs are available in an array of flavors and at a price advantage. Cigar product diversity is driven by a loophole in the Family Smoking and Prevention Act that exempted cigars from many of the policies regulating cigarettes. Despite limited regulation, cigars generate smoke of a similar composition as cigarettes. A limited number of studies have evaluated the cardiopulmonary effects of cigar use and suggest associated toxicity. Importantly, all-cause, lung cancer, and cardiovascular disease-related mortalities are higher among cigar users compared to non-smokers. **Conclusion:** Studies evaluating the cardiopulmonary health effects associated with contemporary cigar products are extremely limited but suggest similar health risks as conferred by cigarette smoking. With the use of LCCs and targeted social media marketing on the rise among high-risk groups such as youth and Blacks, it is crucial that studies moving forward evaluate the cardiopulmonary health effects associated with contemporary cigar products.

PS1-99

PREDICTIVE VALIDITY OF THE ORIGINAL AND EXPANDED SUSCEPTIBILITY MEASURES FOR SMOKELESS TOBACCO

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Background: Susceptibility to smoking is a widely used measure of intention to use tobacco products. This study seeks to validate the original (3-item) and expanded (4-item) susceptibility measures for smokeless tobacco (SLT) use among a longitudinal sample of rural young boys. We also compare the predictive validity of the original and the expanded susceptibility measures for SLT. **Methods:** Data are from a five-wave longitudinal sample of rural boys ages 11-16 at baseline in the United States. Data were collected either in-person or online approximately twice a year from January 2016 to December 2018. We used a series of logistic regressions to identify whether individual demographic variables, the original (will use SLT soon, in next year, if friend offers), or the expanded (same items plus curiosity) susceptibility measures predicted experimentation with SLT by 2018. The sensitivity (true positive rate), specificity (true negative rate), positive predictive value (PPV), and negative predictive value (NPV) of the original and expanded measures were also calculated to determine reliability. All analyses were limited to 2016 never SLT users. **Results:** The original and the expanded

susceptibility measures were significant predictors of SLT initiation by follow-up. Rural boys who were susceptible on the original measure (AOR = 3.38 95% CI=2.71-4.22) and the expanded measure (AOR = 3.20 CI=2.60-3.95) had increased odds of initiating SLT within three years compared to rural boys who were non-susceptible. The original and expanded measures both have high specificity (86.1% and 80.7% respectively), identifying a large proportion of never users as non-susceptible. Sensitivity for the original measure was 37.0% and increased to 44.2% for the expanded scale. The PPV is approximately 20% for both the original and expanded measures (21.2% and 18.8%). **Conclusions:** These results suggest that the susceptibility measure for SLT is a valid predictor of future SLT use. The expanded scale does not improve the overall predictive validity of the scale but improves the sensitivity, which may be beneficial for public health professionals interested in identifying at-risk youth.

FUNDING: Federal

PS1-100

READABILITY OF VAPING INFORMATION ON THE WEB

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Significance: Many people, especially youth and young adults, rely on the internet for information, including information on vaping. However, for information to be useful, it must be easily understood. The recommended reading level for U.S. adults is 6th-7th grade, with lower levels suggested for youth. In one of the only studies to examine readability of e-cigarette-related web content, Park et al. (2017) found that webpages exceeded readability level recommendations and that information promoting e-cigarette use was easier to read than information warning of dangers. This study sought to extend Park et al.'s findings by analyzing online e-cigarette content related to addiction and cessation and comparing information targeted to teens and parents. Methods: Three reviewers identified the first 100 webpages with vaping-related content using six search terms (N=1800). After exclusion (e.g., product advertisement, duplicates), 464 webpages were analyzed using six readability measures: Flesh Kincaid Reading Ease, Flesh Kincaid Grade Level, Gunning-Fog Score, Coleman-Liau Index, Simple Measure of Gobbledygook (SMOG Index), and Automated Readability Index. Webpages were categorized by target audience (e.g., teens, parents), and t-tests and ANOVA assessed differences. Results: Overall, webpage content was written at an 8.39 grade level (SD 1.92). Webpages targeted to teens had lower readability scores than those targeted to adults on three readability tests: Automated Readability Index (p=0.0093), Coleman-Liau Index (p=0.0263), and SMOG Index (p=0.0109). Under half (48.1%) of webpages targeted to teens and under one-third (32.7%) targeted to parents met readability guidelines. Conclusion: Information about e-cigarettes on many webpages exceeded readability recommendations. Although webpages that targeted teens were more readable than those targeting parents, many teen-oriented webpages failed to comply with readability guidelines. To effectively communicate information about e-cigarette risks, messaging has to be interpretable; thus, online content should be crafted according to readability guidelines.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

PS1-101

IMPACT OF THE COVID-19 PANDEMIC ON VAPING AMONG COLLEGE STUDENT E-CIGARETTE USERS

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Significance: While the U.S. has seen substantial declines in combustible cigarette use, e-cigarette use has increased significantly in recent years, especially among college students where rates of past-month use increased from 6.1% in 2017 to 22% in 2019. This dramatic increase is particularly alarming because emerging work suggests that vaping increases risk for COVID-19 infection. Vaping may also increase risk for severe COVID-19 and the need for mechanical ventilation. However, it is unclear whether these risks have impacted college student e-cigarette users. Therefore, the current study sought to examine how the COVID-19 pandemic may have influenced views of vaping risks and vaping behavior among college students. **Methods:** Participants were 129 current e-cigarette users (Mage = 19.68, SD = 1.84; 72% female; 85.3% White) who completed an online survey for course credit in the Fall 2020 and Spring 2021 semesters. Participants reported an average e-cigarette dependence score of 9.37 (SD = 4.88), and 42.6% were daily users. **Results:** Although 69% of participants thought the risk of COVID-19 was somewhat or much higher for vapers than non-vapers, only 34.1% reported that their views on e-cigarettes had changed in the last six months.

Participants thought vaping increased risk of COVID-19 by only a moderate amount (M = 3.61, SD = 1.98 on a 1-7 scale), yet 45.3% reported that their motivation to quit vaping had increased since the pandemic's start and 32.6% had made a quit attempt. However, only 23.4% had decreased their use since learning about COVID-19, and vaping was the second most commonly endorsed coping mechanism for dealing with COVID-19-related stress behind making time to relax. **Conclusions:** These findings suggest that college student e-cigarette users hold conflicting beliefs about the health risks of e-cigarettes, and that their behaviors are not always in line with their risk perceptions. Perhaps conflicting motivations to vape to cope with stress as well as to stop vaping to reduce health risks impede behavior change. Motivational enhancement strategies may be useful to encourage cessation efforts in this population.

FUNDING: Unfunded

PS1-102

TRENDS OF MATERNAL TOBACCO (WATERPIPE, CIGARETTE, AND DUAL) USE IN JORDAN. A DECADE OF LOST OPPORTUNITIES

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BackgroundMaternal tobacco use is a global public health problem. In the literature, the focus was mainly on cigarette smoking, minimally on waterpipe use, and totally ignored dual use among pregnant women. We estimated the prevalence of current maternal tobacco use by tobacco product (cigarette, waterpipe, and dual use) over a period of ten years (2007 to 2017), and examined the socio-demographic patterning of maternal tobacco use.MethodsA secondary analysis of Jordan DHS four data waves was conducted for women who reported to be pregnant at the time of the survey. Current cigarette and waterpipe tobacco use were investigated. Prevalence estimates for cigarette-only, waterpipe-only, and dual use, as well as for cigarette, regardless of waterpipe, and waterpipe, regardless of cigarette, were reported. The effect of independent variables on cigarette smoking, waterpipe use, and dual use was assessed. Logistic regression models assessed the adjusted effects of socio-demographic variables on cigarette smoking, waterpipe use, and on dual use. For each outcome variable, a time-adjusted and a time-unadjusted logistic models were conducted.ResultsOver the last decade, the prevalence estimates of current cigarette-only smoking slightly decreased. The prevalence estimates of current waterpipe-only use exceeded those for cigarette-only after 2007 and showed a steady overall increase. Current dual use showed a continuous rise especially after 2009. Gradual increase in cigarette smoking (4.1%, in 2007, and 5.7% in 2017) and in waterpipe use (2.5% to 6.4%) were detected. Education showed an inverse relationship with cigarette and waterpipe smoking. Household wealth demonstrated a positive association with cigarette and waterpipe smoking.ConclusionsTobacco use epidemic is expanding its roots among pregnant women in Jordan through not only waterpipe use but also dual cigarette-waterpipe smoking. Maternal and child services should consider tobacco counseling and cessation.

FUNDING: Unfunded; Academic Institution

PS1-103

TOBACCO SMOKE IS A MAJOR SOURCE OF AROMATIC AMINE EXPOSURE IN US ADULTS: NHANES 2013-14

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Cigarette smoking increases risk of cancer and cardiovascular diseases, as well as premature death. Aromatic amines (AAs) are found in cigarette smoke and are well-established human bladder carcinogens. In this study, we measured the urinary levels of 1-aminonaphthalene (1AMN), 2-aminonaphthalene (2AMN), and 4-aminobiphenyl (4ABP) in adult exclusive cigarette smokers and adult nonusers of tobacco products among a nationally representative sample of the non-institutionalized U.S. population, National Health and Nutrition Examination Survey (NHANES) 2013-14 (a 1/3 sub-sample of adults aged 18+ years old). Exclusive cigarette users are participants who answered yes to smoking cigarettes in the past 5 days and no to smokeless tobacco products, and other combustible tobacco products such as cigars, hookah, e-cigarettes. Total urinary AAs were measured by isotope dilution Gas Chromatography-Triple Quad Mass Spectrometry. Sample-weighted geometric mean concentrations of AAs in adult exclusive cigarette smokers compared to adult nonusers of tobacco products were 30 times higher for 1AMN and 4-6 times higher for 2AMN and 4ABP. Tobacco smoke exposure analyses were performed using sample-weighted multiple linear regression models to control

for age, sex, race, and urinary creatinine. Tobacco exposure status was categorized using serum cotinine among adult nonusers of tobacco products (SCOT ≤ 10 ng/mL) and reported cigarette smoked per day CPD (self-reported average number of CPD in the 5 days prior to NHANES physical exam) among exclusive cigarette users (SCOT > 10 ng/mL). Sample-weighted regression models show total urinary 1AMN, 2AMN, and 4ABP increased proportionally with the number of cigarettes smoked per day (p < 0.001). We also investigated the relationship between AA levels and U.S. Department of Agriculture (USDA)dietary categories. Dietary intake was examined using the amounts participants reported for each USDA food group in the 24-hours recall period, midnight to midnight. Sample-weighted multiple linear regression models were fit to each of the three analytes to include demographic covariates, tobacco exposure status, as well as 24-hour dietary recall and fasting time as covariates. We observe no consistent significant association between USDA 24-hour recall dietary intake and all three AAs. To our knowledge, this is the first time exposure to AAs from cigarette smoking is characterized among the adult US population, and we confirmed significantly higher levels of 1AMN, 2AMN, and 4ABP in adult exclusive cigarette smokers.

PS1-104

CHARMING E-CIGARETTE USERS WITH DISTORTED SCIENCE: EXAMINING THE IMPACT OF MISLEADING AND FALSE CLAIMS ABOUT NICOTINE ON BELIEFS ABOUT THE TOBACCO INDUSTRY

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Significance. The emergence of misleading scientific claims about the potential role of nicotine in fighting COVID-19 emphasizes the importance of examining public discourse about nicotine in general. This research examines the role of social media in promoting recall and belief of distorted science about nicotine and whether recall and belief in turn predict tobacco industry beliefs. **Methods**. Young adults 18-34 years (N=1225) old were surveyed via an online Qualtrics panel. Participants responded to a survey assessing recall and belief in three claims about nicotine and COVID-19 and three more about nicotine in general followed by assessments of positive and negative industry beliefs and use of various social media platforms. Ordinal logistic regression with robust standard errors controlling for gender, race/ethnicity, education, current e-cigarette use, and age was used to examine relationships between variables. **Results**. Twitter use was associated with higher odds of both recall (OR=1.21 95% CI=1.01, 1.44) and belief (OR=1.26 CI=1.04, 1.52) in COVID-19 specific distorted science. YouTube use was associated with higher odds of believing COVID-19 specific distorted science (OR=1.32 CI=1.09, 1.60). Reddit use was associated with lower odds of believing COVID-19 specific distorted science (OR=0.72 CI=0.59, 0.88). Recall (OR=1.26 CI=1.07, 1.47) and belief, (OR=1.28 CI=1.09, 1.50) in distorted science about nicotine in general as well as belief in distorted science specific to COVID-19, (OR = 1.61 CI=1.34, 1.95) were associated with more positive beliefs about the tobacco industry. Belief distorted science about nicotine in general was associated with more negative beliefs about the tobacco industry (OR=1.18 CI=1.02, 1.35). **Conclusion**. This study provides evidence of the role of social media in both disseminating as well as dispelling misleading and potentially harmful misinformation about nicotine and suggests a role for counter messaging. Additionally, addressing misinformation about nicotine is important, as it appears to be associated with more favorable views of the tobacco industry which may erode public support for effective regulation.

PS1-105

DIFFERENCES IN YOUTH E-CIGARETTE CO-USE OF CANNABIS AND NICOTINE VS. NICOTINE ALONE IN SOUTH CAROLINA

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Significance: Cannabis use in e-cigarettes is a rapidly burgeoning practice that calls for immediate and long-term epidemiologic research. This area of research is particularly prudent given the prominent role of THC-containing products in causing severe illness such as the 2019 EVALI outbreak. *Methods:* This study uses the 2019 South Carolina Youth Tobacco Survey (YTS) to analyze potential differences in ever-users of e-cigarettes among a representative cross-sectional sample of high school students (n=1267). Ever-users of e-cigarettes were differentiated by substance vaped: with nicotine alone e-cigarette users (n=227) representing a larger group than those who had vaped nicotine and cannabis (co-users) (n=116). *Results:* Chi-square analysis revealed

significant differences in lifetime cigarette use with co-users being more than twice as likely to have smoked more than 1 cigarette than nicotine alone e-cigarette users (aOR: 2.89, 95% CI: 1.63-5.11). Significant results were also found in heavy cigarette use, desires to quit smoking, quit attempts, how products were obtained, and perceptions about tobacco use among other variables. *Conclusions:* These results suggest that youth use of e-cigarettes is not limited to what is legally available to adult users, and can inform public health practitioners and policy makers in developing interventions to prevent youth substance use.

PS1-106

SOCIAL MEDIA EXPOSURE AND INITIATION OF VAPING CANNABIS AMONG US ADOLESCENTS RESULTS FROM THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY WAVES 3 AND 4

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BACKGROUND The prevalence of youth cannabis vaping has increased in recent years. Engagement in social media platforms that provide pro-vaping content which includes both vaping cannabis and nicotine may influence youth cannabis vaping behaviors. There have been few longitudinal examinations of these associations. We used a nationally representative longitudinal sample of US youth to investigate the associations between social media use and cannabis vaping initiation. **METHODS** This study utilized the youth dataset from Population Assessment of Tobacco and Health (PATH) Study Waves 3 (2015-2016) and 4 (2016-2018). Using youth respondents who never vaped cannabis at Wave 3 (N=7,821), we conducted a multivariable logistic regression on cannabis vaping initiation at Wave 4 (ever-used cannabis vaping) by frequency of social media use at Wave 3 (never, non-daily, daily), after controlling for associated covariates (e.g., demographics, current tobacco, and other substance use, internalizing/externalizing tendencies). **RESULTS** Among cannabis never-vapers at Wave 3 (n=7,821), 16.1% (weighted) reported never, 16.4% non-daily, and 67.5% daily social media use, and 6.8% (n=540; weighted) initiated cannabis vaping at Wave 4. In the multivariable logistic regression model, daily social media use (vs. never use) was associated with cannabis vaping initiation at Wave 4 (aOR=1.75; 95% CI=1.18, 2.60), but non-daily social media use (vs. never use) was not associated with cannabis vaping initiation at Wave 4 (p=0.594). **CONCLUSIONS** Youth who use social media daily were more likely to report initiation of cannabis vaping a year later. Multi-level prevention efforts are needed to curve pro-vaping content on social media to reduce youth cannabis vaping. These should include surveillance and regulation of cannabis vaping-related content on social media.

PS1-107

PROMISING THEMES FOR CORRECTING PUBLIC MISPERCEPTIONS ABOUT NICOTINE REDUCTION

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Significance: Half of smokers incorrectly think that very low nicotine content (VLNC) cigarettes are less carcinogenic than current cigarettes, which could reduce the impact of an FDA nicotine reduction policy. We sought to determine what themes and messages are most effective in reducing the misperception that VLNC cigarettes are safer to smoke than current cigarettes. **Methods**: We recruited US adult smokers in March of 2021. They participated in a MaxDiff best-worst scaling experiment to determine which themes and messages were most promising for correcting the VLNC misperception based on perceived message effectiveness. The 19 messages used one of seven themes: 1) truth, 2) truth/refute- myth/truth, 3) emotion, 4) alternative cause 5) value affirmation 6) emphasize harm of all cigarettes, or 7) minimal. Participants viewed sets of 3 messages and selected the one they preferred most and least. Participants then rated how much each message discouraged them from using VLNC cigarettes. MaxDiff results were analyzed using hierarchical bayes modeling to derive individual level scores for each message, and these scores were also pooled to compute average scores overall by message. We also computed the mean discouragement rating for each message. **Results:** 508 participants enrolled in the study. Participants were 50% female, mean age 44, 60% white, 18% Black or African American, and 18% Hispanic or Latinx. The three best themes were: 1) emotion (6.6 MaxDiff score, 3.5 mean discouragement), 2) emphasize harm of all cigarettes (6.3, 3.4), and 3) truth/refute-myth/truth (5.6, 3.3). For an individual message, the highest MaxDiff score (7.0) and mean discouragement

(3.6) were both for the same message in the emotion theme: "Cigarettes with less nicotine are as harmful as other cigarettes. Smoking will still cause cancer. If you get lung cancer, you have an 80% chance of dying within 5 years." The next best message was also in the emotion theme (MaxDiff score 6.5, mean discouragement 3.5): "Cigarettes with less nicotine are as harmful as other cigarettes. Smoking will still cause cancer. Imagine telling a loved one you have cancer." **Conclusions**: The promising themes and messages in the MaxDiff experiment align with and reinforce best and promising practices for reducing public misinformation. Future research can test the effectiveness of the top performing messages in changing incorrect beliefs about VLNC cigarettes.

FUNDING: Federal

PS1-108

TOBACCO AS A TOOL FOR GENDER EMBODIMENT, DEFENSE, AND SURVIVAL

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<u>Significance</u>: The prevalence of tobacco use disparities among transgender and gender diverse (TGD) people are often broadly attributed to holding minoritized identities, where smoking is used for perceived stress relief and to cope with minority stressors. Usually, these explanations do not include detailed components of TGD identity, such as identity development processes, dimensions (e.g., valence or centrality), milestones (e.g., coming out, use of a chosen name), or the overlap of TGD identity with other minoritized social identities. This study explored the association of specific identity components with tobacco use among TGD young adult tobacco users ages 18-29. <u>Methods</u>: Participants in 25 one-on-one semi-structured interviews were 68% (n=17) assigned female at birth and averaged 23 years old. They were 64.0% (n=16) non-Hispanic White, 24% (n=6) Hispanic, and 12% (n=3) other or multiple race/ethnicities. <u>Results</u>: Thematic, multiple-coder analyses revealed specific instances of participants using tobacco as a tool for gender embodiment and in situations of defense and survival. Tobacco played a role in cultivating masculine ideals for some participants, particularly those whose identities did not match their external gender presentations. For some, smoking was a way to increase feelings of personal safety in public, through limited exchanges related to smoking behaviors, or as a way to ensure isolation. Identity uncertainty and lower identity integration were associated with experiences of minority stress, which were robustly associated with smoking. <u>Conclusion</u>: Multiple elements of TGD identity appeared associated with tobacco use across a range of developmental processes and contexts. In a variety of settings, smoking was used in identity management, and as a way to establish personal safety. Models of TGD tobacco use should include identity dimensions and milestones to improve our understanding of the etiology of TGD tobacco use. Future studies should explore identity management behaviors with larger samples across a broader range of minoritized social identities to improve targeted smoking cessation efforts and to increase TGD health.

FUNDING: Federal

PS1-109

CORRELATES OF E-CIGARETTE USE DEPENDENCE AMONG REGULAR ADULT E-CIGARETTE USERS

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Significance: Factors such as age of initiation, use frequency and liquid nicotine concentration are relevant to use dependence of combustible tobacco products. Less is known about which factors are relevant in the development of use dependence with e-cigarettes (E-CIGs), including device type, nicotine formulation and flavor. We aimed to fill the gap using data from regular adult E-CIG users. **Methods**: A total of 1209 US adult (21+) participants who used E-CIGs at least five days per week (711 exclusive E-CIG users; 498 dual E-CIG and cigarette users) self-reported their most used E-CIG device type and most used liquid, age of initiation of E-CIGs, and E-CIG dependence (Patient-Reported Outcomes Measurement Information System Nicotine Dependence Item Bank for E-CIGs: range 1-5, 5 being most dependent). Participants further uploaded photos of their most used device and liquid. E-CIG device and liquid characteristics were from coded photo data if available; otherwise, self-reported data were used. Data were analyzed using bivariate correlation, independent t-test, and analysis of variance. **Results**: Participants who used disposable pod/cartridge (DPC) devices reported

significantly higher E-CIG use dependence than participants who used refillable tanks/pods/cartridges (3.4 vs. 3.1, p<0.001). There was no significant difference between exclusive E-CIG users and dual users with respect to E-CIG dependence. Dependence was positively correlated with first use of E-CIGs before age 21 (r=0.12, p<0.001), use of DPC device (r=0.11, p<0.001), use of device without adjustable wattage/voltage (r=0.09, p<0.01), greater liquid nicotine concentration (r=0.15, p<0.001), nicotine salt-containing liquid (r=0.11, p<0.001), and use of menthol-flavored liquid (r=0.08, p<0.01). **Conclusion**: These findings suggest that initiating E-CIG use at an early age, use of DPC device, device without adjustable settings and menthol-flavored liquid are correlated with higher dependence among adults. Knowledge of correlates of E-CIG use dependence among regular E-CIG users can inform product regulations that will impact toxicity, addiction, and use behaviors at the individual and population level.

FUNDING: Federal

PS1-110

LABORATORY QUANTIFICATION OF GRAVIMETRIC CORRECTION FACTORS FOR REAL-TIME MEASUREMENTS OF ELECTRONIC CIGARETTE AEROSOL EXPOSURE

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Significance: Electronic cigarette (ECIG) use exposes bystanders to an aerosol containing toxicants that are associated with negative health outcomes. To examine secondhand exposures, researchers often attempt to quantify particulate matter (PM) generated during ECIG use with real-time optical sensors. The accuracy of these sensors is variable based on the PM source and requires on-site calibration specifically for different PM exposures. Therefore, this study calculated the filter correction factors needed to quantify real-time PM concentrations for different PM optical sensors and ECIG devices. **Methods:** We generated ECIG PM using a diaphragm pump and a clock generator for four ECIG devices inside a 0.5 m^3 exposure chamber. Devices included a box mod (VooPoo Drag 2), two disposable ECIGs (NJOY Daily and Hyde), and a "pod mod" (JUUL). A clock generator was used to control the vaping time of the ECIG devices with 4 seconds ON and 30 seconds OFF at different flow rates for each device. In addition to the real-time measurements performed by three optical sensors (MiniWRAS, pDR, and SidePack AM520), we used gravimetric analysis to capture the true mass concentrations using filter measurements. We measured the aerosol size distribution by mass for the four ECIG devices during PM generation. Experiments were repeated 3 times. **Results:** The filter correction factors varied by PM sensor and ECIG device, where the MiniWRAS underestimated most of the filter concentrations by 1.3-6 times. In contrast, the pDR and SidePack overestimated the filter concentrations by 1.2-2.5 and 5-7.7 times, respectively. The mass median diameter by volume varied between 0.41 and 0.62 μm, where most particles generated from the ECIG devices were smaller than 1 μm, except for the Hyde device, with some larger particles. **Conclusion:** This study shows that concentrations of ECIG-generated aerosol may be underestimated or overestimated depending on the ECIG device generating the aerosol and the sensor used to measure PM concentrations. These data can provide researchers correction factors needed to provide more accurate measurements of secondhand ECIG exposures.

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PS1-111

COVID-19 VACCINATION UPTAKE AND PERCEPTIONS AMONG CURRENT TOBACCO USERS

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Significance: Novel mRNA vaccines were developed and first distributed to high-risk individuals (including smokers) in the U.S. starting in December 2020 to combat the coronavirus (COVID-19) pandemic. Over one-half of the U.S. adult population has received at least one dose of a COVID-19 vaccine, but many others have reported hesitation about becoming vaccinated. Methods: We examined COVID-19 vaccine uptake and hesitancy from a convenience sample of Pennsylvanian adult smokers through an online survey. Email invitations with a unique survey link were sent to 3,509 valid email addresses on April 21, 2021, approximately 3 months after tobacco users were eligible to receive vaccination in the state of Pennsylvania. A logistic regression model was used to predict vaccination status. Results: Participants (n=231) were 23.4% male, 90.5% white, and had a mean age of 48.1 (SD=11.9) years. All participants were current tobacco users, with the majority reporting current cigarette smoking (90.9%) with an average of 16 (SD=8.1) cigarettes smoked per day. Nearly 60% (n=137) reported receiving at least one dose of the vaccine and of those who did not (n=94), 84% (n=79) said they were somewhat

or very unlikely to get a vaccine. A logistic regression model revealed that among all tobacco users, younger age (beta=-.05, p<.01), Hispanic ethnicity (beta=3.1, p=.01), higher distress over COVID-19 (beta=.19, p=.04), not consuming news about COVID-19 (beta=1.7, p<.01), not endorsing COVID-19 information from the government as reliable (beta=-1.4, p<.01), and not ever being tested for COVID-19 (beta=-1.6, p<.01) were significant predictors of being unvaccinated. Qualitative responses among those who were vaccine hesitant expressed concerns about the lack of research on the vaccine and fears about side effects. Conclusion: Understanding vaccine hesitancy among adults who smoke and who may be at an increased risk for severe complications from COVID-19 can help develop targeted communication strategies and directly address concerns about COVID-19 vaccines. This study has implications for public health to better understand and address the usage of higher health care resources during a pandemic.

PS1-112

HOW DO RISK-TAKING PROPENSITY AND TIME-DISCOUNTING RELATE TO ELECTRONIC NICOTINE DELIVERY SYSTEM ABUSE LIABILITY AND DEPENDENCE?

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Significance: An individual's propensity for risk-taking and time-discounting (how subjective value of rewards changes with delays in receipt) are two traits known to increase likelihood of initiating tobacco use. How these traits intersect with predictors of tobacco use behaviors among current users is less clear. We examined associations of risk-taking and time-discounting with abuse liability and dependence among current electronic nicotine delivery systems (ENDS) users. **Methods:** Participants were adult ENDS users (n=19 exclusive ENDS users, n=17 dual ENDS/cigarette users). Risk-taking was measured by responses (number of balloon pumps) on the Balloon Analog Risk Task. Time-discounting was measured by discount rate (k) and Effective Delay-50 (ED50; delay that reduces rewards' subjective value by half) from the Minute Discounting Task. A progressive ratio task (PRT) and drug purchase task (DPT) for own-brand ENDS puffs indexed ENDS abuse liability, and ENDS (all participants) and cigarette dependence (dual users only) were indexed by the PROMIS/PROMIS-E, Penn State (PS) Cigarette/E-cigarette Dependence Indices, and Fagerström Test for Nicotine Dependence (FTND). Pearson correlations examined relationships of risk-taking and time-discounting with abuse liability and dependence. **Results:** Greater risk-taking exhibited moderate negative correlations with DPT demand elasticity (r=-0.42, p=0.01) and ENDS dependence (PROMIS-E: r=-0.37, p=0.02). Time discounting (k) was positively correlated with PRT reinforcers earned (r=0.34, p=0.04) and responses entered (r=0.41, p=0.01). Among dual users, higher ED50 (lower time discounting) was strongly correlated with higher cigarette dependence (PS: r=0.51, p=0.04; FTND: r=0.57, p=0.02). **Conclusions:** Among dual and exclusive ENDS users, greater risk-taking and time-discounting were associated with greater ENDS abuse liability but lower dependence. These diverging relationships suggest different mechanisms by which individual traits relate to other key predictors of tobacco use behavior among current users and warrant further research.

PS1-113

INTENTIONS, ATTEMPTS, AND METHODS USED TO QUIT VAPING AMONG E-CIGARETTE USERS IN THE US AND UK

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Background: Because the long-term health effects of e-cigarettes are unknown, most health experts suggest that e-cigarette users quit at some point. Many e-cigarette users are interested in stopping, but little data exists on factors related to e-cigarette cessation. **Methods:** We used the online crowdsourcing platform, Prolific, to survey current e-cigarette users in the US and UK. Measures were drawn from existing international surveys. **Results:** The study included 1064 current e-cigarette users (535 UK; 529 US). The mean age was 34.7 years old; most were male (51%), white (85%), had a bachelor's degree or above (55%), and were employed (75%). Most were also ever (80.5%) or current smokers (55.5%) and reported using e-cigarettes on a daily basis (60.9%). Few respondents (9.5%) had been advised by a healthcare provider in the past year to quit vaping. Respondents showed moderate interest in quitting e-cigarettes (5.3 on average). Most (61.1%) reported they wanted to quit at some point in the future, and 22.5% had tried to quit e-cigarettes. Among those who had made a past quit attempt, 24.7% tried to quit once, 54% tried 2 or 3 times, and 21.3% ≥4 or more times. Regarding methods to quit, 3.9% tried to quit using nicotine replacement therapy (NRT), 0.7% used Bupropion,

and 0.5% used Varenicline. A few (2.8%) reported using cigarettes to quit vaping. Very few (less than 1% each), used either hookah, snus pouches, traditional cigars, pipe tobacco, filtered cigars, smokeless tobacco, dissolvable tobacco, or cigarillos to quit. We also present differences in quit strategies by country and qualitative analyses of responses to questions regarding reasons for quitting and what governments should do to help adults quit e-cigarettes. **Conclusion:** In this online sample, current e-cigarette users were moderately interested in quitting vaping and nearly 1 in 4 respondents had already tried to quit. Among those who had attempted to quit, few used methods shown to be effective for smoking cessation. A small percentage reported using cigarettes to quit.

PS1-114

THE ELECTRONIC NICOTINE DELIVERY SYSTEM PURCHASE TASK: ARE RESULTS SENSITIVE TO PRICE FRAMING?

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Background: Extension of the Cigarette Purchase Task (CPT) as a behavioral economic assessment of abuse liability to electronic nicotine delivery systems (ENDS) is complicated by the heterogenous nature of this product class (e.g., disposables, tank-, cartridge-based systems). Ambiguity exists regarding selection of the appropriate price frame (i.e., what the participant is purchasing - puffs, mL of liquid solution, cartridges), presenting challenges in contextualizing findings and comparisons across studies. This work sought to quantify the strength and direction of correlations between results from ENDS Purchase Tasks (EPT) featuring two commonly used price frames, puffs and mL of liquid. Methods: Adult, exclusive ENDS users (N=17) and dual users of ENDS and cigarettes (N=19) were recruited for an in-person laboratory study. Participants were asked to complete two own-brand, 16-price point ($0.00-$10.24) EPTs. One EPT used "10 puffs" as its price frame; the other used "1 mL of liquid solution." Five outcomes were generated for each EPT: breakpoint, intensity, Omax, Pmax, and elasticity. Pearson correlations among these outcomes were generated to assess within-person variation between the two price-frames. We also stratified analyses to assess whether correlations differed between dual and exclusive ENDS users, as well as between those that reported their baseline consumption of ENDS liquid in mLs versus cartridges. Results: Results suggested that EPT outcomes were highly correlated across price frames (breakpoint: rho=0.7515 (p<0.001); intensity: rho=0.8163 (p<0.001), Omax: rho=0.6724 (p<0.001); Pmax: rho=0.6560 (p<0.001); elasticity: rho=0.9505 (p<0.001)). Correlations between mLs and cartridges for all outcomes were higher for exclusive ECIG users than dual users, but did not systematically differ between those that reported baseline liquid consumption in mLs versus cartridges. Conclusions: EPT outcomes were not sensitive to the price frames examined, suggesting that both puffs and mLs are valid EPT price frames. Researchers should consider their population of interest and structure the EPT to reflect participants' knowledge and purchasing behaviors.

PS1-115

PROPYLENE GLYCOL - A BIOMARKER OF EXPOSURE SPECIFIC TO E-CIGARETTE CONSUMPTION

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For decades, measurement of biomarkers of exposure (BoE) has provided important data for assessing the health risk from cigarette smoking. With the emergence of new tobacco and nicotine-delivery products the tobacco landscape increasingly changed. Especially electronic cigarettes (ECs) are proposed to be considered for tobacco harm reduction. This reinforces the need to identify BoE specific to the EC use in order to complement exposure compliance monitoring and risk assessment. Therefore, a sensitive LC-MS/MS method was developed for the quantification of the main e-liquid constituents, propylene glycol (PG) and glycerol (G), in urine and plasma. The method was validated according to US FDA guidelines for bioanalytical method validation. PG and G were analyzed in plasma and urine samples from a clinical study comparing five nicotine product user groups, namely users of combustible cigarettes (CC), electronic cigarettes (EC), heated tobacco products (HTP), oral tobacco (OT), and oral/dermal nicotine delivery products (used for nicotine replacement therapy, NRT) with a control group of non-users (NU). Data clearly demonstrates significant differentiation of the PG levels in urine and plasma in EC users compared to users of CC, HTP, NRT, OT as well as NU. Elevated PG levels in EC users were observed under controlled (3 days of confinement), but also under real-life conditions (directly after admission to the clinic). In addition, PG in plasma and urine of vapers significantly correlated with the PG intake as

well as nicotine (plasma) / total nicotine equivalents (urine), biomarkers reflecting product consumption. This emphasizes the high specificity of PG as a BoE for EC consumption. We therefore suggest the use of PG as BoE in urine and/or plasma in order to monitor EC use compliance in exposure assessments. Concurrently, the differentiation between user groups of different tobacco/nicotine products could provide a better understanding of the exposure pattern and related health effects.

PS1-116

EXAMINATION OF THE INTERACTIVE EFFECTS OF E-CIGARETTE FLAVORS AND LIQUID NICOTINE CONCENTRATION ON TIME TO FIRST VAPE AFTER WAKING AMONG CURRENT E-CIGARETTE USERS

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Significance: Flavors have been found to enhance the rewarding and reinforcing effect of nicotine in e-cigarettes and might also contribute to nicotine dependence. The objective of this study is to examine the relationships between e-cigarette flavors, nicotine concentration, and their interaction on a measure of nicotine dependence. **Methods:** Survey data are drawn from a cross-sectional convenience sample of past 30-day e-cigarette users aged 15 to 24 years (N=2037). Participants were asked to provide information about the e-cigarette products they used most regularly. Only those with available information on flavors (fruit/mint, menthol, tobacco), nicotine concentration (0-2.9%, 3-4.9%, and 5% or greater), and time to first vape after waking (within 30 minutes, greater than 30 minutes) were included in analyses (N=1457). Generalized linear regression models were used with log link and binary distribution to assess the relationship between flavors and nicotine dependence. Effect modification by nicotine concentration was assessed using an interaction term for flavors by nicotine concentration. Models were adjusted for age, race/ethnicity, and gender. **Results:** Fruit/mint and menthol flavor user groups had a very similar dose-response relationship between nicotine concentration and prevalence of vaping within 30 minutes. Both groups showed that the prevalence of vaping within 30 minutes gradually increased as nicotine concentration increased. **Conclusions:** Results highlight the need for understanding how e-cigarette product characteristics like flavors and nicotine concentration can facilitate nicotine dependence to e-cigarettes and suggest that comprehensive e-cigarette product regulation of all flavors, including menthol, as well as reducing nicotine concentration will help to reduce the risk for nicotine dependence among young people.

PS1-117

NICOTINE FLUX PREDICTS NICOTINE DEPENDENCE AMONG E-CIGARETTE USERS: RESULTS FROM A PILOT STUDY

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Significance: E-cigarette device and liquid characteristics determine the rate at which nicotine is emitted from the e-cigarette (i.e., nicotine flux) and thus, likely influence users' nicotine dependence. The aim of this study was to assess associations between nicotine flux and the E-cigarette Dependence Scale. **Methods:** Data were obtained from United States adults ages 18-65 participating in online Qualtrics panels. Participants reported past 30 e-cigarette use and information on device type, power, nicotine concentration, and nicotine flux (N=666). Multivariable regressions were conducted to assess the relationship between nicotine flux and nicotine dependence, as measured by the E-cigarette Dependence Scale (EDS) score. Separate models were run for pod-based and disposable device types and adjusted for age and any e-cigarette use within the past 30-days. **Results:** The sample was diverse in terms of race/ethnicity, as 54.3% were non-Hispanic White, 20.7% were Hispanic, 15.6% were Black and 9.4% were Asian. Nearly half were female and most had earned a high school diploma or greater (89.8%). Regarding device type, 80.9% reported they used a pod-based e-cigarette. Most pod-based e-cigarette users used a device with lower nicotine flux (range: 56.3 to <76.3 mg/s), while most users of disposable e-cigarettes used a device with a higher nicotine flux (93.8 to 144.6 mg/s). Greater nicotine flux was associated with higher EDS scores among users of pod-based e-cigarettes (beta = 0.19, SE = 0.09, p-value = 0.043), but not

disposables. **Conclusion:** Given the variability in e-cigarette characteristics influencing nicotine delivery, results suggest that regulation based on a single factor, such as liquid nicotine concentration, is unlikely to control nicotine exposure and nicotine dependence. Because nicotine flux considers the effects of power, nicotine concentration, and user behavior, it is an important variable for consideration in research and regulation that seeks to determine risks for nicotine dependence.

PS1-118

USE, APPEAL, AND RISK PERCEPTIONS OF CIGAR/CIGARILLO FLAVORS BASED ON HISTORY OF USE IN PREGNANT WOMEN

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Significance: Pregnant mothers may be more vulnerable to the appeal of flavorings due to alterations in taste, cravings, and nausea during pregnancy. This study is the first to focus on characterizing use, preferences, and perceptions of flavors of cigars/cigarillos in pregnant women. **Methods**: Pregnant women (N=124, 50% smokers, 26±5 years old, 49% ethnic/racial minority) responded to questions using 1-7 Likert-scale ratings (1=lowest appeal/harm) about preferences (liking, attractiveness), interest (current interest, postpartum intention), and perceptions of harm (general, pregnancy-specific, fetal) for eight flavor categories (e.g., menthol, spices, fruit). Analyses were used to examine differences in ratings for each flavor between history of hookah use (never vs. lifetime vs. pregnant users). **Results**: More than half (51%) reported lifetime cigar/cigarillos use, 12% reported use during pregnancy, and 37% reported never trying cigars/cigarillos. Dual/poly tobacco use was commonly reported with 50%, 13%, and 8% reporting using cigarettes, hookah, and e-cigarettes, respectively, during pregnancy. The most tried cigar/cigarillo flavor was fruit (37%), tobacco (36%), and alcohol (13%), with 73%, 60%, and 53%, respectively, reporting current use. Liking of spice and alcohol, interest in spice, and postpartum intention to use alcohol flavors significantly differentiated lifetime vs. pregnant users ($ps<.04$). Liking of, attractiveness, and postpartum intentions to use spice, fruit, alcohol, and tobacco flavors also significantly differentiated never vs. pregnant users ($ps<.04$). The only flavor that did not differ between groups was menthol/mint ($ps>.05$). Only significant differences in perceptions of harm were for fruit and candy flavors between never vs. pregnant users ($ps<.02$), with no differences for any flavor between groups regarding pregnancy- or fetal-specific harm ($p>.05$). **Conclusion**: The most used cigar/cigarillos flavors in pregnant women are fruit, tobacco, and alcohol. Differences in perceptions of spice and alcohol flavors differentiated lifetime vs. pregnant users, and of spice, fruit, alcohol, and tobacco flavors between never vs. pregnant users.

PS1-119

AWARENESS, APPEAL, AND EVER USE OF NICOTINE POUCH PRODUCTS AMONG U.S. ADULT SMOKERS, 2021

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SIGNIFICANCE: In last few years, tobacco-free nicotine *pouches* have become one of the fastest growing tobacco product categories in the U.S. market. However, there is limited data that explores awareness, appeal or ever use of these products in the U.S. METHODS: Data came from a web-based survey of current U.S. adult smokers fielded between January 21, 2021 and February 4, 2021 (n=1,018). Respondents were drawn from KnowledgePanel®, a probability-based web panel designed to be representative of the United States. Eligible respondents included adults who were aged 18 or older and current established smokers (smoked at least 100 cigarettes in their lifetime). Respondents were asked if they had ever seen or heard of tobacco-free nicotine pouches, ever tried such pouches, or were interested in trying such pouches in the next six months. Descriptive statistics were calculated overall and by demographic and tobacco use characteristics. RESULTS: In early 2021, a total of 29.24% of adult smokers had ever seen or heard of tobacco-free nicotine pouches. Among those who had ever seen or heard of these products, 19.04% had ever tried nicotine pouches and 16.77% reported interest in using nicotine pouches in the next six months. Prevalence of nicotine pouch awareness varied by age, with younger smokers reporting higher awareness than older smokers. Prevalence of having ever tried nicotine pouches was higher among smokers who also reported current use of smokeless tobacco compared to those who were exclusive cigarette smokers. Interest in trying nicotine pouches was more prevalent among smokers who had plans to quit smoking compared to those with no plans to quit as well as smokers who also reported current use of SLT or vapes

relative to exclusive cigarette smokers. CONCLUSION: This study documents modest levels of awareness, appeal, and trial of tobacco-free nicotine pouches among U.S. adult smokers. However, these levels are likely to increase as the product category expands and continued surveillance is warranted, including among naïve users and users of other tobacco and nicotine products.

FUNDING: Federal

PS1-120

DECREASES IN SMOKING AND VAPING DURING COVID-19 STAY-AT-HOME ORDERS AMONG A COHORT OF YOUNG ADULTS IN THE UNITED STATES

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Significance: In Spring 2020, most US states and territories implemented stay-at-home orders to slow transmission of the novel coronavirus SARS-CoV2, the cause of COVID-19. This societal disruption could have resulted in increased tobacco or nicotine use due to stress, decreased exposure to tobacco-free environments, or boredom. Alternatively, use could have decreased due to respiratory health concerns, reduced product access, or unwillingness to use products at home. We examined young adult smoking and vaping behavior during the stay-at-home pandemic phase. **Methods**: The current study examined participants (N=1,727) completing three recent survey waves from a longitudinal cohort of young adults recruited in 2010: Wave 13 (Spring 2019), Wave 14 (Fall 2019), and Wave 15 (Spring 2020) to assess changes in cigarette and e-cigarette use. We conducted logistic regression to compare the odds participants reported smoking or vaping in Wave 14 relative to Wave 13 to establish if there was a trend of use pre-pandemic. Then, we conducted logistic regression to compare the odds participants reported smoking or vaping in Wave 15 relative to Wave 14 to determine the impact of stay-at-home orders. **Results**: At Wave 15, participants were 27.6 years old (SD: 0.6); 52.1% female; 7.6% identified as Black/African American; and 6.3% as Hispanic. Most (95%) reported living in a US state, territory or foreign country with stay-at-home policy restrictions during Spring 2020. At Wave 15, 4.6% of participants reported past 30-day cigarette use compared to 6.2% at Wave 13 and 6.1% at Wave 14. For e-cigarettes, 5.0% reported use at past-30 day use at Wave 15 compared to 8.1% at Wave 13 and 7.4% at Wave 14. When comparing the odds of reporting tobacco use at Wave 14 to Wave 13, no differences emerged (p's > 0.05). However, when comparing tobacco use at Wave 15 to Wave 14, participants had 40% lower odds of reporting past 30-day cigarette use (p = 0.02) and 50% lower odds of reporting past 30-day e-cigarette use (p < 0.01). **Conclusion**: Participants had lower odds of reporting cigarette and e-cigarette use during Wave 15, which coincided with COVID-19 restrictions. The current study provides initial evidence that young adults may have reduced their tobacco/nicotine use during stay-at-home orders. More work is needed to determine the long-term impact of the COVID-19 pandemic on tobacco use in this population.

FUNDING: Unfunded; Federal

PS1-121

THE RELATIONSHIP BETWEEN TOBACCO USE AND FOOD INSECURITY AMONG DISAGGREGATED LATINX AND ASIAN AMERICANS: RESULTS OF THE NATIONAL HEALTH INTERVIEW SURVEYS, 2014-2019

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Background: Smoking is causally linked to food insecurity (FI) in the general population, but there has been limited research examining the relationship between smoking and FI in diverse Latinx and Asian American (one of the fastest growing minoritized populations in the US) populations. Latinx Americans experience high rates of FI. This study examined whether current smoking was independently associated with FI among disaggregated Latinx and Asian Americans (AA). **Methods:** This study analyzed cross-sectional data from 19,730 Latinx adults who participated in the 2015-2019 National Health Interview Surveys (NHIS) (N=11,587 Mexican Americans, N=1,716 Puerto Ricans, N=812 Cuban Americans, N=526 Dominican Americans, N=2,578 Central or South Americans, N=2,511 Other Latinx Americans) and 8,688 AA adults from the 2014-2018 NHIS (N=1,814 Chinese, N=2,043 Filipino, N=1,850 Asian Indian, N=2,981 Other Asian). Multivariable regression models estimated associations between current cigarette smoking and FI, controlling for covariates. Models were run for the overall Latinx and AA samples, followed by separate models for each Latinx and AA

subgroups. **Results:** Among Latinx participants overall, the prevalence of FI was 14.5%. Dominican Americans had the highest rate of FI (22.1%) and Cuban Americans had the lowest rate of FI (12.3%). Among Latinx participants overall, the prevalence of FI was 1.75 times higher among current smokers than non-smokers, after controlling for other known determinants of FI (23.5% vs. 13.4 %; aOR=1.75; 95%CI 1.55-1.97). Among AA participants overall, the prevalence of FI was over two times higher among current smokers than non-smokers, after controlling for other known determinants of FI (14.4% vs. 4.6%; aOR=2.58; 95%CI 1.99-3.34). Disaggregated Latinx and AA subgroup analyses showed that current smokers had significantly higher rates of FI among all Latinx and AA subgroups except Cuban Americans and Asian Indian Americans. **Conclusions:** Current smoking may be an important and modifiable risk factor for FI among Latinx Americans and AA. Public health interventions may benefit from taking a coordinated approach to reducing both smoking and FI among these adults.

PS1-122

AN END TO ENDS: YOUTH-LED INITIATIVES

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Significance: The popularity of electronic nicotine delivery systems (ENDS) among youth has skyrocketed, resulting in a youth vaping epidemic with current use by approximately one-fifth of high schoolers in 2020 (Wang et al., 2020). Although health campaigns strive to prevent use and encourage cessation, tobacco marketing and advertising efforts often target youth. Additionally, promotion techniques rapidly evolve as does the array of new products being marketed. Because youth tend to be far more familiar with these techniques, the behavior of their peers, and popular practices than adults, youth are in key positions to lead change in preventing tobacco use. This project reports on youth-led activities designed to inform peers of ENDS dangers and call for an end to youth vaping. Methods: Across the past year, youth, recruited from across the nation, have collaborated in regular meetings and on advocacy initiatives. Working in subteams, building on peer feedback, and using an iterative process, several products were developed. Beyond describing the methods employed in and outcomes of these youth-led works, we employed the constant comparative method in a content analysis of group conversations and textual aspects of these works to identify themes. Results: Across these works, which included a TikTok video, a public service announcement, materials for classroom use, and digital narratives, youth interest in helping other youth is evident. Key themes included thinking for yourself (not being fooled by tobacco companies), knowing the facts (being "in the know"), valuing science and health, and making smart decisions (taking care of your future). Example projects and themes illustrate the creativity and dedication of youth leaders in preserving the health of their peers. Conclusion: The energy, creativity, and commitment of youth are important in increasing peer awareness of the dangers of vaping, preventing initiation, and promoting cessation. Youth-led approaches are important in improving programs, reaching young people, and staying abreast of trends.

FUNDING: Academic Institution; Nonprofit grant funding entity

PS1-123

PREVALENCE & CORRELATES OF CANNABIS USE AMONG CIGARETTE SMOKERS & NON-SMOKERS: AN EMERGENCY DEPARTMENT STUDY

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Significance: Compared to the general household population, elevated rates of cannabis use and cigarette smoking are found among adults seeking care at urban safety-net Emergency Departments (EDs). The purpose of this study is to assess the prevalence and correlates of cannabis use among cigarette smokers and non-smokers in an urban safety net ED population. Methods: Cross-sectional survey data on past 12-month cannabis use and past 30-day cigarette smoking, demographic and mental health factors, and past 12-month risky drinking (females/males drank 4+/5+ drinks) were collected from a multiracial/multiethnic sample of adult ED patients (N=1,037; 53% female; 50% Hispanic; 29% African American; mean age=35.2 years [SD 8.5]). The sample comprised smokers without cannabis use (13.5%); cannabis users without smoking (13.8%); cannabis/tobacco co-users (13.3%); and those who used neither substance (59.5%). We used multinomial logistic regression to estimate factors associated with each cannabis/tobacco use outcome compared to non-use. Results: Approximately half of cannabis users smoked cigarettes. Men had greater odds for all cannabis and cigarette use outcomes than women. Hispanics had lower odds for all

cannabis and cigarette use outcomes than non-Hispanic white participants. Age was inversely associated with using cannabis without cigarettes (aOR=0.93; 95% CI 0.91, 0.96) and co-use of cannabis and cigarettes (aOR=0.95; 95% CI 0.93, 0.98). Anxiety was associated with using cannabis without cigarettes (aOR=1.93; 95% CI 1.20, 3.10) and co-use of cannabis and cigarettes (aOR=3.40; 95% CI 2.04, 5.66). PTSD was associated with using cannabis without cigarettes (aOR=1.65; 95% 1.00, 2.75). Risky drinkers had greater odds for all cannabis and cigarette use outcomes than non-risky drinkers. Conclusion: Over one quarter of an urban ED sample used cannabis with or without cigarettes. The results suggest that there are distinct demographic and mental health risk and protective factors associated with cannabis use and co-use in cigarette smokers and non-smokers. Cannabis users who smoke cigarettes may be especially vulnerable to mental health problems.

PS1-124

DO SENIORS VAPE OR SMOKE? COMPARISON OF SMOKING AND VAPING IN THE OLDER POPULATION IN 26 EUROPEAN COUNTRIES AND ISRAEL. DATA FROM THE SHARE SURVEY 2019/ 2020 (WAVE 8)

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Significance. Currently, only moderately informative data on the use of e-cigarettes and tobacco products are available for Europe's oldest population. The present study describes the distribution of e-cigarette and tobacco product use in the elderly population in 26 European countries and Israel. Methods. Wave 8 (release 1.0.0) of the SHARE Survey on Health, Aging and Retirement in Europe served as data basis. A total of n = 46,077 persons aged 50 years and older (42.6 percent male, 57.4 percent female) were interviewed about their smoking behavior. The mean age was 71.3 years (minimum = 50 years, maximum = 104 years). For the extrapolation to the population, we used calibrated cross-sectional weights. Results. Overall, the sample's prevalence for e-cigarette use was 0.45 percent (extrapolated to 811,000 persons aged 50 and above in the 26 European countries and Israel). The proportion of e-cigarette users was found to decline with age. Among those aged 50 to 69, 0.64 percent (extrapolated to 725,000) used e-cigarettes; among those aged 70 to 79, 0.16 percent (extrapolated to 62,000) used e-cigarettes; and among those aged 80 and older, 0.1 percent (extrapolated to 23,000) used e-cigarettes. The overall prevalence for the use of tobacco products was 43.9 percent in the sample (extrapolated to 80 million). Tobacco product use also declined as age increased. For example, among those aged 50 to 69, 49.1 percent (extrapolated to 55 million) used tobacco products; among those aged 70 to 79, 41.3 percent (extrapolated to 17 million) used tobacco products; and among those aged 80 and older, 27.7 percent (extrapolated to 8 million) used tobacco products. Conclusion. As of late 2020, e-cigarette use is far from a mass phenomenon among older persons. However, it could become significant if it were suitable for the cessation of the more widespread tobacco smoking.

PS1-125

COMPARATIVE ANALYSIS OF HEAVY METALS IN E-LIQUIDS PURCHASED IN 2017 AND 2018 FROM THE UNITED STATES, ENGLAND, CANADA, AND AUSTRALIA

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Significance: Electronic nicotine delivery systems (ENDS) have been shown to contain toxic heavy metals in their e-liquids. These metals originate from leaching parts of the ENDS device rather than e-liquids. While more ENDS regulations have been enacted over the last few years, few polices have targeted heavy metals in these products. This study examined heavy metals found in e-liquids within four countries over two years. **Methods**: ENDS e-liquid products, including refill bottles (open-system, n_1) and prefilled devices (closed-system, n_2), were purchased from the United States (n_1=57, n_2=48), England (n_1=17, n_2=67), Canada (n_1=42, n_2=11), and Australia (n_1=15, n_2=0) in 2017 and 2018. These e-liquids were analyzed for heavy metal concentrations using electrothermal atomic absorption spectroscopy (ETAAS). Metals of interest included lead, nickel, chromium, and cadmium. **Results**: No open-system sample contained quantifiable levels of tested heavy metals. Only one closed-system sample, purchased

in the United States in 2017, contained cadmium (2.4 ppb). Closed-system e-liquids from the United States had a significant increase in average nickel concentration from 2017 (292.4 ± 233.6 ppb) to 2018 (1130.7 ± 1734.5 ppb, p = 0.0032), with a maximum nickel concentration of 7332.7 ppb observed in a single 2018 sample. Alternatively, England's e-liquids had a significant decrease in average chromium concentration from 2017 (61.3 ± 90.1 ppb) to 2018 (50.6 ± 107.9 ppb, p < 0.0001). **Conclusions**: Open-system e-liquids continue to not contain heavy metals as observed in previous research. Closed-system e-liquids continue to contain metal concentrations up to 328 times higher than EPA drinking water action levels. Little change was observed in e-liquids purchased in the United States and England between 2017 and 2018, showing a lack of improvement in industry standards for preventing harmful heavy metals from appearing in e-liquids.

PS1-126

USING MIXTURE MODELS TO IDENTIFY SMOKING CESSATION PROFILES BASED ON SELF-EFFICACY, POSITIVE EXPECTANCY, MOTIVATION, AND CESSATION FATIGUE: AN EXPLORATORY LATENT PROFILE AND LATENT TRANSITION ANALYSIS

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Introduction: The addictive nature of tobacco makes smoking cessation a dynamic and challenging process. Smokers who attempt to quit transition through different phases based on their withdrawal symptoms, motivation, outcome expectancies, and self-efficacy. Relapse risk is determined collectively by the above constructs, and the effect of these constructs varies over time. Our study aims to identify underlying classes (or profiles) among smokers participating in a pharmacotherapy cessation program based on withdrawal symptoms and motivational processes. Our interest further lies in examining changes in class membership over 4 weeks since the target quit day (TQD) and its association with long-term abstinence outcomes.**Methods:** Our case study includes Ecological Momentary Assessment (EMA) data from the first 4 weeks post-TQD of a smoking cessation study which compared the efficacy of three pharmacotherapies. We apply Latent Profile Analysis to classify 1086 participating smokers into subgroups based on their responses to EMA prompts that indicate latent quitting behavior at four different time points (day 0 post-TQD, and end of weeks 1, 2, and 4 post-TQD). We then determine the changes in membership over time using Latent Transition Analysis (LTA). This analytical approach was executed separately for morning and evening prompts. The associations between baseline covariates, smoking profiles, the transition trend, and long-term abstinence outcomes were also examined to characterize key predictors of relapse risk. **Results:** A four latent class model solution is selected through a holistic assessment of model fit-statistics (BIC, VLMR LRT p-value, entropy) and interpretability of profiles. The transition probabilities estimated via the LTA model with no assumed model structure across time show a moderate to high percentage of neutral/motivated subjects tend to improve on their motivation or stick to the same subgroup and the demotivated subjects transition to improved subgroups over 4 weeks. The findings are consistent across the morning and evening prompt-specific analyses.**Conclusions:** Change in behavioral patterns due to fluctuating withdrawal tendencies and motivational processes during cessation attempts are useful in identifying vulnerable subgroups and to target interventions to prevent relapse risk in smoking cessation trials.

PS1-127

EVALUATION OF TRADITIONAL AND SMARTPHONE BASED METHODS TO ASSESS VAPING AND SMOKING BEHAVIORS

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Significance: Accurately measuring vaping and smoking behavior in real-world settings is important to inform tobacco regulatory science. Additionally, quantifying nicotine flux (i.e., nicotine emission rate) from an Electronic Nicotine Delivery System (ENDS) requires information on device(e.g., power and settings) and ENDS liquid characteristics, as well as user behavior. This information can be collected via paper diaries or smartphone apps, where participants report information in the app or capture images of devices and liquids for researchers to obtain relevant details. The purpose of this study was to assess preference for, and perceived burden of, methods to assess nicotine intake among ENDS and combustible tobacco users. **Methods:** Current ENDS users

[N=129, 70% women, mean (SD) age 37.0 (12.7) years] completed an online survey that described the following 3 methods to record ENDS device and liquid characteristics: 1) paper diaries, 2) recall interviews conducted in-person or via phone, and 3) a smartphone app that relies on pictures and drop-down menus to obtain information. Participants ranked the 3 methods from most to least preferred and from least to most burdensome. Current smokers [N=207, 78% women, mean (SD) age 45.5 (13.4) years] reported their preference for recording smoking via paper diaries or an app. **Results:** ENDS users' rankings of preference and burden differed across the 3 methods, with the app rated as less burdensome and more preferred than recall (both p=0.029). For all 3 vaping assessment methods, preference and burden ratings were highly correlated (all Spearman's rho ≥0.84, all p<0.001), indicating that participants preferred methods that they perceived as less burdensome. A significantly larger proportion of smokers preferred an app (78.3%) over diaries (21.7%, p<0.001), yet a significant age effect (p=0.021) indicated that preference for an app was attenuated in older (≥65 years) participants. **Conclusions:** Results suggest that personalizing assessments based on individual participant's perceived burden and preferences may facilitate better measurement of ENDS use and smoking.

FUNDING: Unfunded; Federal; Academic Institution

PS1-128

ON THE TRANSMISSION OF COVID-19 THROUGH ENVIRONMENTAL E-CIGARETTE AEROSOL

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We examine the plausibility and scope of transmission of pathogens (including the SARS-CoV-2 virus) through exhaled e-cigarette aerosol (ECA). Since there is no experimental evidence of this transmission, we examine (i) the respiratory dynamics of mouth breathing (ii) effects of suction and mouthpieces and (iii) hydrodynamics of intermittent turbulent jets, to infer that exhaled ECA from most common low powered and tank devices (used by 80% of vapers) should transport approximately a median of 30 respiratory droplet nuclei of diameters below 1 micrometer per puff, over a horizontal distance between 1 and 2 meters. High powered devices should transport over 100 droplets nuclei per puff over 2 meters distance. Since ECA droplets are also submicron, they act as visual tracers of the exhaled air flow. As a consequence, bystanders can instinctively position themselves away from the vaping jet to avoid any possible direct contagion by transported respiratory droplets.

PS1-129

LONGITUDINAL ASSOCIATIONS BETWEEN MULTIPLE TOBACCO PRODUCT USE AND INCIDENT ASTHMA AMONG US YOUTH

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Significance: While cigarette use has declined over the last decade, use of other products such as electronic nicotine delivery systems (ENDS) has become more common, leading to increased complexity of tobacco product use, including dual- and poly-tobacco use. However, little is known about the health effects of poly-tobacco use, especially among younger populations. **Methods:** We followed a longitudinal cohort of youth into adulthood from Waves 1-5 (including Wave 4.5) (2013-2019) of the Population Assessment of Tobacco and Health Study. We examined incident diagnosed asthma at follow-up among respondents who had no history of asthma at baseline and at least one follow-up interview. We classified current tobacco use, defined as any use in the past 30 days, based on the following categories: 1) non-current use, 2) exclusive cigarette use, 3) exclusive ENDS use, 4) exclusive other combustibles (OC) use, 5) cigarettes + ENDS or ENDS + OC use, 6) cigarettes + OC use, and 7) cigarettes + ENDS + OC use (poly-tobacco use). Other combustibles included use of cigars/cigarillos/little filtered cigars, traditional pipe, and hookah. Using discrete time survival models, we analyzed the incidence of diagnosed asthma across Waves 2-5, predicted by time-varying current tobacco product use, lagged by one wave, and adjusted for potential confounders at baseline such as age, sex, race/ethnicity, parental education, urbanicity, secondhand smoke exposure, household use of combustible products, and body mass index. **Results:** The most common use pattern among the analytic sample (n=9,140) at baseline was non-current use (92.5%), followed by exclusive cigarette use (2.4%), exclusive OC use (1.4%), and exclusive ENDS use (1.3%). Diagnosed asthma was reported by 574 respondents with an average annual incidence of 1.4% (range 0.3% to 2.0%, Waves 2-5). In adjusted models, exclusive cigarette users (HR: 1.71, 95% CI: 1.11-2.64) and cigarette + OC users (HR: 2.78, 95% CI: 1.65-4.70) had higher risk of incident diagnosed asthma, compared to non-current users. However, when compared to exclusive cigarette users, the association between cigarette + OC use and incident diagnosed asthma was null (HR: 1.63, 95% CI: 0.82, 3.24). Furthermore, exclusive ENDS use (HR: 1.50, 95% CI: 0.92-2.44) and poly-tobacco use (HR: 1.95, 95% CI: 0.86-4.44) were not associated with incident diagnosed asthma. **Conclusions:** From 2013 to 2019, exclusive cigarette use and cigarette + OC dual use were associated with incident diagnosed asthma; ENDS use, alone or in combination with other products, was not associated with incident diagnosed asthma. Youth who use cigarettes with or without other combustible products may be at heightened risk for developing asthma. Our results emphasize the need for further longitudinal examination of the health effects of dual- and poly-tobacco use.

FUNDING: Federal

PS1-130

PSYCHOMETRIC PROPERTIES OF SMOKELESS TOBACCO DEPENDENCE MEASURES: A COSMIN SYSTEMATIC REVIEW

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Background: A comprehensive assessment of the quality of the psychometric properties of smokeless tobacco (SLT) dependence measures is necessary to help researchers and health professionals choose the most appropriate measure to use when assessing dependence and planning cessation treatment. This systematic review aimed to i) identify measures for assessing dependence on smokeless tobacco products and ii) critically appraise the measures using the Consensus-based Standards for the selection of health Measurement Instruments (COSMIN) guidelines. **Methods**: A comprehensive search strategy was used across MEDLINE, CINAHL, PsycINFO, EMBASE and SCOPUS databases. English-language studies describing the development or psychometric properties of a smokeless tobacco dependence measure were included. Two reviewers independently extracted data and appraised risk of bias following the COSMIN guidelines. **Results**: Fifteen studies, assessing 16 unique measures, were eligible. Ten studies were conducted in the USA, two in Taiwan, one each in Sweden, Bangladesh and Guam. None of the sixteen measures were rated as adequate for assessing dependence on smokeless tobacco products, with content validity being particularly poor. Twelve measures have potential for assessing dependence although further assessment of their psychometric properties is needed. **Conclusion**: This systematic review highlights the need to further validate existing measures assessing dependence on smokeless tobacco products. There is a clear need to develop a multidimensional, valid and reliable measure for use by clinicians and researchers for assessing dependence on smokeless tobacco products.

FUNDING: Academic Institution

PS1-131

ADDICTION AND POLYUSE OF COMBUSTIBLE CIGARETTES, E-CIGARETTES, AND MARIJUANA

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Significance: With the growing popularity of e-cigarettes and increased legal accessibility of marijuana, cigarette smokers have new ways to supplement their smoking behavior. Although there has been some attention paid towards dual use between cigarettes, e-cigarettes, and marijuana, there has been very little work focused on poly-use between all three substances. The current study describes the prevalence of nicotine and marijuana use across single, dual, and poly-use patterns of behavior and its relationship to cigarette addiction in a sample of rural community respondents. **Methods:** The current analysis focuses on a sub-sample of 2,712 residents of California's Central Valley who reported smoking in the past 30 days. Participants answered questions about their cigarette, e-cigarette, and marijuana use, as well as self-reported addiction to cigarettes. **Results:** Of the cigarette smokers, 29.18% (N = 749) used combustible cigarettes exclusively, 53.17% (N = 1,442) used both cigarettes and e-cigarettes, 0.01% (N = 25) used cigarettes and marijuana exclusively, and 15.38% (N = 417) used all three products in the past 30 days. Further, while 55.17% of our exclusive cigarette smokers reported being addicted to cigarettes, 83.24% of cigarette and e-cigarette users reported the same. Addiction was less common in our small sample of cigarette/marijuana users (50.0%), and highest in those who used all three products (95.43%). **Conclusion:** In our sample, single product use was less common than multi-product use. These findings suggest that higher risk of addiction is associated with dual cigarette/e-cigarette use as well as poly-use of all three products. To understand cigarette use behavior and to develop addiction interventions, it is essential to consider the concurrent use of both e-cigarettes and marijuana among cigarette smokers.

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PS1-132

LONGITUDINAL TRAJECTORY OF ENDS DEPENDENCE FROM 2014-2019 AMONG TEXAS YOUNG ADULTS: EXAMINING CHANGES AFTER THE 2017 SURGE IN VAPE POD POPULARITY

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Significance. ENDS use increased significantly among U.S. young adults from 2017-2018, after a period of decline from 2014-2017. The increase is attributed to the surge in vape pod sales in late 2017. However, it is not known if ENDS dependence also increased after the 2017 surge. We examined the longitudinal trajectory of ENDS dependence among young adults from 2014-2019. Given the surge and that vape pods contain high levels of nicotine, we expected ENDS dependence to increase significantly after 2017. Method: Participants were part of Project M-PACT, which followed 5,482 students from 24 Texas colleges from 2014-2019. Participants completed online surveys on eight occasions/waves; there were six bi-annual waves from 2014-2017, and two one-year waves in 2018 and 2019. Only participants who were 18-25-years old at wave 1 and who reported past 30-day ENDS use on at least one wave were included in this study (n=1833). At wave 1, participants were 20.7 years old (sd=1.88) on average; 57.3% female; 36.2% non-Hispanic, white, 33.6% Hispanic, 30.1% other race/ethnicity. A discontinuous growth curve model was fit to test the hypothesis that the ENDS dependence trajectory would increase after 2017. The outcome variable, ENDS dependence, was assessed at all eight waves with one item measuring use of an ENDS product within 30 minutes of waking. The model was adjusted for participant sex, age, and race/ethnicity. Results: Prevalence of ENDS dependence was 2.8% at wave 1 and 8.3% at wave 8. Analyses indicated that ENDS dependence did not change from 2014-2017, but then increased significantly from spring 2018 to spring 2019 [z = 12.8, p < .001]. A post-hoc mixed analysis with data from spring 2018 and 2019 indicated vape pod users were more likely than users of other device types to report ENDS use within 30 minutes of waking [z = 2.98, p = .003]. Conclusion: Vape pods are a disruptive technology that may have contributed to an increase in the number of young adults addicted to ENDS. Findings underscore the need for cessation programs tailored to young adults and also for prevention programs, as this population may be more likely than adolescents to initiate ENDS use.

PS1-133

TRENDS IN SMOKING (2002 TO 2020) AND E-CIGARETTE USE (2015 TO 2020) AMONG MEXICAN BY SEX AND AGE

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Significance: Since 2008, the sale, importation, and marketing of e-cigarettes have been banned in Mexico. Nevertheless, e-cigarette use continues. Monitoring trends in e-cigarette and cigarette use are important for tobacco control. This study describes changes in e-cigarette use in Mexico between 2015 to 2020 and cigarette use between 2002 to 2020 by sex, age, and smoking status. **Methods:** We used data from seven comparable nationally representative surveys (National Survey of Addictions 2002, 2011 and 2016, Global Adult Tobacco Survey 2009 and 2015, National Health and Nutrition Survey 2018 and 2020). Current e-cigarette use includes everyday and someday use. Smoking use was stratified by daily and nondaily use. After adjusting for sample design, prevalence estimates of current smoking, daily smoking, nondaily smoking, and current e-cigarette use were calculated by sex and age group (15-19, 20-29, 30-39, 40-49, and 50-65). Two-sample independent t-tests were used to determine statistically significant differences. **Results:** Current e-cigarette use increased from 0.7% in 2015 to 1.5% in 2018, but did not change from 2018 to 2020 (1.5% to 1.4%). Current e-cigarette use is higher among smokers (daily smokers: 2015 (3.3%), 2018 (6.0%), 2020 (3.6%); nondaily smokers: 2015 (1.9%), 2018 (4.6%), 2020 (3.6%)), than former (2015 (1.0%), 2018 (1.2%), 2020 (1.2%)) and never smokers (2015 (0.2%), 2018 (0.4%), 2020 (0.6%)). In addition, e-cigarette use is higher among males (2015 (1.2%), 2018 (2.3%), 2020 (1.9%)) than in females (2015 (0.3%), 2018 (0.9%), 2020 (0.9%)). Current e-cigarette use is also higher among youth and young adults (15-19 years: 2015 (2.1%), 2018 (2.5%) 2020 (2.3%); 20-29 years: 2015 (1.0%), 2018 (2.9%), 2020 (2.2%)) than middle and older adults (30-39 years: 2015 (0.3%), 2018 (1.2%), 2020 (1.3%); 40-49 years 2015 (0.4%), 2018 (0.8%), 2020 (0.5%); 50-65 years: 2015 (0.1%),

2018 (0.5%), 2020 (0.7%) . Prevalence of current smoking decreased from (2002 to 2009 by 23% (from 21.4% to 16.6%). However, overall current smoking prevalence did not decrease from 2009 to 2018. Nonetheless, there were decreases in daily smoking among females and youth from 2018 to 2020. **Conclusions:** Most e-cigarette users are current smokers, although the prevalence is still relatively low. E-cigarette use is higher among males, youth, and young adults compared to females, and middle and older adults. The greatest decrease in smoking prevalence in Mexico occurred from 2002 to 2009 before e-cigarettes were available. Smoking did not decrease since 2009 and did not change during the period in which e-cigarette use increased. Finally, from 2018 to 2020 the prevalence of smoking decreased among females and youth that may have been affected by the COVID-19 pandemic.

PS1-134

A PROSPECTIVE EXAMINATION OF THE TIME-VARYING EFFECT OF CIGARETTE AND ENDS USE ON SELF-REPORTED INCIDENT HYPERTENSION AMONG US ADULTS

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Significance: Harm reduction advocates argue that Electronic Nicotine Delivery Systems (ENDS) products should be part of a risk minimization strategy because they may be less harmful than combustible cigarettes. However, ENDS products contain potentially dangerous toxicants and chemical compounds, and little is known about their health effects.**Methods**: Using adult data from Waves 1-5 (2013-2019) of the Population Assessment of Tobacco and Health Study, we examined the risk of self-reported incident hypertension associated with ENDS use using discrete-time survival models. To distinguish the role of cigarettes and ENDS, we constructed a time-varying tobacco exposure, lagged by one wave, defined as no use, exclusive established use (daily or some days) of ENDS or cigarettes, and dual use. We controlled for demographics (age, sex, race/ethnicity, household income), clinical risk factors (family history of heart attack, obesity, diabetes, binge drinking) and smoking history (cigarette pack-years). **Results**: The self-reported incidence of hypertension was 3.7% between Waves 2-5. At baseline, 18% of respondents exclusively smoked cigarettes, 1.1% exclusively used ENDS, and 1.7% were dual users. In adjusted models, exclusive cigarette use was associated with an increased risk for self-reported incident hypertension compared to non-use (aHR=1.21, 95% CI: 1.06-1.38), while exclusive ENDS use (aHR=1.00, 95% CI: 0.68-1.47) and dual use (aHR=1.15, 95% CI: 0.87-1.52) were not. **Conclusions**: We found that smoking increased the risk of self-reported hypertension, but ENDS use and dual use did not. These results highlight the importance of using prospective longitudinal data to examine the health effects of ENDS use.

PS1-135

INVERSE CORRELATION OF ENDS DEVICE POWER AND LIQUID NICOTINE CONCENTRATION: ARE USERS SELF REGULATING NICOTINE EMISSIONS?

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Significance:For electronic nicotine delivery systems (ENDS), device power (Watts, W) and liquid nicotine concentration (mg/ml) are important predictors of nicotine emissions and delivery to the user. We examined the relationship between device wattage and nicotine concentration among regular ENDS users to determine the association between these two factors. **Methods**:Participants (n=1209) were US adults (21+) using ENDS 5+ days per week, recruited for an online survey using Craigslist in 2020. Participants were asked about, and submitted photos of, their most used device/liquid from the past week. Information from photos, online research, and survey responses were combined to reduce missing values. In some cases (n=369), wattage was estimated using a device type-specific weighted average of a device's minimum/maximum values. Overall and device type (disposable(D), reusable with discardable pods/cartridges(RD), reusable with refillable pods/cartridges(RR), reusable with tanks(T)) Pearson correlation coefficients were calculated. **Results**:Median wattage (29W, range:3-220W, n=822) tended to be

higher for devices with refillable liquid [T:60W(6-220W), RR:15W(3-80W), RD:10W(6-30W), D:10W(10-10W)]. Median nicotine concentration (18mg/mL, range:0-90mg/mL, n=1182) tended to be lower for devices with refillable liquid [D:50mg/mL(2-60mg/mL), RD:50mg/mL(0-80mg/mL), RR:25mg/mL(0-60mg/mL), T:6mg/mL(0-90mg/mL)]. Correlations between wattage and nicotine concentration, overall (-0.574, p<0.001) and by device type [D:0(p=1.000); RD:-0.069(p=0.368); RR:-0.230(p=0.001); T:-0.221(p<0.001)], had a weak to moderate negative relationship. Correlations were also negative when restricting the sample to only user set wattages [n=438, overall:-0.285(p<0.001), RR:-0.191(p=0.111), T:-0.226(p<0.001)]. **Conclusion**:Wattage and nicotine concentrations varied by device type. There was a significant, inverse relationship overall and within some reusable device categories. While it is possible to consume high nicotine concentrations from high powered devices, these findings suggest that adult regular ENDS users tend to use lower nicotine concentrations with higher powered devices and vice versa.

PS1-136

ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS) PARTICLE SIZE DISTRIBUTION (PSD). FROM CIG-ALIKES TO VAPE-PENS, MODS, AND PODS. INFLUENCE OF HEATING POWER, CHEMICAL CONTENT, AND PUFFING TOPOGRAPHY

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Significance:A common feature that strongly differentiates ENDS aerosol emissions from combustible tobacco smoke is the particle size distribution (PSD). Bi-modal PSD previously measured for cig-alikes and vape-pens expanded from nanoparticles (NPs) to submicron-micron size, and its nature is still not understood. Of a particular concern is a significant fraction of NPs that are often observed in ENDS aerosol and could cause various toxicological implications such as deep penetration into the lungs, crossing into systemic circulation, and breaking the blood-brain barrier.Methods:PSDs for various types of ENDS including modern vape-pens, PODs, and MODs were measured using both a real-time differential mobility technique and an inertial impaction method. Tested e-liquids contained propylene glycol (PG), vegetable glycerol (VG), and nicotine with various flavoring additives. Additionally, e-liquids consisted of vitamin E acetate (VEA) and tetrahydrocannabinol (THC) mixtures in different proportions were also tested. Heating power was varied, as well as puffing topography. Temperature for selected ENDS was measured using infra-red monitor. Selected aerosol samples were analyzed by two-dimensional gas-chromatography-time-of-flight mass-spectrometry (GCx-GC-TOFMS). Results:For all tested ENDS devices multi-modal (bi-modal or tri-modal) PSD was typically observed when aerosol was generated from PG-VG based e-liquids at temperature above 200 C (tests at temperatures below 150 C showed only single mode PSD). Particle size ranged from NPs to above micron. Tri-modal PSD correlated with the presence of flavors. Many of the samples contained high concentrations of NPs. THC-VEA aerosol showed single-mode PSD. Particles ranged from nano to sub-micron size, and higher proportions of VEA were associated with smaller particle sizes (down to 50 nm). Heating power increase led to particle size increase whereas puffing flow rate increase typically led to particle size decrease. New signals were detected by GCxGC-TOFMS in the aerosol samples generated at above 200 C as compared to e-liquid, indicating formation of new compounds. Conclusions: For the modern vape-pens, PODs, and MODs tested, the distinction between type of PSD was consistently correlated with the use of either PG-VG based e-liquids or THC-VEA e-liquids, which led to multi-modal PSD or single-mode PSD, respectively. In the latter case, particle sizes were smaller for e-liquids containing higher proportions of VEA. In the former case, number of modes, particle size, and concentration per mode are all affected by the e-liquid chemical content, heating power, and puffing topography. Understanding the factors that favor the formation of NPs is particularly important because of the serious toxicological concerns presented by the inhalation of NPs.

PS1-137

TRENDS IN PUBLIC INTEREST IN SHOPPING AND POINT-OF-SALES OF JUUL AND PUFF BAR 2019-2021

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Background: This study investigated public interest in shopping and point-of-sales (POS) of JUUL and Puff Bar products in the context of six regulatory, company sales policy and other events of interest that may have influenced the trajectory of these products during 2019-2021. Methods: Outcome variables included relative search volume (RSV) from Google search queries indicative of shopping interest in and aggregate dollar sales from Nielsen POS for JUUL and Puff Bar in the U.S. from March 2019 to May 2021. Adjusted autoregressive integrated moving average (ARIMA) assessed the observed and predicted trends in the outcome variables and adjusted linear regression analysis measured the relative rate of change in the outcome variables for each time period of interest. Results: Peaks in Puff Bar's shopping interest RSV and sales intersected with declines in JUUL's shopping interest RSV and sales. After the Trump administration announced its plans to ban flavored e-cigarettes and JUUL Labs, Inc.'s decision to suspend the sales of its sweet and fruity flavored products, JUUL's shopping interest RSV and sales declined while Puff Bar's shopping interest RSV peaked, and its sales increased. From the period following the FDA's announcement of its enforcement guidance policy on unauthorized flavored cartridge-based e-cigarettes until May 2021, JUUL's shopping interest RSV and sales continued to decline. Puff Bar's shopping interest RSV increased, and its sales peaked until the House approved the flavored e-cigarette ban bill. Puff Bar's sales steeply declined following suspension of its sales in February 2020. The decline, however, slowed after Puff Bar products were relaunched as 'synthetic nicotine' e-cigarettes. Conclusion: Puff Bar's unprecedented peak in the shopping interest and sales of Puff Bar warrants continued surveillance.

PS1-139

EXPLORING THE AMOUNT AND THEMES OF NOVEL NICOTINE SMOKELESS-RELATED MESSAGES ON TWITTER

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Objective. Although there is a growing body of research suggesting that social media promotion of non-cigarette tobacco products is on the rise, digital marketing remains to be an understudied domain in global tobacco control. Social media messages promoting novel tobacco products are currently under-regulated, target youth and often contain misinformation. Youth use social media at higher rates than the general population, which potentially multiplies the effect of social media marketing. In particular, research on novel smokeless nicotine pouch social promotion is sparse. The objective of the present study was to assess the amount and characterize the content of novel smokeless-related messages on Twitter.Methods. Keyword search filters (including terms related to novel nicotine pouches, nicotine sticks, gums, and pellets-related brands, products, behaviors and slang) were applied to collect tweets related to novel smokeless products from the Twitter Historical PowerTrack for the period between August 2016 and April 2020. Posts were coded for commercial content (e.g., youth and new user targeting) using a combination of machine learning methods, keyword algorithms, and human coding. Post metadata were analyzed to assess user geolocation and language of the message.Results. Findings reveal that our keyword 712,269 smokeless-related tweets posted by 437,049 users, with 142,141 (19.9%) tweets and 15,891 (3.6%) users identified as commercial and 1,761 users being "social influencers". Commercial tweets accounted for 47.1% of overall reach. There were 1,128 tweets related to novel pouched product promotion. Promotional tweets featured such new user appeals as "spit-free," "easy-to-conceal," and "sting-free" claims, nicotine product benefits and reduced-harm appeals to smokers. Conclusion. Tobacco control prevention initiatives should include efforts to prevent and reduce novel nicotine product uptake by new users and youth and should take into account the role of social media as a major marketing platform for these products. The social media marketing and normalization of novel oral nicotine products warrants urgent need for surveillance from public health.

PS1-140

EXAMINING THEMES RELATED TO COVID-19 AND NICOTINE ON INSTAGRAM

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Objective: The COVID-19 pandemic moved much of public life online causing people to turn to mediated channels like social media for more of their information needs. Instagram plays a unique role in the online information environment in being predominantly image focused and youth driven, offering a means to reach young people with advertising and lifestyle content related to nicotine products and to potentially leverage the platform to promote online commerce. This ongoing research investigates the most prominent themes associated with posts about COVID-19 and nicotine products on Instagram. Methods: We identified posts about COVID-19 and nicotine through the presence of keywords in either post text or hashtags between April and September 2020. A combination of human coding and LDA topic modeling was used to examine prominent themes. Results: Keyword classification identified over 29,000 relevant posts from which 2000 were sampled for human coding. Posts containing themes of individual responsibility, government criticism, comparison of risk posed by COVID-19 to chronic diseases, as well as conspiracy theories and posts related to the protective role of nicotine were all

identified. The most prominent theme was commercial posts with over 40% of posts using COVID-19 hashtags to capitalize on the pandemic by advertising pandemic related deals or appeals to "stay home and vape". Discussion and Implications: Findings suggest that to some extent discourse on Instagram compares to that on other social media platforms like Twitter. However, unique to Instagram's focus on images is the clear focus on e-commerce. Without clear and enforced regulations of advertising claims and strategies, Instagram provides an avenue for problematic advertising of nicotine products to target a younger demographic with potential with mis and disinformation and other predatory advertising strategies, as well as provide avenues for young people to circumvent age restrictions through online businesses that deliver to private residences.

PS1-141

PAST YEAR VAPING QUIT ATTEMPTS AND CESSATION AMONG US ADULTS WITH CURRENT OR PAST ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS) USE: FINDINGS FROM WAVE 4 (2016-2018) OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY

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Introduction: Electronic nicotine delivery systems (ENDS) have the potential to increase smoking cessation but approximately half of adults who use ENDS regularly continue to smoke cigarettes and most intend to quit ENDS someday. Little is known regarding factors associated with initiating an ENDS quit attempt versus complete cessation. In this analysis we describe US adult users of ENDS who either 1) made no attempt to quit ENDS (Continuers), 2) attempted to quit but continued using ENDS (Quit attempters), or 3) completely quit ENDS (Complete ENDS quitters) in the past year.Methods: We analyzed data from a United States nationally representative sample of 1,912 adults who reported current or former regular ENDS use from Wave 4 (2016 to 2018) of the Population Assessment of Tobacco and Health Study, a United States nationally representative sample. We describe sociodemographic characteristics, ENDS use characteristics, cigarette smoking, and strategies used to quit ENDS separately among 1) ENDS Continuers, 2) Quit attempters, and 3) Complete ENDS quitters.Results: Among adult ENDS users, 64.5% were Continuers (made no attempt to quit,) 21.9% were Quit attempters (attempted but did not quit ENDS), and 13.6% were Complete ENDS quitters. Neither age nor cigarette smoking status differed across the three groups. Complete ENDS quitters had the greatest perceived harm from ENDS, the lowest likelihood of using treatment, and, among current smokers, more cigarettes per day and the greatest tobacco dependence (all p<.001). Most (93.8%) ENDS Quit attempters gradually cut down to quit and 21.7% reported using a combustible tobacco product to quit ENDS. Conclusions: Characteristics associated with completely quitting ENDS differ from those associated with initiating a quit attempt. Among current smokers, quitting ENDS was associated with heavier cigarette smoking than continuing ENDS and suggests that self-selected ENDS cessation among dual users may be associated with a net negative for harm reduction. Future prospective experimental research is needed to determine whether treatments that promote ENDS cessation have a causal impact on combustible tobacco smoking.

PS1-142

QUITTING EXPERIENCES, SUCCESS, AND REASONS FOR QUITTING OR REDUCING E-CIGARETTE USE AMONG YOUTH WHO VAPE

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Introduction: Many US youth are regular users of e-cigarettes. Understanding youth experiences with quitting vaping and reasons for quitting is important for informing youth-focused e-cigarette cessation interventions. Methods: We surveyed 1863 high school students in Connecticut in Fall 2020 (51.7% female, 32.6% Hispanic, 45.4% non-Hispanic White, 11.1% non-Hispanic Black, 6.3% NH Other, 4.5% NH Multiracial, Mean age=15.6, SD=1.2) using a brief, anonymous online Qualtrics survey assessing e-cigarette use, experiences quitting or cutting back on vaping in the past (assessed separately), and reasons for quitting/cutting back (select all that apply). Results: In

total, 479 (25.7%) youth reported lifetime e-cigarette use. Among youth with lifetime e-cigarette use, 62.2% (n=298) reported only vaping a few times and had no need to quit/cut back on vaping, 19.6% (n=94) reported seriously trying to quit, 25.1% (n=120) reported seriously trying to cut back, and 17.1% (n=82) reported both trying to quit and cut back on vaping in the past. Among youth who tried to quit, they reported 3.3 quit attempts on average in their lifetime (SD=2.8), and 44.7% (n=42) reported success and quit using all nicotine products, 39.4% (n=37) reported continued vaping, and 14.9% (n=14) reported that they quit vaping but use other tobacco products. Among youth who reported trying to quit or cut back on vaping (n=131), the most frequently endorsed reasons for quitting/cutting back were concerns about health (42.0%), concerns about addiction (40.5%), cost (35.9%), affecting ability to play sports (28.2%), and to reset tolerance (23.7%) (e.g., because they felt they had developed a tolerance to nicotine). Conclusions: Findings indicate that although many youth are motivated to quit or cut back on vaping, efforts are needed to help support quitting because many are not successful. Findings also identify common reasons for quitting/cutting back on vaping among youth that may be important when developing interventions to address issues such as tolerance, which may be an indicator of dependence, and to help reinforce specific motivations for quitting.

PS1-143

EFFECT OF A STATE-LEVEL VAPING PREVENTION CAMPAIGN ON VAPING-RELATED BELIEFS AND BEHAVIORS IN ADOLESCENTS AND YOUNG ADULTS

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Introduction Vaping prevention media campaigns have promising effects on harm perceptions but have yet to demonstrate impacts on vaping behaviors in young people. The goal of this study was to evaluate the effect of Vermont's vaping prevention targeted digital media campaign (Unhyped) on vaping-related beliefs, harm perceptions, and behaviors.MethodsData for the current study come from Waves 2 (Summer 2019; n = 1,173) and 3 (Fall 2019; 1,094) of the Policy and Communication Evaluation (PACE) Vermont study, an online cohort of adolescents and young adults (AYA) ages 12-25. Analyses examined associations between confirmed awareness (exposure) of Unhyped and outcomes at each wave and between exposure at Wave 2 and outcomes at Wave 3. Analyses compared exposed participants to propensity score-matched controls. ResultsConfirmed awareness of Unhyped doubled over three months in 2019 (8.6% to 19.1%). While there was no effect of Unhyped exposure on any outcome at Wave 2, exposure at Wave 3 was positively associated with a campaign-targeted belief about the nicotine content in a vape pod (76% exposed vs. 67% matched controls; p = 0.017) and a greater proportion of past-year attempts to quit or cut down on vaping compared to matched controls (75% vs. 48%; p = 0.006). Exposure to Unhyped also predicted reductions in the number of days vaped in the past month at follow-up.Conclusions-Vermont's Unhyped campaign was effective in promoting short-term vaping prevention and cessation or reduction in AYA. The PACE Vermont Study will continue to assess short- and long-term outcomes of ongoing Unhyped campaigns as part of state-level vaping prevention efforts.

PS1-144

ARE SOME ENDS HARDER TO QUIT? THE IMPACT OF NICOTINE FLUX ON PROXIMAL CESSATION OUTCOMES AMONG TEENS AND YOUNG ADULTS

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BACKGROUND. Vaping devices differ in nicotine flux, the amount of nicotine emitted per unit time. Differences in flux may impact dependence and difficulty quitting.OBJECTIVE. Using observational data, we explored cross-sectional relationships of flux with cessation outcomes among treatment-seeking vapers. Brand was used as a proxy for flux based on an existing database of device characteristics our team has developed.

We hypothesized high flux device users (Puff Bar, flux=144.7µg/s) would have worse outcomes than low flux device users (JUUL, flux=56.3 µg/s). Since reliable estimates of flux for other brands were not available, abstinence rates are reported but not compared.METHODS. The sample was 1,457 young adults (YA; ages 18-24) and 638 teens (ages 13-17) who enrolled in This is Quitting, a free vaping cessation program, between 12/20/2019 - 1/30/2020. All participants reported their primary vaping device at enrollment and 7-day vaping abstinence at 30-days post-enrollment. Abstinence rates were calculated among responders only.RESULTS. Distributions of devices were similar across age groups (JUUL 69.4%, Suorin 8.8%, Vuse 6.7%, Puff Bar 5.6%, NJOY 5.1%, Smok 4.5%). The predicted relationship of brand with 7-day abstinence was numerically observed among teens (JUUL 22.5% vs. Puff Bar 9.4%, χ^2=2.3, p=0.13), but not YA (JUUL 18.8% vs. Puff Bar 24.7%, χ^2=1.7, p=0.20). Abstinence rates were generally consistent across ages for other brands (overall: Vuse 22.7%, Suorin 14.4%, Smok 14.6%, NJOY 13.8%).CONCLUSIONS. Teens may have more difficulty quitting when using devices with high nicotine flux than low nicotine flux. Additional research should confirm this finding, and investigate why the predicted result was not observed among YA. For example, other device properties (e.g. marketing demographic) or person characteristics (e.g. tobacco use history, vaping topography) may be more important moderators of cessation outcomes for YA. Careful assessment of devices and their usage may further inform factors related to ENDS cessation.Results suggest nicotine flux is a useful, parsimonious variable for estimating the population impact of nicotine products.

PS1-145

EXPOSURE TO DIFFERENT E-CIGARETTE ADVERTISING CHANNELS AND E-CIGARETTE INITIATION AMONG U.S. YOUTH BETWEEN 2016 AND 2018

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BACKGROUND: E-cigarette use among U.S. youth rose sharply between 2017 and 2018. Exposure to e-cigarette advertising may have contributed to the surge. This study examined the associations between e-cigarette advertising exposure through different marketing channels and subsequent e-cigarette initiation. METHODS: Longitudinal data (Wave 4: 2016-2018; and Wave 4.5: 2017-2018) of the Population Assessment of Tobacco and Health (PATH) Study from a nationally representative sample of U.S. youth never tobacco users (ages 12-16; n=9,405) at Wave 4 were used. Multivariable regressions were conducted to examine the associations between e-cigarette advertising exposure through various marketing channels at Wave 4 and e-cigarette ever initiation, past 30-day initiation, and ever regular use at Wave 4.5, controlling for covariates. RESULTS: At Wave 4, 60.8% of youth reported any e-cigarette advertising exposure. Exposure mainly occurred through gas stations/stores (50.3%), television (22.2%), and websites/social media (20.2%). At Wave 4.5, 7.8%, 3.4%, and 1.2% of youth reported e-cigarette ever initiation, past 30-day initiation, and ever regular use, respectively. Multivariable models showed only websites/social media exposure was associated with all e-cigarette initiation outcomes (ever initiation: AOR=1.45, 95% CI=1.19-1.76; past 30-day initiation: AOR=1.30, 95% CI=1.01-1.71; ever regular use: AOR=1.95, 95% CI=1.19-3.21). Billboard exposure was associated with e-cigarette ever initiation (AOR=1.37, 95% CI=1.12-1.68) and ever regular use (AOR=1.87, 95% CI=1.13-3.08). Exposure through gas stations/stores, newspaper/magazines, and television were associated with e-cigarette ever initiation. CONCLUSIONS: E-cigarette advertising exposure through websites/social media, as well as traditional channels such as gas stations/stores, televisions, newspapers/magazines, and billboards contributed to e-cigarette initiation among youth who are tobacco naïve. Continued monitoring of e-cigarette advertising across different traditional and new marketing channels is needed to inform policies that can prevent youth initiation of e-cigarettes.

PS1-146

THE ROLE OF SOCIAL MEDIA IN TOBACCO USE AMONG US ADOLESCENTS: RESULTS FROM POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY

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BACKGROUND: To better understand the role of social media on youth tobacco use patterns, we assessed the association between frequency of social media use and 1) tobacco use patterns using cross-sectional data, and 2) e-cigarette initiation using longitudinal data. METHODS: We analyzed PATH Study Wave 4 (N=14793) to assess the association between frequency of social media use and youth tobacco use patterns. Tobacco use pattern was estimated using latent class analysis (LCA) with current use

of cigarettes, e-cigarettes, cigars, hookah, smokeless/snus, and other tobacco as indicators. Further, to assess the role of frequency of social media use in e-cigarette initiation, we analyzed Waves 3 and 4 of the PATH data and focused on those who never used e-cigarettes at Wave 3 (N=7689). The outcome was e-cigarette use behaviors at Wave 4 (non-susceptible never use, susceptible never use, ever use, current use). Models controlled for demographics, peer/parental tobacco use, and tobacco marketing exposure on social media. RESULTS: We found (1) among youth in Wave 4, 14.3% never used social media, 13.7% used non-daily and 72.0% used social media in daily basis, and we identified 4 LCA classes–e-cigarette users (3.1%), cigarette smokers (2.7%), poly-tobacco users (0.5%), and non-users (93.7%). Higher frequency of social media use was associated with a higher likelihood of being in the e-cigarette use class (aOR=1.18, p=0.035), and lower likelihood of being in the poly-tobacco use class (aOR=0.69, p<0.001), compared to being in non-use class. (2) Among never e-cigarette users at Wave 3, daily social media use (vs. never) was significantly associated with susceptibility to e-cigarettes (aRRR=1.45; 95% CI=1.15, 1.83), ever (aRRR=3.53; 95% CI=1.64, 7.58) and current use of e-cigarettes (aRRR=2.86; 95% CI=1.26, 6.48) at Wave 4. CONCLUSIONS: This study highlights the role of social media in youth tobacco use, particularly in e-cigarette use. Given the high level of social media use by youth, efforts to curtail tobacco-related content, particularly e-cigarettes, on social media as well as e-cigarette prevention efforts directed at youth through these platforms are urgently needed.

PS1-147

POPULATION CHARACTERISTICS AND DISPARITIES ASSOCIATED WITH LOCAL T21 POLICIES

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BACKGROUND: In 2019, the FDA raised the federal minimum age for tobacco product sales from 18 to 21. Prior to this, 425 local communities across 25 states had adopted Tobacco 21 (T21) policies. This study examined aggregate differences among the communities that implemented T21 policies prior to the federal law versus those that did not. METHODS: Local T21 policies effective 2012-2019 were identified through online searches. T21 policies were coded with a validated Tobacco 21 policy tool by 2 independent coders. Single sample z-tests for proportions were used to compare the percentage of individuals in the sample affected by the policy to the percentage observed for the entire population of the state using US census data. Comparisons were made for education (bachelor's degree or higher), race/ethnicity (white, non-Hispanic), and age (<18 and 65+). Sample sizes were extremely large due to individuals being the unit of analysis, where all tests statistically significant (p<.0001, two-tailed). Differences among rural and urban communities were also of interest, but we were unable to directly measure or test this, due to a lack of comparable data between states as a whole and those affected by the T21 policies. RESULTS: Individuals in localities where T21 policies were passed tended to be more likely than the state to have a bachelor's degree (13% vs. 9%, z=664.08) and less likely to be white, non-Hispanic (53% vs. 58%, z=-462.31). Differences in percentages by age were significant but small, where individuals affected by T21 policies were less likely to be age 65 or older (15% vs. 16%, z=-112.99) and ages 18 or younger (21.5% vs. 22.1%, z=-46.07). T21 localities could not be directly compared to the states as a whole on urbanicity, but only .1% of T21 localities were defined as rural, where 19.3% of the US population lives in a rural area. CONCLUSIONS: Local T21 policies were less concentrated in communities that were rural, had lower education, and had greater racial/ethnic diversity. Of concern, these same populations are disproportionately targeted by tobacco industry marketing, which could inadvertently increase tobacco use disparities among these populations.

PS1-148

LEVERAGING THE ASSOCIATION BETWEEN VAPING NICOTINE AND MENTAL HEALTH TO PREVENT YOUTH E-CIGARETTE USE

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BACKGROUND: Young people are rightly concerned about mental health given the strong association between nicotine and mental health disorders; e-cigarette users are twice as likely to be diagnosed with depression compared to non-users and vaping can worsen the symptoms of depression/anxiety. With the prevalence of mental health issues rising among young people, they may turn to vaping nicotine, erroneously believing it will help them manage their stress and anxiety. METHODS: This study monitored the self-reported attitudes and beliefs on vaping nicotine and mental health among 15-24-year-old non-vapers compared to frequent vapers – defined as individuals who

vaped nicotine for more than 20 days in the past month. Data is from a national continuous tracking survey which surveyed 300 participants per week from March 2019 – June 2021. RESULTS: More frequent vapers reported being stressed, anxious and having poorer health compared to non-vapers. More frequent vapers (67%) reported that they are often or sometimes unhappy, sad, or depressed, compared to non-vapers (57%). Frequent vapers had the lowest percentage of people who reported that they had good health (55%), compared to non-vapers (65%). More frequent vapers (45%) agreed that it is OK to vape for stress relief, compared to non-vapers (20%). Additionally, 70% of frequent vapers reported that they need to vape to cope with stress/anxiety, compared to 29% of non-vapers. CONCLUSIONS: There is a strong association between vaping nicotine and mental health in young people. Furthermore, the data suggests that vaping may be used as a coping mechanism among youth and young adults for anxiety and stress. Because mental health is an issue that young people care about, highlighting its connections with vaping may be a valuable tool – in tandem with standard quitting vaping support – to prevent young people from vaping initiation and current use.

PS1-149

SELF-REPORT MEASURES OF ELECTRONIC CIGARETTE DEPENDENCE: COMPARISON OF PSYCHOMETRIC PROPERTIES

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Background: Several electronic cigarette (ECIG) dependence measures have been adapted from those designed for cigarette smoking, though few have been evaluated for their psychometric properties. This study examined the reliability and validity of four self-report dependence measures in never-smoking ECIG users. **Methods:** Participants (N=134) reported less than 100 cigarettes lifetime and regular use of a nicotine-containing ECIG [mean (SD) = 6.5 (.90) days/week for 2.5 (1.4) years]. Dependence measures were completed online: Diagnostic and Statistical Manual 5th Edition (DSM), Penn State Electronic Cigarette Dependence Index (PSECDI), Glover Nilsson Behavioral Questionnaire (GNBQ), and E-cigarette Dependence Scale (EDS-4). Dependence was qualified as low for EDS-4 [2.2 (.99)] and GNBQ [17.1 (8.5)], moderate for PSECDI [10.1 (4.4)], and moderate-high for DSM (24.6% moderate and 43.3% high). Pearson correlations and Cronbach's alpha were used to assess internal consistency, and concurrent and convergent validity. **Results:** The majority of inter-item correlations were significant for the PSECDI, GNBQ, and EDS-4 (mean r's=.32, .36, and .51, respectively), while less than half were significant for the DSM (mean r=.27). All but one item-total correlations were significant across measures [mean r's=.45 (DSM) to .79 (EDS-4)]. Internal consistency was highest for the EDS-4 (Cronbach's alpha=.88) followed by GNBQ (.75), PSECDI (.72), and DSM (.71). Significant correlations were observed for all measures and the number of vaping days/week (r's=.29 to .44, p's<.01); PSEDCI and EDS-4 scores and vaping years (r's=.28 and .23, respectively); and DSM scores and number of past quit attempts and initiation age (r's=.27 and -.25, respectively). Convergent validity was highest for comparisons between the EDS-4 and the GNBQ (r=.73) or the PSEDCI (r=.67), though all comparisons were significant (r's=.51 to .60, p's<.001). **Conclusions:** Psychometric properties were strongest for the EDS-4, though all measures demonstrated adequate reliability and validity. Importantly, measures differ slightly in terms of those aspects of dependence (e.g. physiological, behavioral, social) they reflect.

PS1-150

SYNERGISTIC USE OF COMPUTER VISION AND GPS FOR PREDICTING ENVIRONMENT-ASSOCIATED SMOKING RISK

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Computer vision can be applied to images of smokers' daily environments to 1) identify environmental determinants of smoking risk and 2) predict environment-associated smoking risk in real time. This approach could be used to support just-in-time adaptive interventions, or interventions focusing on coping strategies for specific high-risk environments. Alternatively, GPS coordinates can be used to identify distinct geospatial locations and predict location-associated smoking risk. However, the relative value of image versus GPS data for predicting environment-associated smoking risk is unknown. Smokers (10 or more cigarettes per day) age 18+ from the Durham, NC area completed 14 days of photo-enabled ecological momentary assessment via smartphone. GPS coordinates were recorded by smartphone and verified by GPS tracker. Participants completed assessments each time they smoked and at 6 randomly selected times each day. A convolutional neural network and Gaussian process classifier (i.e. kriging) were trained to predict current smoking based on images of the current location or the

current GPS coordinates, respectively. The area under the sensitivity-specificity curve (AUC) was used to evaluate prediction performance. Models were trained using data from days 1-10 (all participants) and evaluated using data from days 11-14. Performance was grouped by self-reported location type. Prediction performance when indoors in smokers' homes was higher for images (AUC=0.74) versus GPS (AUC=0.65). Performance when away from the home was also higher for images (AUC=0.73) versus GPS (AUC=0.51). However, performance when outdoors at smokers' homes was higher for GPS (AUC=0.77) versus images (AUC=0.71). Combining predictions from both models yielded consistent performance across all location types (AUC=0.73-0.78). Computer-vision based prediction of environment-associated smoking risk is superior to GPS prediction for indoor home environments and non-home environments, but not outdoor home environments. Images and GPS can be used synergistically to predict smoking risk more consistently and effectively than either data source alone.

PS1-151

USING MACHINE LEARNING TO INFORM SMOKING CESSATION TREATMENT

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Mobile and electronic health record (EHR) data can provide clinicians and researchers a wealth of information that can be used to better understand a smoker's thoughts, feelings, and behaviors when they undergo a quit attempt. Machine learning (ML) methods can be applied to these data to inform treatment. The present study used two ML models to: 1) identify baseline (pre-quit) variables associated with abstinence on the quit date, and 2) identify the strongest momentary predictors of first lapse following an initial quit attempt. ML analyses of baseline psychosocial data from 570 smokers enrolled in a tobacco treatment clinic in Oklahoma were used to create a model that predicted biochemically-verified abstinence on the scheduled quit date (Model 1). A subset of 320 participants used a smartphone app to complete 5 ecological momentary assessments (EMAs) per day from 1 week pre-quit through 4 weeks post-quit. EMAs evaluated mood, smoking urge, environmental context, and smoking lapses. Cox proportional hazards regression models with false discovery rate multiplicity control and a ML-based penalization/model reduction scheme were used to create a model that included the strongest predictors of first lapse (Model 2). ML models identified several pre-quit variables associated with an increased likelihood of abstinence on the quit date (e.g., rural vs. urban address, self-efficacy for quitting). EMA data revealed several significant predictors of time to first lapse, including self-reported likelihood of smoking that day, cigarette availability, feeling frustrated, and recent alcohol use. Study results illustrate the utility of ML for predicting quit date abstinence and first smoking lapse. Participants identified as unlikely to successfully quit on their quit date could be provided with additional support prior to quitting (e.g., extra counseling sessions), and momentary predictors of imminent smoking lapse could be used to inform just-in-time adaptive interventions that aim to prevent smoking lapse.

PS1-152

MINING ANTI-TOBACCO CAMPAIGNS ON SOCIAL MEDIA THROUGH NATURAL LANGUAGE PROCESSING FOR EFFECTIVE CAMPAIGN DEVELOPMENT AND IMPLEMENTATION

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Background: Anti-tobacco campaigns on social media are important channels for tobacco use prevention and control. In the present study, we conducted content analysis of major anti-tobacco campaigns on Facebook and examined the factors that may influence effective anti-smoking information dissemination and users engagement. Methods: We collected 3,515 posts and 28,125 associated comments from seven large national and local anti-tobacco campaigns on Facebook between 2018 and 2021 including Behind the Haze VA, Campaign for Tobacco-Free Kids, Smoke Free US, The Real Cost, Tobacco Prevention Toolkit, Truth Initiative, and CDC Tobacco Free. Natural language processing methods were used for content analysis including parsimonious rule-based models for sentiment analysis. Multinominal logistic regression models were fitted to examine the relationship of anti-smoking message framing strategies and viewer responses and engagement. Results: Although posts from anti-smoking campaigns that were positively framed (sentiment scores > 0.05) were 35% more likely to receive positive comments

than neutral posts (RRR = 1.35, 95% CI: 1.14 - 1.61, p < 0.01), posts that were more likely to receive positive comments on average had 15.31 (95% CI: -26.90 - -3.73, p < 0.05) fewer shares compared to posts that were more likely to receive neutral comments. On the other hand, we found that negative comments were more common (31.9 times more common than neutral comments, 95% CI 19.18 - 44.62, p < 0.01), where numbers of positive comments were similar to neutral comments (2.15; 95% CI -10.36 - 14.66). Posts framed negatively had 108.51 more shares compared to neutral posts (95% CI 19.73 - 197.30, p < 0.05). Compared to neutral-framed posts, negatively framed posts were 32% more likely to receive negative comments (RRR = 1.32, 95% CI: 1.13- 1.54, p < 0.01). Conclusion: Although positive posts tended to receive more positive comments, Facebook (now named META) users, in general, were more responsive to negative posts, leaving more negative comments. Framing strategies taking into account such negativity bias should be implemented in future campaign development.

PS1-153

PATTERNS OF CANNABIS AND TOBACCO USE IN AUSTRALIA: A LATENT CLASS ANALYSIS AND HEALTH-RELATED CORRELATES

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Significance: The co-use of tobacco and cannabis is high in Australia. Co-use can occur simultaneously or asynchronously and could be more harmful than the use of each substance alone. This study examined the patterns of tobacco, cannabis and co-use, and their associations with socio-demographic correlates, health factors and poly-substance use. Method: The nationally representative Australian 2019 National Drug Strategy and Household Survey was used in this study (n =22,015). Latent class analysis was used to identify subgroups of respondents based on a set of tobacco and cannabis use indicators. The socio-demographic correlates, health indicators and recent substance use of each class was examined using multinomial logistic regression. Results: A four-class solution was identified: 'Tobacco-only' (7.4%), 'Cannabis-only' (5.6%), 'Co-use tobacco and cannabis' (2.3%), and 'Non-user' (84.7%). Compared to non-users, respondents in all other classes were more likely to be male, younger (<60 years), single, living in rural regions, experiencing high level of psychological distress, and had used other illicit substances in the last year. Within the co-use class, 79% had simultaneously mixed tobacco and cannabis. In the co-use class, the simultaneous use of other illicit substances (e.g., alcohol, ecstasy, cocaine) with cannabis was high. Conclusions: A substantial proportion of respondents have used either or both tobacco and cannabis. Interventions and policies need to target users of both substances.

PS1-155

PREFERRED MODES OF CANNABIS DELIVERY AMONG ADULT USERS OF TOBACCO CIGARETTES AND NICOTINE VAPING PRODUCTS: FINDINGS FROM THE 2020 ITC FOUR COUNTRY SMOKING AND VAPING SURVEY

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Significance: Nicotine and cannabis are administered using similar modes of delivery (MODs). Little is known about the degree of similarity in preferred nicotine and cannabis MODs among co-users. We examined preferred cannabis MODs among nicotine users across jurisdictions with varying adult-use cannabis policies.Methods: Using data from the 2020 ITC 4 Country Smoking and Vaping Survey, we examined cannabis MODs (e.g., smoked, vaped, edible) among adult users of cigarettes and nicotine vaping products (NVPs) who reported past year cannabis use. Logistic regression estimated age- and sex-standardized prevalence of cannabis MODs by nicotine user group (exclusive cigarette smokers n=1635; exclusive NVP users n=416; dual users of cigarettes + NVPs n=1171) and jurisdiction (Canada n=1524; US: legal adult-use (n=253) and illegal adult-use (n=499) cannabis states; England n=717; Australia n=229). Multinomial logistic regression examined associations between nicotine user group, jurisdiction, and preferred cannabis MOD, controlling for other factors.Results: Smoking cannabis without tobacco was the preferred MOD across all nicotine user groups. A greater percentage of exclusive cigarette smokers (36.2%) smoked cannabis with tobacco than dual

users (28.4%) and exclusive NVP users (12.6%). More exclusive NVP users (10.2%) vaped cannabis oils than exclusive smokers (2.2%). Findings held after adjusting for demographics, use of other tobacco products, cannabis use frequency, alcohol use and indicators of depression. By country, smoking cannabis without tobacco was the preferred MOD in Canada (55.9%), US illegal (70.8%), and US legal (61.9%) states. Smoking cannabis with tobacco was the preferred MOD in England (68.6%) and Australia (65.3%). Prevalence of vaping cannabis oils was highest in the US (legal:9.5%, illegal:7.5%), followed by England (4.1%), Canada (3.1%), and Australia (1.3%). Conclusions: Among nicotine users, smoking cannabis without tobacco is the most popular MOD, but differences emerged by user group and jurisdiction. Mode-specific preferences across substances highlight cross-product interactions requiring attention by researchers and policymakers.

PS1-156

CANNABIS AND TOBACCO/NICOTINE CO-USE AMONG PRIMARY CARE PATIENTS IN A STATE WITH LEGAL CANNABIS ACCESS

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Significance: Cannabis and nicotine/tobacco co-use is prevalent, has public health impact, and has implications for treatment. Further, cannabis and nicotine products are widely available and have evolved rapidly in the United States (US) leading to numerous patterns of dual use. Primary care could be utilized for cannabis and/or tobacco screening and intervention; however, little research has evaluated co-use among primary care patients. This secondary analysis explored the association between tobacco/nicotine co-use status among adults who currently use cannabis on measures of cannabis use. Methods: As part of a NIDA Clinical Trials Network (CTN) parent study, patients were identified through visits to primary care clinics in Kaiser Permanente Washington (US) and were oversampled based on the frequency of past-year cannabis use (indicated in the electronic medical record) and for Black, indigenous, or other persons of color. Patients who endorsed past 30-day cannabis use were included (N=1388). Outcomes included cannabis use (i.e., methods of use, frequency, recreational and/or medical use, and cannabis use disorder symptoms [CUD]) and were analyzed using unadjusted bivariate correlations to compare outcomes between patients who use cannabis only compared to those who co-used nicotine/tobacco. Results: Among primary care patients who co-used nicotine/tobacco and cannabis (n=352; 25%), co-use status was associated with higher rates of combustible cannabis use (p<0.001), more days of use (p<0.05), more use episodes per day (p<0.05), and higher rates of cannabis use disorder (p<0.001) compared to those who used cannabis only (n=1036). Conclusions: In a state with a mature legal cannabis market, primary care patients who co-use cannabis and nicotine/tobacco reported more days of cannabis use and had higher rates of CUD. Interventions targeting cannabis and tobacco/nicotine co-use in primary care populations are not well-established and research in this area is warranted given findings of more severe cannabis use patterns and the adverse health outcomes associated with co-use.

PS1-157

ADVANCED LONGITUDINAL MODELS OF ABSTINENCE AND WITHDRAWAL

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Despite developments in advanced longitudinal data modeling, the application of such models to tobacco randomized controlled trials has been rather limited. Most smokers attempt to quit smoking multiple times, entering and exiting states of smoking abstinence. Here, we describe the use of Markov models to jointly examine the time course of smoking abstinence/relapse and withdrawal intensity. This approach allows for two aspects of transitions that recur repeatedly to be taken into account: (1) how long it takes for a smoker to transition between smoker/abstinent and abstinent/smoker; and (2) how much of a withdrawal intensity can a smoker sustain before transitioning from abstaining to the smoking state. We also describe use of machine learning (ML) approaches that can discover complex interactions between smoking cessation treatments and individual- and contextual-level characteristics and identify heterogeneity of effects that can lead

to more targeted and personalized smoking cessation interventions. We hope that the use of these new approaches will improve representation of the empirical processes of outcomes in tobacco studies and extend the sort of questions that researchers can ask.

PS1-158

SYMPTOM BURDEN, TOBACCO USE, AND QUIT INTENTIONS AMONG INDIVIDUALS WITH CANCER: AN ANALYSIS OF THE US FDA POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY

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Background: Understanding the relationship between symptom burden and smoking/vaping may inform tobacco treatment interventions tailored to the needs of individuals with cancer during and after treatment. **Methods:** Analyses used data from FDA PATH Wave 5, a representative survey of US adults. Chi-square, t-tests, and linear regression were used to compare symptom burden [fatigue, pain, sleep problems, emotional problems, quality of life (QOL)] between patients (diagnosed in past 12 months; N=605) and survivors (in remission; N=863) and to compare symptom burden by smoking status (current=478, former=496, never=394), vaping status (current=94, former/never=1374), quit attempts, level of interest in quitting, and intentions among patients/survivors. Fatigue, pain, emotional problems, and QOL were assessed with single item Likert scales, and past month sleep problems were dichotomized. **Results:** Compared to survivors, patients reported worse fatigue (mean difference (MD)=.34, $p<.0001$), pain (MD=.46, p=.02), emotional problems (MD=.22, p=.007), and perceived QOL (MD=.16, p=.01), but no difference in sleep problems. Among patients, current smokers reported worse pain (MD=1.56, $p<.0001$), emotional problems (MD=.63, $p<.0001$), and QOL (MD=.47, p=.0002) compared to former smokers, and worse fatigue (MD=.40, p=.0007), pain (MD=2.08, $p<.0001$), emotional problems (MD=.37, p=.03) and QOL (MD=.73, $p<.0001$) compared to never smokers. Currently vaping patients reported higher pain (MD=1.63, p=.003), more emotional problems (MD=.68, p=.03), and more sleep problems ($\chi2(1)$=5.35, p=.02) compared to patients not currently vaping. Among patients/survivors, no facets of symptom burden were associated with quit attempts, interest, or intentions, but currently smoking survivors who made a quit attempt in the past year had higher pain (MD=.99, p=.04) and worse QOL (MD=.39, p=.04). **Conclusion:** Among cancer patients and survivors alike, current tobacco use is associated with significantly greater symptom burden. Despite this, cancer patients and survivors expressed interest and intentions to quit. Future research should examine the role of smoking cessation in improving symptom burden.

POSTER SESSION 2

PS2-1

ELECTRONIC HEALTH RECORD CLOSED-LOOP REFERRAL (EREFERRAL) TO A STATE TOBACCO QUITLINE: PRIMARY CARE IMPLEMENTATION CHALLENGES AND ADAPTATIONS

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Background: Health system changes can increase the reach of evidence-based smoking cessation treatment. Proactive ask-advise-connect (AAC) referral programs, for example, increase the rates at which patients who smoke enroll in cessation treatment. Implementing such system changes poses many challenges, however, and adaptation to system contexts is often required. This case study identified implementation challenges and adaptations that were made to enhance adoption and implementation of electronic health record (EHR)-enabled, closed-loop referral (eReferral) of adult primary care patients to a state tobacco quitline. Methods: Twenty three primary care clinics in two healthcare systems implemented quitline referral, starting with 1 pilot clinic per system and then 2 phases of implementation (an experimental phase in 5-6 test clinics and then a system-wide adoption phase). Adaptations were informed by stakeholder input from in-person trainings, follow-up calls a month after eReferral launch, emails, and direct observation by researchers. Implementation strategy challenges and adaptations were assessed and characterized using RE-AIM and the FRAME-IS adaptation framework as guides. Findings: Major challenges to implementation of closed-loop eReferral to a tobacco quitline included: achieving interoperability between the healthcare system EHR and the state quitline vendor platform; tailoring the eReferral program to healthcare system-specific EHR configurations; and tailoring to system- and clinic-specific workflows, roles, policies, and procedures. The two health systems used different approaches to adoption, interfacing with the quitline vendor, and integrating eReferral into clinician workflows. Both health systems engaged in iterative refinement of the EHR alert prompting tobacco use intervention, the eReferral computerized physician order entry, trainings, and AAC workflows. Conclusions: System-wide implementation of eReferral in primary care outpatient clinics is feasible but requires extensive coordination across stakeholders, tailoring to health system EHR configurations, and sensitivity to system- and clinic-specific workflows.

PS2-2

EXAMINING FACILITATORS AND BARRIERS IN TOBACCO INTERVENTION FOR PERSONS WITH SUBSTANCE USE AND MENTAL HEALTH DISORDERS

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The Covid-19 pandemic provided additional challenges but also opportunities to reach a challenging population engaged in a tenacious behavior. This presentation will focus on the qualitative inquiry of a three-observational study that is testing a Tobacco Harm Reduction model targeted to individuals with Substance Use and Mental Health disorders. While the current three-year observational study is demonstrating some success in facilitating subject efforts to change their tobacco use; recruitment and retention are a challenge in a population known to have limited success and worse outcomes related to tobacco use morbidity and mortality. This presentation will present data derived from focus groups with subjects who demonstrated successful change efforts along with semi-structured interviews with individuals who dropped out of the research protocol. Complementing subject qualitative data, we also present data from semi-structured interviews with research staff. The objective in the use of these qualitative methods is to amplify the facilitators and barriers in engaging with this population. Endeavoring to provide tobacco intervention with this population ultimately means competing with other subject demands and mounting efforts to capture attention and luring individuals away from a myriad of distractions. This overarching view will be considered and described

PS2-3

CIGARETTE SMOKING STATUS AND HORMONE USE AMONG ADOLESCENT AND YOUNG ADULT FEMALES WITH OPIOID USE DISORDER

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Significance: Compared to those who had quit or had never smoked, the prevalence of OUD is higher among those who currently smoke, particularly among adolescents and young adults (AYA). Ovarian hormones, which are altered with hormonal contraceptives (HC), can affect drug-taking behaviors. This has not yet been investigated among AYAs with OUD who also smoke. The objective of this study was to investigate the differences in smoking status by HC use among AYA patients with OUD. **Methods**: We conducted a retrospective chart review of female patients seen from January 1, 2011 through December 31, 2019 at the Medication Treatment of Addiction (MATA) clinic for AYA at Nationwide Children's Hospital. Descriptive statistics were used to identify the prevalence of smoking and hormonal contraception use among patients, and a chi square test was conducted to formally examine this relationship. We excluded those with a missing smoking status. **Results**: Patients (n=119) had a mean age of 19.2 (± 2) years. The majority were white non-Hispanic (92%), and had public insurance (75.6%). Overall, 79% (n=94) of patients reported current smoking, 8.4% (n=10) reported a history of smoking, and 12.6% (n=15) reported never smoking. During the study period, 17.6% (n= 21) were not prescribed any HC, while 49.6% (n=59) were prescribed two or more types, 26.9% (n=32) were prescribed progestin-only long-acting reversible contraceptives (predominately depot medroxyprogesterone acetate), and 5.9% (n=7) were prescribed cyclical hormones (predominately combination oral contraceptives). A similar distribution of smoking status group by HC use was seen; however, a chi square test did not show a statistically significant association between HC type and smoking status. **Conclusions:** These data suggest that HC use is common among AYA females with OUD that also smoke. Additional research is needed to further explore the potential impact of HC use on OUD and smoking related outcomes. Future Implications may include how these findings can be used to promote smoking cessation efforts among AYA with OUD.

PS2-4

TOBACCO/NICOTINE DEPENDENCE AND COVID-19: DISTINCT AND CO-OCCURRING CONDITIONS AMONG PATIENTS IN FIVE ACADEMIC HEALTH CENTERS

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Significance: The spread of SARS-CoV-2 has led to a global pandemic clinically characterized by severe respiratory illness. As of late July 2021, about 35 million US adults have contracted COVID-19. During this same time, approximately 60 million adults used a tobacco/nicotine product. The co-occurrence of COVID-19 in a population with a highly-prevalent respiratory system stressor warrants investigation of patients with comorbid COVID-19 and tobacco/nicotine dependence. We assessed rates of conditions among patients with both COVID-19 and tobacco/nicotine dependence in a large database of electronic health records.**Methods:** We used SQL scripts to query the UCCORDS database, which contains anonymized health records for all patients tested for COVID-19 by the five health centers in the University of California system. Output contained patient gender, race/ethnicity, and comorbidities. We identified rates of observed conditions (using OMOP-compliant coding) for individuals with tobacco/nicotine dependence and determined rates of these conditions for those with tobacco/nicotine dependence (n=25,419), COVID-19 (n=25,194), and both (n=2,193).**Results:** The top 10 conditions observed for patients comorbid with COVID-19 and tobacco/nicotine dependence were essential hypertension (45.1%), abnormal findings on diagnostic imaging of lung (31.7%), hyperlipidemia (30.0%), chest pain (29.7%), chronic pain (29.2%), dyspnea (29.1%), anxiety disorder (28.2%), major depression (25.2%), abnormal electrocardiogram (24.6%), and cough (24.1%). Patients with both COVID-19 and tobacco/nicotine dependence had higher rates of all ten conditions compared to patients with only COVID-19 or only tobacco/nicotine dependence.**Conclusion:** Patients

with comorbid COVID-19 and tobacco/nicotine dependence are at much higher risk of conditions common among patients with tobacco/nicotine dependence alone. While increases in some (e.g. cough, dyspnea) appear to be driven by COVID-19, increases in others (e.g. hyperlipidemia, chest pain, major depression), may have unique etiologies corresponding to comorbid COVID-19 and tobacco/nicotine dependence that require further study.

PS2-5

RELATIONSHIP BETWEEN PROGESTERONE AND IMPULSIVITY AND PERCEIVED STRESS IN CO-USERS OF MARIJUANA AND TOBACCO

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Significance: The use of marijuana has increased over the past few decades, a trend that is likely to continue due to the rise in decriminalization laws. Both marijuana and tobacco use are associated with potential negative health-related consequences and users face many challenges in the cessation process. A growing body of research demonstrates associations between sex hormones and drug abuse behaviors; namely, that progesterone has been shown to be associated with decreases in these behaviors. Our lab's previous research has also demonstrated decreased smoking-related symptoms, including impulsivity, during the luteal phase of the menstrual cycle, at which point progesterone levels are high. This study seeks to build upon this research by assessing the effect of progesterone administration on impulsivity and perceived stress measures in marijuana and tobacco co-users. Methods: The data used in this project was obtained from a parent randomized study examining the effect of exogenous progesterone on impulsivity and change in marijuana use in a sample of marijuana and nicotine cigarette co-users who are looking to quit. The study enrolled both males and females who self-reported use of marijuana $\geq$ 4 days per week. Participants were randomized to active progesterone or placebo. Progesterone was administered in the form of active micronized natural progesterone pills (generic Prometrium) or placebo. Participants took 200 mg twice daily (approximately 8am and 8pm) for five weeks starting seven days prior to their assigned quit date. Results: Findings indicate that co-users randomized to exogenous progesterone had, on average, 2.24 points lower scores on Behavioral Inhibition System (95% confidence interval [CI]: 0.34-4.13 points lower; p=0.02) and 3.30 points higher scores on Brief Self-Control Scale (95% CI: 0.17-6.43 points higher; p=0.04), compared to those randomized to the placebo. Conclusion: These results indicate that exogenous progesterone administration leads to lower impulsivity and higher self-control.

PS2-6

TOBACCO SMOKING IS ASSOCIATED WITH THE RE-ACTIVATION OF HERPES VIRUSES

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Significance Infections with human herpesviruses (HHVs) are associated with a range of adverse health consequences. Following primary infection, HHVs establish latency and can reactivate throughout life. The factors which facilitate reactivation are related to the T-cell arm of the immune system. Cigarette smoking is recognized as one of the most important environmental factors which can affect T-cell functioning. The effect of smoking on reactivation of HHVs has not been extensively studied. Methods The study population consists of 2098 individuals from the Sheppard Pratt cohort enrolled between 1999 and 2021. A blood sample was obtained along with demographic and smoking information. The study population had a mean age 36.1 (SD 12.6), was 54% female and 61.2% White. Diagnoses were schizophrenia 38%, bipolar disorder 28%, major depressive disorder 6%, and non-psychiatric 28%. A total of 827 (39%) individuals were current tobacco smokers, including 61% of those with schizophrenia. We employed solid phase immunoassays to measure IgG antibodies to HHVs in the blood samples including Cytomegalovirus (CMV), Epstein Barr Virus (EBV), Herpes Simplex Virus Type 1 (HSV-1), and Varicella Zoster Virus (VZV). Associations between antibody levels and smoking variables were determined by multivariate and ordered regression models. Results The levels of IgG to CMV and to EBV were significantly associated with current smoking (coefficient (co) = .185, 95% CI .072 - .297, p <.001; co.126, 95% CI .039 -.212, p < .005). Levels of IgG antibody to CMV and to EBV were also significantly associated with the number of cigarettes smoked per day (co .115, 95% CI .045 -.185, p < .001; co .289, 95% CI .123 -.455, p < .001 respectively). Antibodies to HSV-1 and

VZV were not associated with smoking variables. The correlation between IgG levels and smoking variables were shared among the diagnostic groups. Conclusion Smoking is associated with an increased risk for viral re-activation to CMV and EBV. It is likely that this association is related to smoking induced alterations in T-cell function. Smoking cessation programs may improve the immune response and lessen viral reactivation.

PS2-7

USING WITHDRAWAL AND CRAVING IN A RISK ESTIMATION MODELING SYSTEM TO PREDICT POSTPARTUM CIGARETTE SMOKING RELAPSE

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Introduction: Approximately 90% of women, who quit smoking during pregnancy, relapse within a year. To date, behavioral interventions addressing postpartum relapse to smoking (PRS) have yielded limited success. Traditionally used in engineering settings, dynamical system modelling is a multivariate time-varying process, where changes to input variables (e.g., withdrawal) lead to changes in mediating variables (relapse risk) that affect outcomes of interest (relapse). The goal of this study is to illustrate an example of a risk simulation model based on changes in withdrawal and cravings to identify periods of high-risk for PRS. **Methods:** Ecological momentary assessments data from a previous randomized controlled trial for PRS (N=36 participants) was used. Data included daily ratings of nicotine withdrawal, cravings, and daily cigarette smoking through 12 weeks postpartum. Fuzzy inference system (FIS) design approach was used to check the feasibility of our methodology. **Results**: Compared to raw data, the estimated risk values using our simulation approach indicated a clear distinction in the interaction between cravings and withdrawal when relapsed(n=19) and abstinent(n=17) participants. Our prediction model using optimized FIS parameters identified a period of high-risk for relapse with 72% accuracy. Specifically, compared to abstinent participants, data patterns among relapsed participants showed a high-risk period starting, on average, 18 days prior to relapse based on the craving data alone, 13 days prior to relapse based on withdrawal data, and 20 days prior to when relapse when both craving and withdrawal data are included. **Conclusion**: Our study illustrates that a dynamic risk modeling system can be used to identify periods of high-risk and potentially, prevent PRS. Next steps include inclusion of additional predictors to refine our model. Overall, this innovative transdisciplinary approach has potential to inform development, timing, and frequency of effective personalized behavioral interventions to prevent PRS

PS2-8

TIME AND A GAIN, A LOSS: CHOICE BUNDLING INCREASES VALUATION OF DELAYED LOSSES MORE THAN GAINS IN CIGARETTE SMOKERS

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Significance Choice bundling, in which a single choice produces a series of repeating consequences over time, has been shown to increase valuation of delayed monetary and non-monetary gains. Interventions derived from this manipulation may be an effective method for reducing the bias for immediate gratification observed in cigarette smokers. No prior work, however, has investigated whether effects of choice bundling generalize to reward losses. *Methods* In the present study, an online panel of cigarette smokers (*N*=307), recruited using Ipsos, were randomly assigned to complete assessments for either monetary gains or losses. In Step 1, participants completed a standard delay-discounting task to establish Effective Delay 50 (ED50), or the delay required for a monetary outcome to lose half of its value. In Step 2, participants completed three conditions of an adjusting-amount task, choosing between a smaller, sooner (SS) adjusting amount and a larger, later (LL) fixed amount. The bundle size (i.e., number of consequences) was manipulated across conditions, where a single choice produced either 1 (control), 3, or 9 consequences over time (ascending/descending order counterbalanced). The delay to the first LL amount in each condition, as well as the intervals between all SS and LL amounts (where applicable), were set to individual participants' ED50 values from Step 1 to control for differences in discounting of gains and losses. *Results* Results from Step 1 showed significantly higher ED50 values (i.e., less discounting) for losses compared to gains (*p*<.001). Results from Step 2 showed significant Bundle Size x Sign (*p*<.001) and Bundle Size x Order (*p*<.05) interactions, with larger increases in LL valuation (i.e., indifference points) observed for losses vs. gains and in the ascending

vs. descending orders. Despite these interactions, planned comparisons in all sign and order conditions revealed greater valuation of gains and losses in bundle sizes 3 and 9 compared to 1 (all *ps*<.05). *Conclusions* These data suggest that choice bundling increases valuation of delayed gains and losses, although larger effects are observed for losses and ascending bundle-size orders. The potential clinical utility of these effects will be discussed, such as development of motivational interventions that emphasize both the bundled health gains associated with smoking cessation and the health losses associated with continued smoking.

PS2-9

INITIAL EVALUATION OF ACUTE SUBJECTIVE SENSORY PERCEPTIONS OF USING IQOS VERSUS SMOKING CIGARETTES

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SIGNIFICANCE: The heated tobacco product IQOS delivers nicotine via smokeless aerosol, reducing toxicant exposure relative to cigarette smoking. IQOS may be an acceptable tobacco harm reduction alternative if it matches cigarettes on factors known to reflect reinforcement such as sensory perceptions and use behavior. The primary aim of this pilot study was to evaluate IQOS directly against participants' own brand cigarettes (OBC) to gauge relative acceptability—comparing products on acute sensory perceptions and topography. **METHODS:** Adult daily smokers with no previous IQOS use (n=28) completed a single session following ≥2 hours of abstinence. Sessions consisted of two testing periods varying only in products presented unblinded in fixed order: IQOS, OBC. In each period, participants were instructed to use ad lib each product for up to 6 mins (the device-mandated limit for IQOS). Immediately afterwards, participants rated puffs from each product on "Liking", "Satisfaction", "Nicotine", "Flavor", "Strong", "Harsh", and "Smooth" (0-100 visual analog scale). Periods were recorded to measure topography variables. Expired-air CO was measured pre- and post-use. **RESULTS:** As expected, pre- to post-use change in CO was significant for OBC (t(27)=11.1, p<0.001), but not IQOS (t(27)=1.0, p=0.33). Puff number and duration of use were similar for IQOS and OBC, t(25)=0.6, p=0.54 and t(25)=0.7, p=0.50, respectively. Using an equivalence margin of ±25 (the distance between VAS verbal anchors), the Two One-Sided Test procedure indicated equivalence between products on sensory ratings Nicotine, Strong, Harsh, Flavor, and Smooth, but not Liking and Satisfying. **CONCLUSIONS:** IQOS was rated lower than OBC on some pleasurable sensory items but was similar on other perceptions and acute use behaviors. These preliminary pilot results may suggest reasonable initial acceptability of IQOS relative to combustible smoking. Yet, additional research directly comparing heated and smoked tobacco products used over a longer duration of access under naturalistic conditions is needed to more thoroughly evaluate acceptability of IQOS as a substitute for combustible cigarettes.

PS2-10

A COMPARISON OF DAILY AND NON-DAILY SMOKERS WITH HIV

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SIGNIFICANCE: Cigarette smoking is the leading killer of people with HIV (PWH), who smoke at 3x the rate of the general US population. Non-daily smoking, observed in about 15% of US cigarette smokers, is increasingly prevalent and associated with significant morbidity. However, less is known about non-daily smoking in PWH. We sought to determine the prevalence of and factors associated with non-daily smoking among PWH. METHODS: We aggregated results from the baseline interviews of two smoking cessation trials for PWH, conducted between 2014 and 2020 in the Bronx, NY; Washington DC, and Baltimore, MD (combined N=872). The primary outcome of both trials was biochemically-verified, 7-day point-prevalence abstinence at 6 months. RESULTS: The mean age of the sample was 50.4±9.8, 55.5% were Male, 20.4% Latino/a, 83.1% Black, 13.0% White, 60.8% had ≤high school education, 87.5% unemployed or with disability, and 91.0% had a household income <$30K. Past 30 day ("current") other substance use: 37.7% cannabis, 19.3% cocaine, 4.9%/11.9% heroin/methadone. HIV risk factor: 45.6% hetero-sex, 27.5% same-sex, 12.0% IDU. Baseline CD4=621±373. Mean anxiety (GAD-7)=6.3±5.8. 13.4% of the sample reported non-daily smoking. In univariate analysis, the following characteristics were significantly associated with

non-daily smoking (vs daily smoking): non-White race, current cannabis use, not currently on methadone maintenance, higher motivation to quit (Readiness to Quit Ladder), and higher anxiety score. In the multivariate adjusted model, the following associations remained significant: non-White race AOR=2.26[1.01-5.05], p=0.05, not currently on methadone maintenance AOR=2.82[1.00-7.94], p=0.05, higher motivation to quit AOR=1.28[1.08-1.53], p=0.005, and higher anxiety score AOR=1.04[1.00-1.07], p=0.05. 22.7% of non-daily smokers were abstinent at 6 months vs.12.1% of daily smokers, OR=2.14[1.30-3.51], p=0.002. CONCLUSIONS: Non-daily smoking is common in PWH and is associated with non-White race, not using methadone, and higher motivation to quit and anxiety levels. PWH with non-daily smoking were significantly more likely to achieve 6-month abstinence than PWH with daily smoking.

PS2-11

THE RELATION BETWEEN PRE-QUIT INSOMNIA SEVERITY AND SMOKING CESSATION OUTCOMES AMONG ADULTS PARTICIPATING IN TREATMENT: A LONGITUDINAL STUDY

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Significance: There is preliminary evidence that experiencing insomnia is associated with a lower likelihood of smoking cessation among those making a quit attempt. Yet, few studies have used longitudinal data to examine the association between insomnia and smoking cessation. **Methods:** Data from a community-based tobacco cessation program for adults (N=649) were used to examine the association between pre-quit insomnia and smoking cessation at follow-up. On the scheduled quit date, the Insomnia Severity Index was administered to assess insomnia severity during the previous two weeks. Biochemically-verified 7-day point prevalence abstinence was measured at four-time points (i.e., quit date, 4-, 12-, and 26-weeks post-quit-date). Repeated measures logistic regression analyses were conducted to evaluate the odds of achieving abstinence at each follow-up given pre-quit insomnia severity (i.e., none/subthreshold vs. moderate/severe), after adjustment for covariates. The potential interaction between pre-quit insomnia severity and time was evaluated in the model. **Results:** On average, participants were 51.9 (SD=12.1) years old with 12.5 (SD=2.2) years of education. Participants were predominantly female (58.1%), White (58.4%) or Black (27.3%), and most had a household income below $21,000 (61.6%). Participants reported smoking an average of 17.0 (SD=10.3) cigarettes per day for an average of 30.2 (SD=14.1) years at baseline. Analyses indicated that pre-quit insomnia severity was not significantly associated with abstinence on the quit date (OR: 0.79, CI: 0.54-1.15) or at 4-weeks post-quit follow-up (OR: 0.73, CI: 0.53-1.01). However, those with moderate/severe insomnia had a significantly lower likelihood of achieving abstinence at 12- and 26-weeks post-quit follow-up (OR: 0.64, CI: 0.46-0.88 and OR: 0.50, CI: 0.28-0.88, respectively). **Conclusion:** While insomnia severity was not related to abstinence early in treatment, it was associated with a lower likelihood of abstinence at later follow-ups. Future research should explore whether insomnia screening and treatment before and during a smoking cessation attempt might increase the likelihood of smoking cessation.

PS2-12

CARDIOVASCULAR AND RESPIRATORY HEALTH EFFECTS OF ELECTRONIC CIGARETTES: AN UMBRELLA REVIEW

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Topic: Public Health **Key Words:** E-Cigarettes, Health Consequences **Funding:** National Cancer Institute (NCI) and Food and Drug Administration (FDA) grant U54CA229974. **Background/Objectives**: As the global e-cigarette (EC) market expands, it is essential that the health effects of ECs are systematically understood so evidence-based regulatory frameworks can be implemented. Although a substantial literature has examined differential product health effects, there is often conflicting evidence and claims. With the increase in systematic reviews of the health effects of ECs in the last few years, we summarize findings of reviews on cardiovascular and pulmonary health effects. **Methods:** We conducted an umbrella review of systematic reviews and meta-analyses

of the cardiovascular and respiratory/pulmonary health effects of ECs published through May 27th, 2020. Evidence from both preclinical and human studies were considered. PubMed, Web of Science MEDLINE, Embase, and Cochrane Database of Systematic Reviews were searched with no restrictions. **Results:** We summarized evidence from nine systematic reviews on cardiovascular outcomes and eight reviews on respiratory/pulmonary outcomes of EC use. Across cellular and animal studies, EC exposure was found to induce several negative cardiovascular and respiratory/pulmonary reactions including oxidative stress in cardiovascular cell cultures, endothelial cell dysfunction, reduced airway function, and impaired lung function. EC use was reported to have minimal impact on myocardial function compared to cigarette use. Human studies found short term EC use increased heart rate and systolic and diastolic blood pressure, though to a lesser extent than cigarettes while there is also evidence that EC use may increase respiratory resistance similar to cigarette smoking. Generally, reviews concluded that switching from combustible cigarettes to EC may reduce harmful health effects. **Conclusions:** Evidence regarding cardiovascular and respiratory health indicates that ECs may be a safer alternative to cigarettes but cannot be deemed harmless to non-smokers. Evidence on the effects of EC use in dual users is also lacking and needs to be addressed in future research.

PS2-13

UNDERSTANDING DYADIC PROCESSES OF FAMILY-BASED SUPPORT FOR SMOKING CESSATION- A CROSS-LAGGED PANEL ANALYSIS

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Significance: Social support is considered important in enhancing smoking cessation outcomes, but there is limited understanding of dyadic processes. We examined dyadic processes for providing and receiving smoking cessation support, in a context of a family-based cessation intervention designed to enhance support. **Methods**: We analyzed data from an educational intervention, targeting Asian American immigrant dyads of Chinese or Vietnamese American men who smoke daily and their non-smoking family members. Dyads (N=340; 680 individuals) were randomly assigned to a smoking cessation curriculum or an active control curriculum (nutrition and physical activity) delivered over 2 months, with 4 contacts. At baseline and at 3-, 6-, and 12-month follow-ups, smoking participants reported the frequency of receiving cessation support from their family (such as encouragement/praise), and family participants reported on parallel items on the frequency of providing cessation support. Cross-lagged panel analyses were used to examine support processes over time between the two treatment groups. **Results**: Dyadic support processes varied by group assignment and across time. For dyads (N=177) who received the smoking cessation curriculum, family support continued past the intervention and into the follow-up periods, such that family participants' provision of support predicted the smoking participants' receipt of support at a subsequent timepoint. For dyads (N=163) who received the control curriculum, however, family participants' provision of support did not predict smoking participants' receipt of support at a subsequent timepoint. Furthermore, there was no group difference in verified smoking abstinence at the 12-month follow-up. **Conclusions**: There was a longitudinal effect of providing and receiving cessation support, suggesting that the intervention resulted in continued family communications regarding cessation support. The lack of group difference in abstinence rates suggests multiple pathways to cessation, beyond family support as measured here. Further research is needed to examine dyadic processes that are most relevant for cessation and impacts on longer-term outcomes.

PS2-14

UTILIZATION OF E-REFERRALS TO THE MARYLAND QUITLINE IN A LARGE HEALTH SYSTEM DURING THE COVID-19 PANDEMIC - IMPACTS OF CLINICAL EDUCATION

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Significance: The tobacco cessation e-referral process addresses a major public health issue and overcomes challenges for providers to create links between tobacco users and the Maryland Quitline (Quitline), an evidence-based cessation service. The correlation between clinical tobacco education and trends in the number of e-referrals to the Quitline made by the University of Maryland Medical System (UMMS) from January 2020 to June 2021 are explored during the COVID-19 pandemic. Methods: A system-wide e-referral pathway to the Quitline has been established at the UMMS allowing for a closed-loop communication between the electronic health record (EHR) system and the Quitline. Clinical tobacco education for clinicians on e-referral processes did not occur throughout most of 2020 but was revived in January 2021. Patient-level data for the number of e-referrals were extracted from the EHR quarterly and included demographic and clinical characteristics of the referred patients. Results: Based on quarterly patient-level Quitline reports, e-referrals to the Quitline saw a downward trend across the UMMS from 619 e-referrals submitted in the second half of 2019 to 318 and 250 e-referrals in the first and second half of 2020 respectively. In the first half of 2021, e-referrals to the Quitline saw a slight increase with 315 e-referrals submitted. Four clinical education activities were conducted across the UMMS in 2020 and sixteen in the first half of 2021. Conclusion: With no clinical tobacco educator on staff during the COVID-19 pandemic, tobacco cessation e-referrals decreased throughout 2020. Clinicians no longer received education about the importance of tobacco cessation and how to utilize the e-referral to the Quitline. Clinical tobacco education resumed in October 2020 and slight increases in e-referrals were seen across the UMMS beginning in January 2021. It will be important to further study how regular clinical education can improve or maintain tobacco cessation efforts. Additionally, health systems should urge clinicians to screen all patients for tobacco use at every visit and create system wide electronic reminders to continue connecting patients to cessation resources regardless of active educational efforts.

PS2-15

ASSOCIATIONS BETWEEN ANXIETY DISORDER SYMPTOMS AND BARRIERS TO CESSATION AMONG AFRICAN AMERICAN SMOKERS

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Background: Both African American smokers and smokers with mental health conditions, such as anxiety disorders, have disproportionately low quit rates and experience tobacco-related health disparities. Whether and how anxiety symptoms are a barrier to smoking cessation among African American smokers is unknown. This cross-sectional correlational secondary study examined the association of various types of anxiety disorders symptoms and various barriers to cessation among non-treatment-seeking African American smokers. **Methods:** 565 African American smokers in Los Angeles enrolled in a clinical research study on individual differences in tobacco addiction between 2013 and 2017. This study uses baseline visit self-reports of past two-week levels of social anxiety, panic, and trauma-related symptoms and severity of three types of barriers to cessation: tobacco addiction stressors (addiction barriers), environmental and social stressors (external barriers), and affect-related stressors (internal barriers). Multiple regression models were used to test associations between each anxiety disorder symptom scale with each barrier to cessation, with and without adjusting for demographics, nicotine dependence, and dysphoria. **Results:** All anxiety disorder symptoms were significantly positively associated with each barrier to cessation without adjustment (Standardized Regression Coefficients [Betas] range from .235 to .375). After covariate adjustment, panic and trauma-related symptoms were no longer significantly associated with any barrier to cessation. Only social anxiety symptoms remained significantly associated with addiction barriers (Beta = .145), external barriers (Beta = .197), and internal barriers (Beta = .110) in covariate-adjusted models. **Conclusion:** Symptoms of social anxiety, but not trauma or panic-related symptoms, may play a unique, but modest, role in the barriers to cessation in non-treatment-seeking African American smokers. Future research using longitudinal and other methods is needed to determine whether interventions targeting barriers to smoking cessation may improve quit attempts and outcomes in socially anxious African American smokers.

PS2-16

LONG-TERM SMOKING CESSATION EFFICACY OF THE FRONTLINE MEDICATIONS AND PLACEBO IN THE MULTINATIONAL, RANDOMIZED, CONTROLLED EAGLES AND CATS TRIAL

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Background: The 24-week, Evaluating Adverse Events in a Global Smoking Cessation Study (EAGLES, NCT# 01456936) and its continuing 28-week non-treatment cardio-vascular safety extension trial (CATS, NCT# 01574703) provide a unique opportunity to examine the long-term efficacy of the frontline smoking cessation medications in the context of a multinational randomized controlled trial. We explored longer-term smoking abstinence rates in a subcohort of EAGLES and CATS subjects followed up to 40 weeks after receiving up to 12 weeks of active study medication (varenicline, bu-propion, nicotine patch) or placebo in the parent trial. **Methods:** Secondary exploratory analysis of EAGLES and CATS efficacy results in smokers with (N=2435) and without (N=2160) psychiatric disorders. Subjects completed a standardized self-report Nicotine Use Inventory at study visits on weeks 28, 32, 36, 40, 44, 48 and 52. Abstinence was confirmed when expired breath carbon monoxide levels were less than or equal to 10 parts per million. Generalized linear models that included treatment classes (varenicline, bupropion, nicotine patch, placebo); cohort (psychiatric versus non-psychiatric); and region (US versus non-US) were performed. **Results:** Using a conservative approach of classifying subjects (N=3549) who did not enter the extension trial as non-respond-ers, varenicline-treated participants achieved higher continuous abstinence rates for weeks 9 to 52 than those on placebo (OR, 2.54; 95% CI [1.38 to 2.23]), nicotine patch (1.45; 1.19 to 1.77), and bupropion (1.41; 1.16 to 1.71). Those on nicotine patch and bupropion achieved higher longer-term abstinence rates than those on placebo (OR 1.75 [1.38 to 2.23] and 1.80 [1.42 to 2.29]), respectively. **Conclusions:** Although the relative rates of long-term abstinence were lower overall than those reported in the parent EAGLES trial, varenicline was more effective than placebo, nicotine patch, and bupropion in helping smokers sustain abstinence whereas nicotine patch and bupropion were more effective than placebo.

PS2-17

DEVELOPMENT AND PILOT TESTING OF A MOTIVATIONAL INTERVIEWING E-CIGARETTE REDUCTION INTERVENTION FOR ADULT EXCLUSIVE E-CIGARETTE USERS

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Significance: While e-cigarettes may provide a harm reduction benefit to combustible cigarette smokers, many e-cigarette users wish to quit using e-cigarettes. **Methods:** We developed and pilot tested a four-session, telehealth-delivered, motivational interviewing (MI) intervention among exclusive e-cigarette users who were interested in reducing their e-cigarette use. Participants (N=5) were offered four MI therapy sessions and up to 10 weeks of transdermal nicotine patches. Participants were recruited and screened for initial eligibility online. At baseline, participants provided information on demographic characteristics and about smoking and e-cigarette use history. At each session, and at the 3-month follow-up assessment additional information about nicotine/tobacco product use, nicotine patch use, and treatment satisfaction was collected. **Results:** On average, participants were 28.6 years old. Eighty percent were male, 60% were Asian, and most (80%) were non-Hispanic. Forty percent of the participants were students, 40% were working full time, and 20% were unemployed. At baseline, 60% of the sample reported using fruit flavor e-liquid and the remaining participants used mint/menthol. Participants reported picking up their e-cigarette 59 times per day on average (range 20-100) and taking 4 puffs per use on average (range 2-10). On average, participants reported 14 past serious quit attempts (range= 2-50); however, only 60% of the sample reported ever quitting for a period of 24 hours or more. Eighty percent of the sample attended all four treatment sessions and of those who attended all four sessions, 100% quit e-cigarettes completely by the follow-up assessment. All participants reported that the treatment was easy to understand and helpful. **Conclusion:** Findings suggest that among those initially interested in reducing their use, motivational interviewing and transdermal nicotine patches may help exclusive e-cigarette users to quit e-cigarettes.

Future studies should examine the efficacy of an MI intervention in a larger sample and among other groups of e-cigarette users, including young adults, dual users, and those not currently interested in reducing or quitting.

PS2-18

TRANSFORMING TOBACCO CESSATION SERVICES NECESSITATED BY COVID-19 FOR A VETERAN POPULATION LED BY A CLINICAL PHARMACY SPECIALIST (CPS)

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Significance: Our Health care systems have had to face unprecedented challenges with the COVID-19 epidemic. Including transforming many outpatient services from face-to-face care to telehealth services. At the James A. Haley Veterans' Hospital, Tampa, Florida, traditionally tobacco cessation interventions were conducted in face-to-face groups or individual formats, and rapidly changing to other methods of delivery was concerning without impacting access and effectiveness of services. To address these concerns this performance improvement project (PI) was implemented at one of the community-based outpatient clinics led by a Clinical Pharmacy Specialist (CPS). Method: This PI project was conducted at the beginning of the COVID-19 epidemic from 3/4/2020 to 9/30/20. The transformation occurred rapidly (< 5 days). Veterans could self-refer to the program or providers from Patient Aligned Care Teams or Mental Health could assist in their enrollment. The CPS provided individual services by clinical video telehealth or telephone. The CPS assessed the Veteran's smoking habits, willingness to quit, offered tobacco counseling, and a plethora of interventions including pharmacotherapy as well as educational materials. Results: 55 Veterans were seen in this PI project. Cigarettes were the most frequent product used at 93% and the number of sessions seen M=9. Pharmacotherapy regimens included all FDA approved medications. After 6 months of their last known tobacco usage, Veterans' records were reviewed for tobacco use disorder status. It was found that 23 Veterans (41.8%) were in remission, 29 (52.7%) were still using tobacco products, and 3 (5.45%) were still actively working on quitting. Varenicline was the preferred medication (45.4%) and had the highest rate of success. Conclusion: Results clearly show that the urgent modification in services demanded by COVID-19 could still result in high rates of cessation at 6 months. This was the first time a CPS led tobacco cessation interventions at JAHVH. The findings of this project are congruent with previous literature regarding the effectiveness of CPS in providing tobacco cessation services and supports their continued use.

PS2-19

THRESHOLD FOR SUBJECTIVE AND PHYSIOLOGICAL EFFECTS OF NICOTINE - AN IV SELF-ADMINISTRATION STUDY IN HUMANS

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Significance: Reducing the nicotine content of inhaled tobacco products below the reinforcement threshold may help reduce their addictive potential. In a recent human laboratory study, we found that 0.1 mg nicotine was the threshold dose for subjective drug effects and physiological responses while the 0.2 mg nicotine was the threshold dose for nicotine self-administration (NSA). The threshold for the subjective drug effects and physiological outcomes was determined by directed nicotine and saline doses ad-ministered during a sampling period. This study aimed to determine if the initial response to the positive subjective and physiological effects of nicotine, assessed in the sampling period, was similar to those observed during the choice period. Additionally, we sought to examine if urges to smoke and withdrawal severity, assessed at the beginning of sessions, impacted NSA and subjective positive responses to nicotine. Methods: Young adults (n=35; 68% male), who smoked an average of 4.5 (SD=1.3) cigarettes per day, had 5 laboratory sessions after overnight abstinence verified by breath CO. Participants first sampled and rated the subjective effects of an IV dose of nicotine (0.0125, 0.025, 0.05, 0.1, or 0.2 mg/70kg) versus saline (placebo). After the sampling period, participants completed an NSA forced-choice procedure during which they were given a total of 10 opportunities to self-administer IV dose of either nicotine or placebo. During each administration, heart rate was recorded and participants completed self-report items rep-resenting pleasurable, stimulatory, and aversive effects. Results: The nicotine threshold for subjective stimulatory and pleasurable effects were 0.05 and 0.1 mg, respectively. This was supported by a main effect of choice (nicotine vs. placebo; ps < .0001) and a trend nicotine dose-by-choice interaction (ps < .06) in both pleasurable and stimulatory

effects. Nicotine threshold for increased heart rate was at 0.2 mg, supported by main effect of choice ($p < .01$) and nicotine dose-by-choice interaction ($p < .05$). In addition, greater urges at baseline was associated with greater number of nicotine choices at 0.2 mg nicotine condition ($p < .05$). No significant relationships were found for aversive effects or baseline withdrawal. Conclusion: Taken together, results of from the NSA procedure complement prior findings indicating that the threshold for positive effects of nicotine is between 0.05 and 0.1 mg. Threshold for heart rate response was 0.2 vs. 0.1 mg of nicotine with directed dosing, suggesting tolerance development. Baseline craving and withdrawal do not appear to greatly influence nicotine reinforcement, but higher baseline craving may result in greater use of nicotine at 0.2 mg. These findings further support the threshold dose for the positive subjective and physiological effects of nicotine under repeated nicotine deliveries.

PS2-20

CHANGES IN MOTIVATION AND BEHAVIORAL EXPECTANCY: A PROSPECTIVE STUDY OF THE ASSOCIATIONS WITH SMOKING ABSTINENCE AMONG WOMEN

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Elucidating the role of acute changes in psychological determinants of smoking cessation may inform the ongoing development/refinement of smoking cessation interventions for women. Although motivation and behavioral expectancy are established predictors of behavior change, we are unaware of previous work testing the main and interactive effects of dynamic changes in motivation and behavioral expectancy for smoking cessation on smoking behavior among women. Moreover, there is reason to believe that exercise may lead to acute increases in motivation and behavioral expectancy for smoking cessation, and that this, in turn, may improve quit outcomes. The primary goal of these secondary analyses was to test whether change in motivation, change in behavioral expectancy, and their interaction predicted smoking abstinence (conceptual theory test). We also tested whether exercise exerted acute effects on motivation/behavioral expectancy (action theory test), and, consequently, improved odds of abstinence (mediation). Participants included 105 women ($M_{age} = 42.5$) who participated in a RCT testing the efficacy of aerobic exercise (vs. contact control) as an adjunct smoking cessation treatment and completed a 12-week EMA protocol. We used a multi-level, longitudinal mixed effects model to test all pathways simultaneously. Results indicated significant between-group differences in change in motivation pre-to-post session ($p = .04$), but not behavioral expectancy ($p > .05$). Greater increases in motivation and behavioral expectancy were each associated with higher odds of abstinence at next session ($ps < .05$), and there was a significant interaction such that, for those with larger changes in behavioral expectancy, larger changes in motivation were associated with greater odds of quitting ($p = .02$). Finally, there was an indirect effect of exercise (vs. control) on abstinence via changes in motivation ($p < .05$). This study provides initial evidence that a single bout of exercise can increase motivation for quitting smoking, which may improve odds of abstinence. Moreover, increasing behavioral expectancy may enhance the effect of increased motivation on cessation.

PS2-21

INTEREST AMONG PREGNANT CURRENT AND FORMER SMOKERS IN BUPROPION FOR POSTPARTUM RELAPSE PREVENTION

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Significance: Though many women quit smoking during their pregnancy, relapse one year postpartum is approximately 90%. The Bupropion for Postpartum Smoking Relapse study is an ongoing randomized clinical trial. Given difficulty recruiting pregnant smokers for this trial, we interviewed pregnant smokers about their interest in participating in this clinical trial to identify barriers. **Methods**: Pregnant current or recent former smokers ($n=16$; 69% white) in Minnesota were interviewed. Data collection is ongoing. Interview topics included overall knowledge of pregnancy and quitting, postpartum cessation, participation in research, and feelings on taking medication postpartum and/or while breastfeeding. **Results**: Women are aware of the risks of continuing to smoke in their pregnancy. Regardless of quit status, many have a goal of complete abstinence during pregnancy. They receive most of their cessation information from their providers. Most women do not use empirically supported treatments to quit. Most women are planning to stay quit postpartum but are aware it is challenging. Research participation is viewed positively, but interest in the Bupropion trial is low. Women who do not want to participate in the current study fall into three categories: those who do not want to take medications in general, those who have concerns regarding taking a medication while breastfeeding, and abstinent women who believe they will stay quit postpartum without intervention. Though women identified things that would make participating in research easier, such as remote visits, childcare, surveys rather than scheduled visits, and high payment incentives, most still maintained that the concerns listed above would prevent them from participating. **Conclusions**: Pregnant women are aware of the challenges of staying quit postpartum but do not believe they will relapse. Additionally, they are reluctant to take medications regardless of breastfeeding status. Future studies should educate women on postpartum relapse rates and assist in planning for challenges. Providers play a critical role in understanding of risk and could address concerns regarding medication.

PS2-22

RECRUITMENT OF CERVICAL CANCER SURVIVORS TO A SMOKING CESSATION TRIAL: A COMPARISON OF IN-CLINIC VS. ONLINE APPROACHES

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Smoking is a major risk factor for cervical cancer, and cervical cancer survivors have among the highest rates of continued smoking post-diagnosis. Recruitment of cancer patients to smoking cessation trials is challenging, and virtually all trials have recruited from clinical settings. We describe a two-pronged recruitment strategy utilized in a recently completed RCT testing the efficacy of a **M**otivation **A**nd **P**roblem **S**olving (MAPS) approach for facilitating smoking cessation among cervical cancer survivors. Participants (n=202) were recruited: 1) locally from a gynecologic oncology clinic in Oklahoma City, and 2) nationally online via Facebook. This study compared several characteristics of participants recruited via these two different approaches. Independent samples t-tests and Chi-squared tests compared participants in 4 key areas: 1) socio-demographics (age, race/ethnicity, education, employment status, income, partner status, health literacy), 2) nicotine dependence, smoking history and number of previous quit attempts, 3) psychosocial characteristics (depression, negative/positive affect, perceived stress, loneliness, fear of cancer recurrence, financial strain, sense of control, subjective social status) and 4) disease status (cancer stage, treatment status, years since diagnosis). Less than half of participants (43.1%) were recruited in-clinic, with the remainder (56.9%) recruited online. Results indicated that those recruited online versus in clinic were more educated (73.1% vs. 50.6% > HS/GED, $p<.01$), were more likely to have cervical cancer in situ (61% vs. 17%) in contrast to cervical cancer ($p<.01$), had a longer history of cancer (17.3 vs. 6.4 years; $p<.01$), and had higher perceived subjective social status (5.67 vs. 5.02, $p<.05$). No other significant differences emerged. In summary, participants recruited via both approaches were similar on the vast majority of characteristics examined. However, the few characteristics on which those recruited online versus in clinic should be attended to in future trials. These findings strongly suggest that online recruitment may be suitable for reaching and engaging cancer survivors in tobacco cessation trials.

PS2-23

PROXIMAL EFFECTS OF A MINDFULNESS-BASED ECOLOGICAL MOMENTARY INTERVENTION FOR SMOKING CESSATION WITH WEARABLE SENSORS: A MICRO-RANDOMIZED TRIAL

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Background: Determining how and when to best deliver smoking cessation interventions at key moments during the quit smoking process is critical to enhancing treatments. Mindfulness-based interventions may disrupt the associative learning process between aversive affective state and craving. The current study examined the proximal effects of a mindfulness-based ecological momentary intervention for smoking cessation delivered via a smartphone in real time, using a micro-randomized trial design. **Method:** Daily smokers motivated to quit participated in a 6-week cessation study. Over the first 2 weeks, some key moments (negative affect and smoking behavior detected passively via sensors) were randomized to receive either brief mindfulness strategies/motivational messages, or no intervention up to 12 times/day. Ecological momentary assessments (EMAs) of affect, craving, and abstinence self-efficacy were completed following the delivery of strategies. Participants received four in-person brief cessation counseling during these 2 weeks. Nicotine replacement therapy was provided for 6 weeks. **Results:** Participants included in analyses were those who wore the sensors for at least 8 of the 14 days and completed 60% of the pushed strategies (N=13; 61.5% Female; 23.1% Hispanic/Latinx, 69.2% White, Age M=48.5, Cigarettes/day M=15.7). Proximal effects of pushing a strategy were analyzed using generalized estimating equations in the following time windows: pre-quit, post-quit, and the final week post-quit. The results indicated that for the last week post-quit, negative affect was lower (β=-.140, *p*=.018) after a strategy was pushed vs not. There were no significant differences for positive affect, craving, or self-efficacy, nor were any of the outcomes significant over other subsets of days. **Conclusion:** The current study is one of the first to show that mindfulness/motivational strategies have a proximal impact on negative affect during a quit attempt, particularly at the later part of the intervention. When considering that negative affect is one of the primary relapse risk factors, these strategies delivered at specific moments during a quit attempt may be particularly beneficial. Future research should assess the differential effect of mindfulness strategies versus motivational messages and the efficacy of this intervention on tobacco abstinence in a large-scale RCT.

PS2-24

EFFECTS OF CIGARETTE SMOKING STATUS ON ENDOGENOUS PAIN MODULATION

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Significance: Cigarette smoking has been identified as a risk factor in the onset and worsening of chronic pain. Dysregulated endogenous pain processing has been implicated in the development of chronic pain. Although smokers have demonstrated greater sensitivity to experimental pain induction, research has not examined the effect of smoking status on indices of endogenous pain modulation (EPM; ability of the central nervous system to inhibit or facilitate pain). The goal of the current study was to test smoking status as a predictor of EPM. Given that sex plays an important role in EPM, and there are known sex differences in smoking prevalence rates as well as pain-smoking relationships, we also examined these effects among men and women, separately. Method: Participants were 217 moderate-to-heavy alcohol users with no current pain (42% female; 35% Black/African American; n = 100 current smokers) who were enrolled in a primary laboratory study of pain-alcohol effects. EPM was assessed using a MEDOC Q-Sense device, and primary outcomes included conditioned pain modulation (CPM), offset analgesia (OA), and temporal summation (TS). The overall effect of smoking status on EPM was tested using MANCOVA. Results: MANCOVA revealed a main effect of smoking status on EPM (*p* < .05). Univariate follow-up tests indicated this effect was driven by higher CPM scores observed among smokers (vs. non-smokers; *p* < .05). Follow-up analysis further revealed that smokers who identified as female (vs. female non-smokers) demonstrated higher CPM and TS scores (*p*s < .05). Conclusion: The findings suggest that smoking status is related to maladaptive pain modulatory function. Dysregulation of EPM may be one mechanism by which smoking contributes to the development and progression of chronically painful conditions. In the current sample, smokers (vs. non-smokers) evinced higher CPM scores, indicating a reduced capacity to inhibit pain. Among women, smoking was associated

with higher TS scores, indicating enhancement of pain facilitatory processes. Future longitudinal research is needed to clarify the potential mediating role of EPM in the effects of smoking on pain.

PS2-25

THE ASSOCIATION BETWEEN IN UTERO EXPOSURE TO CIGARETTE SMOKE AND CANNABIS AND SEVERITY OF NEONATAL ABSTINENCE SYNDROME

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Introduction: Neonatal abstinence syndrome (NAS), which is caused by in utero exposure to opioids and other substances, is exacerbated by in utero exposure to nicotine. Currently, less is known about the role of cannabis on NAS severity. Therefore, we sought to explore the effect of in utero exposure to cigarette smoking and/or cannabis on NAS severity. Methods: We abstracted medical record data from substance exposed newborns born between January 2015 to December 2020. We excluded those who did not have data on cigarette smoking status (based on self-report) and/or cannabis use (based on toxicology screens for tetrahydrocannabinol [THC] at birth). Patients were classified into four groups: no in utero exposure, in utero exposure to cigarettes only (Cig+), in utero exposure to cannabis only (THC+), and in utero exposure to both (Cig+THC). Outcomes were maximum Finnegan Neonatal Abstinence Score (FNAS) on day 3 and cumulative dose of morphine during hospital stay. Group differences in outcomes were analyzed using Poisson regression models adjusting for type of NAS treatment. Results: Patients (n=428) included 136 infants in the no exposure group, 155 in the Cig+ group, 68 in THC+ group, and 69 in Cig+THC group. Significant group difference were observed in both outcomes. Specifically, infants in the Cig+ group had the highest (more severe) FNAS score (8.4±3.3), followed by the no exposure group (7.6±3.4), the Cig+THC group (7.3±3.4), and THC+ group (6.9±2.6; p=0.03). Cumulative morphine dose was the greatest among the Cig+ group (8.0±20.3 mg) followed by the no exposure group (6.4±15.8 mg), the Cig+THC group (4.5±17.3 mg), and the THC+ group (2.3±5.9; p<0.001). Conclusions: The association between cigarette smoking and severity of NAS-related outcomes appears to vary by in utero cannabis exposure. Additional research is needed in a larger study sample with stronger methodology to capture in utero exposure to cigarettes and cannabis. Understanding the simultaneous effect of in utero exposure to multiple substances on clinical outcomes in infants will inform the development of new treatment guidelines.

PS2-26

MOTIVATING A SPECTRUM OF CANCER PATIENTS TO QUIT SMOKING: INTERVENTION DEVELOPMENT

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Smoking after a cancer diagnosis is associated with poor treatment outcomes and reduced survival across cancer types. Our previous research has shown lower smoking cessation motivation and cessation rates among patients with a strong link to smoking (i.e., thoracic and head and neck) compared to those with cancers that are somewhat smoking-related (e.g., colorectal) or not smoking related (e.g., melanoma). Efforts are needed to increase motivation among smokers diagnosed with cancers less obviously linked to smoking. Using a systematic, iterative process, we developed a brief and easily disseminated intervention, targeted by cancer type, to increase cessation motivation in patients with cancers not obviously linked to smoking (e.g., bladder). We followed a three-phase process: (1) in-depth interviews with patients (N=18) to assess their knowledge on the association between smoking and their cancer, to identify ways to increase cessation motivation, and to elicit preferences for intervention modalities; (2) based on Phase 1 and existing literature, we developed intervention content guided by the teachable moment model; (3) the initial draft of the intervention was presented to the target population (N=22), and learner verification interviews were conducted. All participants had a recent diagnosis of melanoma, breast, gynecological, bladder, or colorectal cancer and smoked in the past 30 days. Examples of emerging themes from Phase 1 interviews included: lack of knowledge about the connection of smoking and their cancer; negative affect, habit, dependence, and weight gain as quitting barriers; and a preference for non-judgmental content. Reactions to the intervention during the learner verification were overall favorable. Some suggested edits included: highlighting savings in the cost of cancer treatments; explaining how nicotine replacement therapy

does not maintain nicotine addiction; suggestions for photo content; and adding more diversity in the examples and photos. The new intervention is currently being pilot tested for acceptability and feasibility in preparation for a larger RCT.

PS2-27

DEEPTOBACCOWORKS AN APPLICATION OF NATURAL LANGUAGE PROCESSING (NLP) TO ASSESS DISPARITIES IN TOBACCO RESEARCH

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Significance: As the tobacco research literature continues to grow, and novel products such as electronic cigarettes quickly gain popularity, there is an urgent need for synthesizing published evidence to inform tobacco control policies in a timely manner. Deep Learning and Natural Language Processing (NLP) have been increasingly used in biomedical research, but have not been applied to facilitate almost real-time evidence synthesizing in the framework of translational research such as tobacco control research. This study uses tools and algorithms in Deep Learning and NLP to identify race/ethnicity and gender disparities in tobacco research, and make timely recommendations to promote health equity. **Methods:** We build the DeepTobaccoWorks tool to automatically extract data from peer-reviewed tobacco research journals. We apply NLP methods to identify, extract, and summarize data on study populations, end outcomes, and policy (intervention) impacts from texts as well as non-textual tables and figures in published tobacco control research papers. **Results:** This study contributes to the identification of disparities in tobacco research, with respect to race/ethnicity and gender. We apply Deep Learning and NLP techniques to identify study populations in tobacco research literature and assess whether the published studies include vulnerable populations such as racial minorities and women and whether they address tobacco use disparities. The tools and algorithms that we identify are broadly reusable and highly scalable for public health research. **Conclusion:** We identify race/ethnicity and gender disparities in tobacco research, and present the application of NLP analysis using the DeepTobaccoWorks tool we built.

PS2-28

A LATENT VARIABLE APPROACH TO SEXUAL ORIENTATION DISCORDANCE AND ITS ASSOCIATION TO DISCRIMINATION AND TOBACCO USE DISORDER SEVERITY

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Significance: Studies find that individuals who self-identify as sexual minorities are at higher risk for tobacco use. Drawing on van Anders's *Theory of Sexual Configuration,* we examined whether Sexual Orientation Discordance (SOD) and Sexual Orientation Discrimination (SODIS) were associated with the severity of tobacco use disorder (TUD). **Methods:** The 2012-2013 National Epidemiologic Survey on Alcohol and Related Conditions-III (NESARC-III) data were analyzed using a sample of adults who sexually identified as gay/lesbian, bisexual or heterosexual with same-sex attraction and/or same-sex sexual behavior (n=3,494). Two latent constructs were developed: (1) SOD as determined with three manifest variables reflecting misalignment among identity, attraction (to opposite-sex or same-sex), and behavior (with opposite-sex or same-sex partner); and (2) SODIS as determined by responses on the *Experiences with Discrimination* scale. The outcome was TUD severity as determined by 11 symptoms consistent with the *Diagnostic and Statistical Manual of Mental Disorders-5.* Structural equation modeling assessed SOD and SODIS on the observed severity of TUD. **Results:** Gay/lesbian and bisexual SOD was associated with less SODIS (β = -.342, p<.001; β = -.102, p<.05, respectively). Gay/lesbian SOD was associated with greater severity of TUD (β = .139, p<.001); this was not true for bisexuals (β = .053, p=.247). The effect of gay/lesbian SOD on severity of TUD was partially mediated by SODIS (indirect effect, β = -.030, p<.01; total effect [SOD], β = .109, p<.01). Discordant heterosexuals were both less likely to report SODIS (β = -.119, p<.001) and they had lower TUD severity (β = -.087, p<.05) when compared to self-identified sexual minorities. **Conclusion:** A social environment that reduces discrimination may decrease risk of TUD severity because SOD was associated with greater TUD severity for some sexual minorities. However, for others, SOD was associated with less discrimination and lower TUD severity. This study contributes to the theoretical literature on sexual identity and SOD, and to the growing research corpus demonstrating risk differences among sexual minority sub-

groups. **Funding:** This work was supported by grants from the National Institute on Drug Abuse (R01DA044157, R01DA043696, R21DA051388) and the National Cancer Institute at the National Institutes of Health (R01CA212517). The National Institutes of Health and Food and Drug Administration Center for Tobacco Products (U54CA229974).

PS2-29

CIGARETTE PACK PRICE AND ITS WITHIN-PERSON ASSOCIATION WITH SMOKING INITIATION, SMOKING PROGRESSION, AND DISPARITIES AMONG YOUNG ADULTS

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Background: There is a dearth of research on within-person relationships between tobacco price and cigarette smoking initiation and progression in young adulthood. This project examines the within-person association between cigarette pack price and smoking initiation and progression between age 18 and 21/22, focusing on differences across subgroups. **Methods**: Data came from the longitudinal Monitoring the Future (MTF) project. MTF examines drug use behaviors with nationally representative samples of 12th graders annually. Subsamples of 12th graders are annually selected and followed longitudinally. Among 12th graders from baseline years 2000-2014, we examined past 30-day cigarette smoking initiation among baseline never smokers (N=15,280) and progression to daily smoking among youth who were not daily smokers at baseline (N=26,998). We used hierarchical logistic regression and interaction terms to assess differences across sex, race/ethnicity, and parental education. **Results**: The within-person relationship between pack price and smoking indicated that a one-dollar increase in pack price corresponded with an 72% decrease in the odds of initiation (AOR=0.28, 95% CI=0.18, 0.44) and 70% decrease in the odds of progression to daily smoking (AOR=0.30, 95% CI=0.21, 0.44). There were no statistically significant interactions between price and demographics, making it difficult to disentangle differences across subgroups. **Conclusions**: There is a strong, within-person relationship between cigarette prices and smoking initiation and progression among young adults: higher prices are associated with decreased odds of both initiation and progression. Cigarette taxation can prevent smoking initiation and progression, but it is less clear how prices impact disparities in smoking experienced by vulnerable young adults. We could not draw definitive conclusions about the impact of cigarette prices on tobacco-related disparities. Tobacco taxes should be increased on a regular basis to ensure young adults experience within-person increases in prices, and complementary programs geared toward reducing tobacco-related disparities among young adults should be promoted.

PS2-30

SEXUAL AND GENDER MINORITY TOBACCO CESSATION AND EMPOWERMENT THEORY

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SIGNIFICANCE: Sexual and Gender Minority (SGM) individuals are nearly twice as likely to use tobacco as their non-SGM peers. SGM people report lower cessation intervention satisfaction, participation barriers, and prefer SGM-tailored interventions. Empowerment Theory (ET) focuses on how people gain control over their lives, democratic participation in community, and a critical understanding of their environment (e.g., targeted tobacco marketing). We evaluated ET's influence on SGM tobacco cessation intervention design via a scoping review of its use as a theoretical intervention foundation. **METHODS:** We conducted a literature review (2009-2021; Scopus, Ovid, PubMed) to identify: 1) Theoretical frameworks, intervention components, and outcomes of existing SGM-tailored tobacco cessation interventions, excluding articles that omitted intervention components or outcomes; 2) Health behavior change interventions of any kind, for any population, that incorporated ET, excluding articles that did not name an underpinning theoretical framework. **RESULTS:** We found 162 publications on SGM tobacco interventions and included 23. Most intervention delivery modes were counseling (e.g. 7 group, 3 individual) and informational campaigns (e.g. social media, social gatherings; 7 total). The Transtheoretical Model was the most cited (6) theory; 6 cited no theory. None on SGM tobacco cessation cited ET. We found 4 on other types of ET-informed health behavior change interventions. One targeted low-income, minority youth tobacco prevention. The

rest targeted risky sexual behavior for young Black MSM, depression for Asian American women with interpersonal violence history, and adult diabetes-related behaviors. Their ET-informed components promoted health education, identity pride, sense of autonomy and control, and community engagement. **CONCLUSION**: Empowerment theory would be a new approach to tailoring SGM tobacco cessation interventions. A focus on empowerment among marginalized groups, like SGM, may facilitate tobacco cessation by building self-efficacy and social support for behavior change. For example, participation in SGM advocacy work could be paired with cessation best practices.

PS2-31

REASONS FOR INITIATING AND REGULAR USE OF HEATED TOBACCO PRODUCTS IN REPUBLIC OF KOREA: FINDINGS FROM THE 2020 ITC KOREA SURVEY

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Significance: Heated tobacco products (HTPs) were introduced in the Republic of Korea in May 2017. Since then, HTP sales have increased rapidly, accounting for >10% of the total tobacco market in 2020. Although Korea is the world's second largest HTP market, little is known about the reasons why current and former Korean smokers started and regularly use HTPs. **Methods:** We analyzed data from the 2020 ITC Korea Survey, adults aged 19+, consisting of 1815 current ≥weekly HTP users, of whom 1767 were also smoking cigarettes ≥weekly; 48 HTP users were former smokers. Multivariable regression analyses were conducted on weighted data to examine the reasons for initiating and regularly using HTPs. HTP users who also smoked were asked if they used HTPs to stop smoking cigarettes, reduce cigarette smoking, or not having to give up smoking cigarettes. **Results:** The most common reasons for initiating HTPs were curiosity (58.9%), family/friend using HTPs (45.5%), and attractive technology (35.9%) and devices (33.6%). The most common reasons for regularly using HTPs were less smelly than cigarettes (71.3%), less harmful than cigarettes (48.6%), stress reduction (47.4%), enjoyment (44.4%), more socially acceptable than cigarettes (41.8%), less harmful than cigarettes to others (41.7%). Among smokers, 38.2% used HTPs to reduce smoking, 35.3% to help quit smoking, 25.3 % to help not having to give up smoking. Former smokers were more likely than current smokers to use HTPs because of less smelly (p<0.01), but they were less likely to initiate HTP use because of the attractiveness of the device (p<0.01) or packaging (p<0.05). **Conclusion:** Findings from this study were similar to the common reasons reported in the ITC Japan Survey except for less smelly than cigarette and stress reduction. Although 1/3 of smokers used HTPs to help them quit smoking, 1/4 of smokers used HTPs to not having to give up smoking. Consistent with how Japanese smokers were concurrently using HTPs, if substantial number of Korean smokers are using HTPs to complement rather than to quit smoking, then the harm reduction potential of HTPs is diminished.

PS2-32

BASELINE CHARACTERISTICS OF CITIES IN CALIFORNIA WITH FLAVORED TOBACCO SALES RESTRICTIONS

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Significance- Over 80% of youth tobacco users currently use flavored tobacco. Flavored tobacco sales restrictions (FTSRs) are implemented to reduce youth's access to flavored tobacco products. In 2020, California passed a state FTSR, but it's on hold until the 2022 general election for a referendum vote. This study will compare the baseline characteristics of cities in California with and without a FTSR. **Methods -** Cities in California (n=482) were classified as having a FTSR passed before March 2021 using data from the Truth Initiative, Campaign for Tobacco-free Kids, and Public Health Law Center. Because most FTSRs were implemented during or after 2019, we included data on city (or county) level covariates prior to 2019, including demographics and tobacco metrics. The Wilcoxon-Mann-Whitney test (continuous variables) and chi-square test (categorical variables) were used to examine differences in characteristics between cities

with and without a FTSR. To examine which predictors were associated with FTSRs, we calculated adjusted odds ratios using logistic regression models. **Results -** Ninety California cities had a FTSR, covering 18.7% of the population. Most (62) of these FTSRs prohibited all flavors from all tobacco products, but 23 allowed menthol and 5 allowed flavored products to be sold at some locations. Compared with cities without a FTSR, cities with a policy had a higher median income, high-school e-cigarette use prevalence, percent that voted democratic in 2016, percent Asian, and median American Lung Association Overall Tobacco Control grade. These cities also had a lower percent rural, percent Hispanic, percent of stores selling flavored tobacco products, and adult smoking prevalence. Adjusted for covariates, the strongest predictor of having a FTSR was the American Lung Association Overall Tobacco Control grade (OR=1.40, 95% CI: 1.19, 1.64). **Conclusion -** More than 80% of the California population was not covered by a FTSR. These policies were less likely to cover low income and Hispanic populations, and more likely to be implemented in cities with strong tobacco control policies. A state level policy would cover all cities in California.

PS2-33

PUBLIC OPINION TOWARD POLICY RESTRICTIONS TO LIMIT TOBACCO PRODUCT PLACEMENT AND ADVERTISING AT POINT-OF-SALE AND ON SOCIAL MEDIA

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BACKGROUND: The Family Smoking Prevention and Tobacco Control Act granted the Food and Drug Administration authority to regulate tobacco advertising and promotion, including at the retail level, and preserved state, tribal, and local tobacco advertising and promotion authorities. Public health experts have proposed prohibiting point-of-sale tobacco advertisements and product displays, among other tobacco advertising restrictions. METHODS: We examined the prevalence and correlates of public support, opposition, and neutrality toward proposed tobacco product placement and advertising restrictions at point-of-sale and on social media utilizing the National Cancer Institute's 2020 Health Information National Trends Survey (HINTS) (N=3865), a cross-sectional, probability-based postal survey of U.S. addresses conducted from Feb 24, 2020 to June 15, 2020 (Bethesda, MD). Frequencies and unadjusted, weighted proportions were calculated for support, neutrality, and opposition toward the three policies under study, and weighted, adjusted multivariable logistic regression was employed to examine predictors of neutrality and opposition. Tests of significance were conducted at the p<0.05 level. RESULTS: Sixty-two percent of U.S. adults supported a policy prohibiting tobacco product advertising on social media; 55% supported a policy restricting the location of tobacco product advertising at point-of-sale; and nearly 50% supported a policy to keep tobacco products out of view at the checkout counter. Neutrality and opposition varied by sociodemographic characteristics including age, sex, education, rurality, and presence of children in the household. CONCLUSION: Understanding public opinion toward tobacco product placement and advertising restrictions may inform policy planning and implementation.

PS2-34

PUBLIC SUPPORT FOR CIGARETTE PACK PICTORIAL HEALTH WARNINGS IN THE UNITED STATES

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Objectives: To examine population-level characteristics of support, neutrality, and opposition to cigarette pack warnings that use text and images to portray the negative health effects of smoking. Methods: We used nationally representative data from the National Cancer Institute's 2020 Health Information National Trends Survey (n=3865). Frequencies and weighted proportions were calculated for neutrality or opposition to and support for pictorial warnings across sociodemographics and other predictors. Weighted, multivariable logistic regression examined predictors of being neutral or opposed versus supporting pictorial warnings. Results: In 2020, an estimated 68.3% of US adults supported pictorial warnings, 8.9% opposed, and 20.4% neither supported nor opposed. Current smokers had almost twice the odds of being neutral or opposed to pictorial warnings as never smokers. Older adults and those living with children under 18 in their household were less likely to be neutral or opposed than other groups. Conclusions: In advance of the Food and Drug Administration's implementation of pictorial

warnings on cigarette packages, over two-thirds of American adults support this policy. Dissemination of information about the effectiveness of pictorial warnings may further strengthen public support.

PS2-35

TRENDS IN FLAVORED ELECTRONIC CIGARETTE USE AMONG NEW YORK STATE YOUTH, 2020

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Significance: Reducing youth e-cigarette (e-cig) use is a public health priority in New York State (NYS). In May 2020, a statewide restriction on flavored e-cigs, except tobacco flavor, was passed in NYS, and during this time, the US was experiencing the COVID-19 pandemic. The purpose of this study is to examine changes in nicotine product use behavior and perceptions among youth before and after the statewide vaping flavor restriction policy. **Methods:** NYS data were analyzed cross-sectionally from Waves 3.5 (Feb 2020; N=955) and 4 (Aug 2020; N=946) of the US ITC Youth Tobacco and Vaping Survey. Online surveys were conducted among youth 16-19 years who were recruited from US Nielsen consumer panels. Descriptive statistics were used to describe changes in nicotine product use behavior and perceptions and the effects of COVID-19. **Results:** In Aug 2020, after the vaping flavor restriction policy,15% of NYS youth reported using e-cigs in the past 30-days compared with 20% in Feb 2020 (p=0.0198), shortly before the restriction. Most past 30-day youth vapers in NYS reported using any non-tobacco flavored e-cig, with fruit being the most popular at both waves. Further, past 30-day use of any non-tobacco flavored e-cigs (vs. exclusive tobacco flavor) was trending downward over 6-months (99-97%), while past 30-day use of tobacco flavor, either alone or in combination with other flavors, was trending upwards (10-15%). About half of the youth surveyed in Aug 2020 reported that COVID-19 did not impact their vaping behavior (48%) or access to e-cigs (52%); however, 36% reported that they were vaping less, intended to quit or quit vaping, and 41% found it difficult to access their e-cig products. **Conclusions:** Over a 6-month period in 2020, it appears that the youth vaping prevalence was significantly lower, but the vast majority of them continue to vape flavors that were restricted due to the policy. Therefore, it is important to continue monitoring user behavior and perception changes and compliance with the restriction.

PS2-36

DEVELOPMENT AND APPLICATION OF A FLAVORED TOBACCO POLICY COMPREHENSIVENESS CLASSIFICATION SCHEME

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Significance: Research demonstrates that the comprehensiveness of tobacco control policies can predict policy impact. State and local governments have increasingly enacted flavored tobacco policies (FTPs) to restrict the sale of products popular among youth; however, little is known about the comprehensiveness of FTPs. This study describes the development of an approach to characterize the comprehensiveness of US FTPs. Design: We coded US state and local FTPs enacted June 2007-March 2021 for retailer, product, and flavor inclusions. Guided by FTP literature, legal resources, and consultation with experts, we developed a six-category classification scheme - level 6 being the most comprehensive and level 1 being the least - to characterize their comprehensiveness. We analyzed FTP comprehensiveness using descriptive statistics and population coverage estimates. Results: As of March 31, 2021, seven states and 327 locales enacted FTPs. State FTPs apply to 14.4% of the US population; 11.4% of the population is covered by level 2 (n=5, 71.4%) and 1.0% by level 1 FTPs (n=1, 14.3%), and no state FTPs are fully comprehensive (level 6: n=0, 0%). Most state FTPs fall in level 2 because most exempt menthol and/or apply to only one product. Local FTPs cover 9.4% of the population and are more comprehensive than state FTPs; 2.1% of the US is covered by level 6 (n=85, 26.0%), 3.6% by level 2 (n=37, 11.3%), and 1.4% by level 1 FTPs (n=160, 48.9%). Local FTPs are increasingly comprehensive over time, as recent policies are more likely to apply to adult-only retailers, multiple products, and menthol products. Overall, state and local FTP comprehensiveness is most limited by exemptions for menthol flavor (state: n=4, 57.1%; local: n=165, 50.5%), menthol cigarettes (state: n=8, 85.7%; local: n=133, 40.7%), and adult-only retailers (state: n=1, 14.3%; local: n=133, 40.7%). Conclusion: Little of the US population is covered by the most comprehensive FTPs;

however, increased FTP adoption and comprehensiveness over time is encouraging. Current and future FTPs may be strengthened by including all tobacco products and menthol products, and by avoiding exemptions for certain retailers.

PS2-37

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Emily Donovan. Schroeder Institute at Truth Initiative, Washington, DC, USA.

Significance: Research demonstrates that the comprehensiveness of tobacco control policies can predict policy impact. State and local governments have increasingly enacted flavored tobacco policies (FTPs) to restrict the sale of products popular among youth; however, little is known about the comprehensiveness of FTPs. This study describes the development of an approach to characterize the comprehensiveness of US FTPs. Design: We coded US state and local FTPs enacted June 2007-March 2021 for retailer, product, and flavor inclusions. Guided by FTP literature, legal resources, and consultation with experts, we developed a six-category classification scheme - level 6 being the most comprehensive and level 1 being the least - to characterize their comprehensiveness. We analyzed FTP comprehensiveness using descriptive statistics and population coverage estimates. Results: As of March 31, 2021, seven states and 327 locales enacted FTPs. State FTPs apply to 14.4% of the US population; 11.4% of the population is covered by level 2 (n=5, 71.4%) and 1.0% by level 1 FTPs (n=1, 14.3%), and no state FTPs are fully comprehensive (level 6: n=0, 0%). Most state FTPs fall in level 2 because most exempt menthol and/or apply to only one product. Local FTPs cover 9.4% of the population and are more comprehensive than state FTPs; 2.1% of the US is covered by level 6 (n=85, 26.0%), 3.6% by level 2 (n=37, 11.3%), and 1.4% by level 1 FTPs (n=160, 48.9%). Local FTPs are increasingly comprehensive over time, as recent policies are more likely to apply to adult-only retailers, multiple products, and menthol products. Overall, state and local FTP comprehensiveness is most limited by exemptions for menthol flavor (state: n=4, 57.1%; local: n=165, 50.5%), menthol cigarettes (state: n=8, 85.7%; local: n=133, 40.7%), and adult-only retailers (state: n=1, 14.3%; local: n=133, 40.7%). Conclusion: Little of the US population is covered by the most comprehensive FTPs; however, increased FTP adoption and comprehensiveness over time is encouraging. Current and future FTPs may be strengthened by including all tobacco products and menthol products, and by avoiding exemptions for certain retailers.

PS2-38

IMPACT OF EXPOSURE TO TOBACCO RETAIL OUTLET ENDS MARKETING ON ENDS INITIATION: DO DEPRESSIVE SYMPTOMS EXACERBATE RISK?

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Significance: ENDS (electronic nicotine delivery systems) marketing at tobacco retail outlets (TRO) is linked with increased risk for ENDS use. Depressive symptoms are also associated with ENDS use. Those with greater depressive symptoms who are exposed to ENDS TRO marketing may be particularly at risk for ENDS use. Therefore, this study examined if the relationship between ENDS TRO marketing exposure and current ENDS use initiation is exacerbated/moderated by depressive symptoms among college students. **Methods**: Participants were 1637 students (68.3% female; 31.7% white; m age=20.2 [SD=2.10] at wave 1) from 24 2- and 4-year colleges in Texas participating in an nine-wave longitudinal study (2014-2019) who had not initiated ENDS use through wave 2 and had completed surveys from waves 1, 2, and 9. Current (past 30-day) ENDS use initiation after wave 2 was measured by classifying those who reported never current ENDS use at wave 9 as non-initiators; all others were considered initiators (11.5% of sample). ENDS TRO marketing exposure at wave 2 was measured with an index of objective counts of ENDS marketing at TROs within a mile of each college multiplied by each student's weekly store visit frequency and dichotomized using a median split. Generalized mixed-effects logistic regression analyses, with colleges as the cluster variable, controlling for baseline sex, age, race/ethnicity, any other tobacco product use at wave 1 and college type (four vs two-year), were used to examine the association between ENDS marketing and subsequent current ENDS use initiation with depressive symptoms as a moderator. **Results**: The interaction between ENDS POS marketing and depressive symptoms was not significant (p=0.45). Main effects showed that ENDS POS marketing did predict current ENDS use initiation (OR=3.49, 95% CI=[2.49, 4.90]) while depressive symptoms was not significant (OR=1.02, 95% CI=[0.99, 1.06]). **Conclusions**: Exposure to ENDS TRO marketing puts young adults

at risk for ENDS initiation. However, depressive symptoms do not appear to exacerbate ENDS marketing exposure nor do they directly impact current ENDS initiation, after accounting for other important covariates.

PS2-39

RESPONSE TO RESTRICTIONS ON ELECTRONIC NICOTINE DELIVERY SYSTEMS: A SYSTEMATIC REVIEW

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Background: In 2018, the U.S. Food and Drug Administration (FDA) published an advanced notice of proposed rule-making for restrictions on flavors in electronic nicotine delivery systems (ENDS) along with a ban of menthol in cigarettes and all flavors in cigars. There remains a limited understanding of the effects of such policies. To inform FDA's regulatory process, we synthesized the current literature on flavor bans that include, but are not limited to flavored ENDS.**Methods:** We searched the international literature using PubMed and Scopus (to July 24, 2021). We retrieved articles relevant to the impacts of an implemented or hypothetical ENDS flavor ban. We also included studies of flavor bans that included but were not limited to flavored ENDS, as well as those that solicited public support for flavored ENDS bans. **Results:** The search identified 20 relevant studies. Ten considered the effects of implemented flavor bans, while the remainder considered hypothetical flavored ENDS. Eight studies considered support for regulation, three reported behavioural outcomes, while 10 evaluated compliance, with one study considering both behaviour and compliance. ENDS flavor bans were frequently found to be among the least supported tobacco control policy proposed regardless of tobacco use status. However, support appears to be increasing in recent years. An implemented flavor ban in Finland was found to reduce ENDS use among both men and women. Two surveys on the effects of hypothetical bans suggest that restricting flavors would make ENDS use less enjoyable, however, neither asked about cessation. Four compliance studies found persistent and increasing ENDS use in countries that restricted the sale of nicotine-containing ENDS. The remaining six studies on compliance looked at the availability of ENDS in retail and online environments finding mixed results depending on the jurisdiction.**Conclusion:** Our findings suggest that support for a flavor ban for ENDS has been increasing, but that strong enforcement measures to ensure compliance both at brick-and-mortar and internet retailers will be necessary. Much more research on the behavioural effects of restrictions is needed.

PS2-40

E-CIGS EXHIBIT LOWER TOXICITY COMPARED TO CIGARETTES: THE REPLICA STUDY GROUP EXPERIENCE

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Background: Electronic nicotine delivery systems (ENDS) can reduce the health risks associated with chronic smoke exposure, and their potential benefits are the subject of intense scientific debate. Creating an international research group, the Replica Study Group, we independently replicated three relevant studies from the tobacco industry on the cytotoxic and inflammatory effects of cigarette smoke and ENDS aerosol, with a multicentric study. Our primary goal was to establish the reliability of the results and

the robustness of the conclusions.**Methods**: In order to assess cytotoxicity of smoke and aerosol, we exposed human bronchial epithelial cell (H292) to cigarette smoke and to ENDS aerosol at air-liquid interface (ALI). Moreover, we aimed to assess different inflammatory and remodeling mediators release (IL-6, IL-8 and MMP-1) from cells exposed to whole smoke (WS) and to smoke deprived of total particulate matter (vapor phase; VP).**Results**: We were able to replicate the results obtained in the original studies on cytotoxicity confirming that almost 80% of the cytotoxic effect of smoke is due to the vapor phase of smoke. Moreover, our results substantiated the significantly reduced cytotoxic effects of ENDS aerosol in respect to cigarette smoke. However, our data were notably different in terms of inflammatory and remodeling activity triggered by smoke, evidencing a triggered effect with a few puffs, rather than with an increasing number of puffs, as reported by the original work.**Conclusion**: Taken all together, the data obtained independently in different laboratories clearly confirm the reduced toxicity of ENDS products (both e-cigs and THPs) compared to smoke, thus providing a valuable tool to the harm reduction strategies in smokers. Otherwise, we were not able to replicate and confirm the results on inflammatory and remodeling mediators released from H292 cells exposed to smoke (WS and VP). This could be due to the lack of normalization of the quantity of cytokines released, with the number of viable cells, in the original paper, since the production of cytokines itself requires the metabolic capability of cells.

PS2-41

EFFECT OF UNANI FORMULATION HABB-E-JAWAHAR ON SERUM CORTICOSTERONE LEVELS IN NICOTINE DEPENDENT RATS

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Background: Habb-e-Jawahar (HJ), a classical Unani pharmacopeial drug is recommended as a nervine and cardiac tonic drug. The present study evaluated the effect of Unani compound drug Habb-e-Jawahar on plasma corticosterone levels in nicotine dependent rats.Methods: Male adult Wistar albino rats (175-250gms) were made physically dependent by subcutaneous infusion of nicotine (9.0mg/kg/day) via a 7 day osmotic pump, whereas control rats received saline via osmotic pumps. Test doses of Unani Formulation Habb-e-Jawahar (15.9, 22.5, 38.4 mg/kg) were given orally daily for 7 days. On 7th day of infusion of pumps, nicotine withdrawal, were precipitated with subcutaneous injection of nicotine antagonist mecamylamine (1 mg/kg), 2 hours after the test dose. Somatic signs of withdrawal were scored for 15 mins by using the global Gellert-Holtzman (GH) rating scale. Drug Bupropion was used as positive control. Thereafter, blood was withdrawn from heart and serum corticosterone were assessed by ELISA. Results: One way ANOVA revealed increase in serum corticosterone levels during withdrawal in mecamylamine precipitated nicotine dependent rats. The post hoc test confirmed the significant increase in serum corticosterone levels in mecamylamine precipitated nicotine treated rats compared with saline and Bupropion treated rats. The rats treated with three different oral doses of HJ (15.9, 22.5 and 38.4 mg/kg) significantly suppressed the elevated corticosterone levels in mecamylamine challenged nicotine treated rats [F (8,45)= 24.112, p < 0.001] Conclusion: These results provide evidence for a role of corticosterone underlying nicotine dependence, suggesting Unani formulation Habb-e-Jawahar might be an potential therapeutic agent to alleviate the symptoms nicotine abstinence and can be used as a complementary therapy for smoking cessation (Supported by, Ministry of AYUSH, Govt. of India, New Delhi)

PS2-42

HOW TO SUB-OHM? ELECTRONIC CIGARETTE MANUFACTURER RECOMMENDATIONS FOR POWER SETTING OFTEN EXCEED THE THRESHOLD FOR FILM BOILING AND HIGH TOXICANT EMISSIONS

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Sub-ohm vaping refers to the practice of using electronic nicotine delivery systems (ENDS) whose heating coil resistance is less than 1 Ohm. These large, relatively high-power devices were used originally by ENDS aficionados with knowledge of coil building. Today, sub-ohm devices are widely available over the counter and models differ by geometry, materials of construction, and user input options (e.g., power setting), all of which influence toxicant emissions. Manufacturers generally provide users with recommended power and/or temperature ranges, but it is unclear how these ranges

are obtained and how they relate to toxicant emissions. In this study, we examined the implications to carbonyl compound emissions of following manufacturer power recommendations. Carbonyl compounds (CCs) are potent pulmonary toxicants. We identified, acquired, and reverse engineered 10 popular sub-Ohm devices. These devices were selected based on online ranking lists. We machine-generated aerosols at the minimum, medium, and maximum power levels recommended by the manufacturer, in addition to a 50W power condition across devices for comparison. The machine was programmed to execute a series of puffing cycles consisting of 4sec puff duration, 8L/min flow rate, and 10sec interpuff interval. All devices were filled with a 30/70 PG/VG and 3mg/mL freebase nicotine liquid. We found that across devices, the maximum manufacturer recommended power was strongly correlated to the heating coil surface area, with a mean of 600kW/m^2 (power per unit area). This value is well above the 400kW/m^2 film boiling threshold for high CC emissions that we identified previously. ECIG manufacturers of sub-Ohm devices routinely recommend power settings that likely expose users to highly elevated concentrations of pulmonary toxicants.

PS2-43

LEVELS OF SUGARS IN TOBACCO OF POPULAR U.S. CIGARETTES: VARIATIONS ACROSS BRANDS AND OVER TIME

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Background: Sugars in tobacco filler may contribute to the harmful properties of cigarettes by enhancing smoke toxicity, palatability and appeal. In this study, we analyzed sugar content in the tobacco filler of top 50 cigarette brands/sub-types that were regularly used by smokers in the Wave 1 of the Population Assessment of Tobacco and Health (PATH) Study. These data will be used in our future analyses of the relationship between sugar content in tobacco filler and biomarkers of exposure and effect in smokers. **Methods**: The cigarettes were purchased at two time-points: at the time of Wave 1 of PATH Study (batch 1) and in the summer of 2021 (batch 2). Fructose, glucose, and sucrose content in tobacco filler of these cigarettes was analyzed by liquid chromatography-tandem mass spectrometry using BEH Amide column. **Results**: Sucrose levels varied across the brands/sub-types, ranging 0.7-33 mg/g tobacco in batch 1 and 1-45 mg/g tobacco in batch 2. There was a reduction in the levels of fructose and glucose in batch 2 across all brands: the sum of the two sugars averaged 43(±12) and 32(±9) mg/g tobacco in batch 1 and 2, respectively. Sucrose levels changed in an inconsistent manner between the batches, but negatively correlated with the levels of fructose and glucose in both. Overall, there were distinct patterns in the relative levels of individual sugars across tested brands. The sum of fructose glucose in both batches was the highest, and sucrose was the lowest in American Spirit cigarettes. **Conclusions**: Sugar levels vary substantially across U.S. cigarette brands. The temporal variations in glucose and fructose are likely to reflect differences in tobacco harvesting period, while the highly variable levels of sucrose are representative of sugars added to tobacco blend during cigarette manufacturing. If sugar levels in tobacco filler are found to affect the toxicity and abuse liability of cigarettes, the public health impact of regulating this group of constituents should be explored.

PS2-44

THE REINFORCING EFFICACY OF NICOTINE IN ADOLESCENT SPONTANEOUSLY HYPERTENSIVE RATS, AN ANIMAL MODEL OF ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD)

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ADHD is an independent risk factor for tobacco abuse. Individuals with ADHD start smoking at an earlier age, are more likely to progress to daily smoking, smoke more cigarettes per day, and become more nicotine dependent than individuals without ADHD. In addition, adult smokers with ADHD work harder for cigarette puffs under a progressive-ratio (PR) schedule than those without ADHD, suggesting that a higher reinforcing efficacy of cigarette smoke might mediate the relationship between ADHD and tobacco abuse. However, it is unclear whether the reinforcing efficacy of nicotine per se is greater among individuals with ADHD. The purpose of the present study was to examine this issue using an animal model of ADHD, the spontaneously hypertensive rat (SHR) strain. Adolescent SHR and Wistar (control) rats were trained to respond on a lever under an FR 1 (week 1) and FR 2 (week 2) schedule to self-administer a 30, 4 or 0 (saline) µg/kg dose of nicotine. Demand elasticity was also evaluated at the 30 µg/kg

dose through an FR escalation procedure (e.g., FR 3, 6, 9, etc.). At the 30 µg/kg dose, Wistar rats had, on average, higher response rates, a better active to inactive lever discrimination, and a greater proportion of rats acquiring self-administration compared to SHR rats. However, no strain difference in demand elasticity (i.e., reinforcing efficacy) was observed at that dose. In addition, no strain difference in acquisition measures were observed at the 4 µg/kg dose. These findings suggest that the risk of tobacco abuse in adolescents with ADHD may not be attributable to a greater reinforcing efficacy of nicotine, and that other aspects of tobacco smoking (e.g., non-nicotine constituents, sensory factors) may play a more important role in this subgroup. These findings also imply that a nicotine standard to reduce initiation of tobacco use among adolescents in the general population may also be effective among those with ADHD.

PS2-45

RELATIONSHIP BETWEEN ORAL MICROBIOME AND TOBACCO-ASSOSIATED ORAL CELL DNA DAMAGE IN SMOKERS WITH KNOWN DIFFERENCES IN HEALTH RISK

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Significance: Smoking alters the composition and function of the oral microbiome, which in turn might have an impact on immuno-inflammatory responses, metabolism of tobacco smoke carcinogens and overall health status. In our previous study, HPB-releasing DNA adducts (DNA damage derived from tobacco-specific nitrosamines) and mitochondrial DNA content (mtDNA, oxidative stress-derived DNA damage) were higher in oral cells of African American (AA, n=74) than White (WH, n=72) smokers. In this study, we investigated the potential association of the oral microbiome with the previously measured macromolecular alterations.**Methods**: 16S rRNA gene sequencing (V4 region) was performed on the remaining oral cell DNA, short amplicon data were processed using QIIME to characterize taxonomic and compositional diversity, and metagenomic (functional) content was predicted using PICRUSt. **Results**: Alpha-diversity metrics assessed by observed richness, Chao1 and Shannon indexes, were significantly higher in AA when compared to WH smokers (Wilcoxon rank-sum tests, q-value= 0.004, q-value= 0.004, q-value=0.03 respectively). Differences remained significant after controlling for age, sex, smoking intensity (CPD and TNE) and alcohol use. Beta diversity analyses showed higher diversity in AA when compared to WH based on Unifrac distances (unweighted, r^2=0.01, p-value=0.005, and weighted, r^2=0.02 p-value=0.007) but not for Bray-Curtis distances. Functional analysis from predicted metagenome revealed that bacterial taxa enriched in AA had a predicted capacity for antibiotic biosynthesis and metabolism of toluene and cyclohexane (chemicals present in tobacco smoke). There was no association between alpha diversity and mtDNA content. However, Shannon diversity was negatively associated with levels of HPB-releasing DNA adducts, (p=0.01, adjusted for race, age, sex, smoking intensity, and alcohol use).**Conclusion**: Together, these findings suggest that the complex interaction between the oral microbiome and exposures from cigarette smoke could potentially contribute to ethnic differences in cancer risk due to smoking. Microbially mediated mechanisms of cellular and macromolecular responses to harmful chemical exposures from tobacco should be further investigated.

PS2-46

INCREASING THE ACCESSIBILITY OF EVIDENCE-BASED TREATMENT BY TRANSITIONING THE TOBACCO TREATMENT SPECIALIST TRAINING TO REMOTE DELIVERY

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Significance Tobacco Treatment Specialists (TTS's) are highly skilled professionals who provide evidence-based treatment in multiple modalities with different populations. As an accredited program by the Council for Tobacco Treatment Training Programs, MD Anderson's training program ensures that its training exceeds established training

standards. Due to the COVID-19 pandemic, in June 2020 the course was transitioned to be provided remotely. As a result, the program experienced an increase in providers attending the course. Preliminary results indicate that key outcome improvements were similar among providers who attended remote trainings compared to in-person trainings. **Methods** Trainees completed three surveys, which included items on demographics, work setting and years in profession; pre- and post-training tobacco treatment knowledge; and satisfaction measures. Analyses included descriptive statistics and chi-square tests of significance to assess statistically significant differences in pre-test and TTS exam scores. **Results** For in-person and remote trainings, there were statistically significant improvements between pre-test and TTS exam scores respectively on 90% and 100% of items evaluated. Most trainees worked in hospitals or medical centers (52.6%). Two-thirds (69.4%) of trainees had less than 1 year of tobacco treatment experience. Pre-pandemic trainings from June 2018 to October 2019, 20.5% participants joined from outside of Texas. During the virtual trainings from August 2020 to July 2021, 42.8% participants joined from outside of Texas. This indicates a two-fold increase in providers located outside of Texas. Trainees highly endorsed remote training as an alternative to in person training and overall evaluation of the trainings remain high. **Conclusion** There were more statistically significant improvements in TTS exam knowledge upon transitioning the training from in-person to remote delivery. The transition attracted more health care providers from across the country. Most trainees had little experience treating tobacco use prior to the training. We assume many were seeking to develop new tobacco treatment services for their respective organizations and communities. By increasing access and reducing the geographical barrier, we expect to improve the quality of tobacco treatment by having more trained and highly skilled tobacco treatment providers.

PS2-47

EVALUATION OF NICOTINE DEPENDENCE AMONG SMOKERS USING ELECTRONIC CIGARETTES TO REDUCE CIGARETTE SMOKING

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Background: How nicotine dependence will be affected when current smokers initiate electronic cigarette (e-cig) use to reduce cigarette smoking is unknown. This study evaluated self-reported cigarette, e-cig, and total nicotine dependence over 6 months among smokers attempting to reduce cigarette consumption by replacing with e-cigs. **Methods:** Current adult cigarette smokers were randomized to one of four conditions (36mg/ml e-cig, 8mg/ml e-cig, 0mg/ml e-cig, or cigarette-substitute) and instructed to reduce their cigarette smoking by at least 75% at 1 month. Previous work indicated that the 36 mg/ml e-cig could deliver cigarette-like nicotine. The Penn State Nicotine Dependence Index (PSNDI) was utilized to measure dependence on cigarettes (PSCDI) and e-cigs (PSECDI), independently and in total (PSCDI + PSECDI), at baseline (PSCDI only), and 1, 3, and 6 months after initiating e-cig use. Linear mixed effects models were conducted for each outcome and included interaction terms between visit number and group. Last observation carried forward was utilized to address missingness. **Results:** Participants (n=520) were 41.2% male, 67.3% white, and 48.0 years old (median; IQR= [37.0, 56.0]). At baseline, the median number of cigarettes smoked per day was 17.3 (IQR = [13.3, 21.6]) and the mean PSCDI score was 13.4 (SD=3.0) (n=495), with no significant differences between conditions. Those randomized to the 36mg/ml e-cig group had significantly lower cigarette dependence at all follow-ups, compared with the cigarette-substitute condition. There were no differences in cigarette or e-cig dependence between e-cig conditions at any follow-ups nor differences in total nicotine dependence between any conditions. **Conclusion:** Use of an e-cig with cigarette-like nicotine delivery was associated with lessened cigarette dependence, compared with the cigarette-substitute, without significant increases in total nicotine dependence. This data can be used for the development evidence-based product standards which reduce the burden of tobacco use.

PS2-48

ASSOCIATIONS OF PARTNER AND FAMILIAL ENCOURAGEMENT OF SMOKING WITH HOME AND CAR SMOKING BANS

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Environmental tobacco smoke (ETS) poses health risks to infants hospitalized in the neonatal intensive care unit (NICU), especially after they are discharged. ETS-related health risks may be partially mitigated by the implementation of total home and car smoking bans. Understanding the influence that household and extended family members have on home and car smoking policies may inform interventions to reduce ETS among vulnerable infants. In a cross-sectional, secondary analysis of data collected between 2013 and 2019, mothers of NICU infants who reported smoking or living with a smoker (N=360) were asked about whether members of 9 separate relationship types (e.g., partner, mother, father) encouraged or discouraged smoking in the home and car. The influence of perceived encouragement from each relationship type on the odds of having a total smoking ban in place was estimated. Within homes without a smoking ban at baseline, participants reported that partners (47.7%) and siblings (33.0%) were most likely to encourage smoking in the home and car. In a multivariate model, both partner (p<0.0001) and sibling (p<0.0001) encouragement of indoor smoking decreased the likelihood of having a total smoking home and car ban in place. Family members' beliefs, attitudes, and practices toward encouraging or discouraging smoking in the home and car were significantly associated with household smoking practices. Innovative family-based interventions may be needed in order to reduce ETS in this particularly vulnerable group of infants.

PS2-49

UNDOING A BAD HABIT: ASSOCIATIONS BETWEEN NEGATIVE SMOKING EVENTS, COUNTERFACTUAL THEMES, AND THE TRANSTHEORETICAL MODEL IN SMOKERS

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To assist a client in smoking cessation, a clinician may turn to health behavior change models to propose the most effective treatment aligning with their clients' goals. One of the most often used for smoking behavior is the transtheoretical model (TTM), which incorporates self-efficacy, decisional balance, as well as behavioral and cognitive-affective processes. The TTM, however, does not account for past action and how an individual thinks about that past action, both of which have been shown to predict relevant goal-pursuit behaviors (e.g., intentions). After a negative event, individuals may think "If only..." and imagine how things could have been different (i.e., counterfactual thinking). Research suggests that counterfactuals may set the stage for goal-pursuit by highlighting causal links that lead to a better result (e.g., "If only I had started quitting sooner, then I wouldn't have missed out"). The functional consequences of counterfactuals have been noted as increased self-efficacy, motivation, and behavioral intentions; the specific content of the counterfactual (i.e., self-focused, controllable, for a better outcome) is theorized to be crucial for these outcomes. To date there are no known studies examining associations between past negative smoking experiences, counterfactuals, and a health behavior model, such as the TTM. Thus, the objective of the present study was to examine the relationship between these variables in an online sample of self-reported smokers. Results indicate that smokers in different stages reported significantly different scores for various processes of change. No significant differences between stages of change and negative smoking experience themes were present. For counterfactual differences, the types of counterfactuals generated (e.g., self- versus other-focused) did not differ by stage of change. However, the thematic content of the counterfactuals by stage differed, such that those in the action and maintenance stages reported significantly more smoking cravings in their counterfactual antecedents (e.g., If only I wasn't craving a smoke...). Results from this study could be used to inform treatments for smoking cessation.

PS2-50

TOBACCO SMOKE EXPOSURE AND FAMILY RESILIENCE AMONG U.S. SCHOOL-AGED CHILDREN

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Significance: Family resilience is a conceptual framework that considers resilience in the family as a functional unit that may be impacted by their environments. Tobacco smoke exposure (TSE) among children may be a risk factor for low family resilience. The objective was to assess the association between TSE status and family resilience among U.S. school-aged children. Methods: We used 2017-2018 National Survey of Children's Health data, and included 15,423 children ages 6-11 years. TSE status was defined as not living with a smoker (no TSE), living with a smoker with no home TSE (smoking not allowed inside the home), and living with a smoker with home TSE (smoking allowed inside the home). Family resilience is a composite measure on whether the child's family demonstrates resilient qualities during difficult times including: talking together; working together; drawing on strengths; and staying hopeful. Children with low, moderate, and high resilience met 0-1 items, 2-3 items, and 4 items, respectively, which was defined as most or all of the time response options. Weighted multinomial regression analyses were conducted adjusting for child age, sex, race/ethnicity, and health status; adverse childhood experiences; parent education; family structure; and federal poverty level. Results: About 13% of 6-11-year-olds lived with a smoker with no home TSE while 1.6% lived with a smoker with home TSE. Overall, 6.3%, 10.5%, and 83.2% had low, moderate, and high family resilience scores, respectively. Compared to children with high resilience scores, children who lived with a smoker with no home TSE were 1.82 times more likely (95%CI=1.23-2.70) to have low family resilience scores. Children who lived with a smoker with home TSE were at increased odds to have low (AOR=1.29, 95%CI =1.07-1.57) and moderate (AOR=1.28, 95%CI=1.10-1.49) family resilience scores. Conclusion: Children who lived with a smoker with no home TSE were at increased likelihood to have low family resilience, and those with home TSE were at distinct odds of having low-to-moderate resilience. Family-level interventions are needed to increase resilience and the adoption of smoking bans in school-aged children's homes.

PS2-51

THE IMPACT OF SOCIAL MEDIA USE AND GAMING ON INITIATION OF SMOKELESS TOBACCO USE AMONG RURAL MALE YOUTH

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Background: Social media use and gaming are central to the daily lives of youth in the U.S. More intensive use of social media is associated with risky behaviors like alcohol and tobacco use, but less is known about the risks of gaming. There are no studies to date examining the association of social media use and gaming with smokeless tobacco (SLT) use. **Methods:** We surveyed a longitudinal cohort of 2,168 rural male youth ages 11 to 16 at baseline from January 2016 through December 2018. We used discrete time survival analysis to examine transitions from never to ever SLT use. Key predictors were lagged social media use (tertiles of frequency of using Facebook, Instagram, Twitter, and Snapchat) and playing video games at least once per day. The model also included susceptibility to SLT, age, parental rules about media use, and other personal characteristics. The study was conducted as part of an evaluation of *The Real Cost Smokeless* education campaign, and we controlled for campaign exposure. **Results:** After controlling for susceptibility to SLT use, boys in the top and middle tertiles of social media use at the previous wave had greater odds for initiating SLT use at the subsequent wave relative to boys in the lowest tertile of use (OR=2.92, p<.001 for top tertile; OR=1.80, p<.05 for middle tertile). In contrast, playing video games at least once per day at the previous wave was associated with lower odds of initiation at the subsequent wave (OR=0.48, p<.001). Campaign exposure was not related to initiation. **Conclusion:** Greater frequency of social media use prospectively predicted SLT initiation among rural adolescent boys, whereas greater frequency of playing video games was associated with a decreased risk. Increased social media use could result in increased exposure to ads or programs featuring tobacco use. Alternatively, social media use and online

gaming may be proxies for risk factors and protective factors, respectively, in adolescents' non-digital social lives. Social media platforms like Instagram may be an efficient route to reach at-risk youth with educational messages because of their widespread reach.

PS2-52

PERCEIVED SENSORY CHARACTERISTICS OF FLAVOR BLENDS AND AMBIGUOUS "CONCEPT" FLAVORS AMONG ADOLESCENT AND YOUNG ADULT E-CIGARETTE USERS

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The rapid rise of e-cigarette use among youth has been attributed to the wide array of characterizing flavors offered by e-cigarette brands. This research aims to investigate patterns of use and sensory perceptions of flavor blends and ambiguously named "concept flavors" reported by adolescent and young adult e-cigarette users. Current e-cigarette users aged 15-24 (N=2,281) completed an online convenience sample survey (October 20, 2020-November 23, 2020). Using 9-point continuous slider scales, past 30-day users of a flavor blend or concept flavor rated the intensity of each according to sensory characteristics previously established as appealing to adolescents (fruity, minty, sweet, cooling). For each flavor blend or concept flavor, mean scores were calculated for each sensory perception scale. Most respondents used at least one flavor blend (74.8%) or concept flavor (57.9%) in the past 30 days. Over half of the sample (56.8%) reported disposables as their most frequently used device type. Popular flavor blends included Iced Mango (used by 30.2% of the sample), Banana Ice (27.5%), Lush Ice (23.8%) and Melon Ice (22.9%). Top concept flavors included Tropic (used by 17.5% of the sample), Blue Dream (16.0%), Winter (13.6%), Bahama Mama (12.9%) and Gold (12.8%). The most commonly used flavor blends were rated highly on a combination of cooling sensation with fruit and sweet taste. Concept flavors had a similar sensory profile as flavor blends. Flavor blends and concept flavors are used by the majority of young e-cigarette users, who describe these products as having fruity, sweet and cooling flavor profiles. Findings from this study inform public health interventions concerning flavored e-cigarettes with the intention of curbing the rise in e-cigarette use in youth and young adults

PS2-53

SMOKING CESSATION PATTERNS DURING PREGNANCY

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Significance: Maternal smoking during pregnancy is a well-established risk factor for adverse neonate outcomes. Our study examined the trajectory, methods, and difficulties surrounding cigarette cessation during pregnancy. We hypothesized that difficulty quitting is lowered for women during pregnancy compared to prior cessation, and that motivation to stay abstinent postpartum is higher in women who intend to breastfeed. **Methods:** Data came from a phone screen in a parent study focused on preventing postpartum smoking relapse. Participants self-reported average daily cigarette use in the 12 months before pregnancy and in each trimester. Difficulty in achieving cessation while pregnant and when not pregnant was measured on a scale of 1-10 (10 being the hardest). Motivation to remain smoke-free postpartum was measured on a scale of 1-10 (10 being the highest). Subjects reported intent to breastfeed as yes, no, or maybe/unknown. **Results:** The median age was 29 and most women (71%) were in their third trimester. Of the 70 participants, 54% quit smoking during pregnancy. Of these, 79% quit cold turkey (without nicotine replacement therapy [NRT]). Of those who quit, 34% quit in the 1st trimester, 26% in the 2nd, and 39% in the 3rd. During the 1st trimester, 92% of those who quit did so cold turkey, compared to 90% during the 2nd and 60% during the 3rd. Among women who had also previously quit while not pregnant (n=23), women found it on average 2.5 points easier (95% CI: 1.1-3.9; p=0.001) on a scale of 1-10 to quit while pregnant than when not. Of all participants, 58% reported being motivated at a level of 10/10 to be tobacco-free after delivery; 81% reported 8/10 or higher motivation. Motivation did not differ by intent to breastfeed (p=0.14). **Conclusions:** As hypothesized, women found it easier to quit smoking during pregnancy than when not pregnant. Intent to breastfeed did not have a significant influence on motivation to remain abstinent after

delivery. Further research should investigate when the use of NRT during pregnancy is beneficial, the factors contributing to decreased difficulty in achieving cessation during pregnancy, and how to prevent postpartum relapse.

PS2-54

DISPARITIES IN DENTAL HEALTH ISSUES AND DENTAL CARE VISITS AMONG U.S. CHILDREN WITH TOBACCO SMOKE EXPOSURE

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Significance: Dental caries, or tooth decay, is an infectious disease and there is growing research that TSE is associated with increased risk of development of dental caries in children. The study objective was to assess the relationships between TSE and current dental health and dental care visits among U.S. children ages 1-11 years overall and within age groups. Methods: We conducted a secondary analysis of combined data from the 2018-2019 National Survey of Children's Health including data on TSE, dental health, and dental care visits. Children were categorized into 3 groups based on caregiver reports of TSE: (1) no home TSE: did not live with a smoker; (2) THS exposure only: lived with a smoker who did not smoke inside the home; and (3) SHS and THS exposure: lived with a smoker who smoked inside the home. We conducted weighted multivariable logistic regression analyses among children ages 1-11 years (N=32,214) and among subsamples of children ages 1-5 years (n=14,437) and 6-11 years (n=17,777). Results: Overall, 12% and 1.5% of children were exposed to home THS only and home SHS and THS, respectively. Children with home SHS and THS exposure were at increased odds of having frequent or chronic difficulty with $\geq$1 oral health problem (AOR=1.59, 95%CI=1.07-2.35) and decayed teeth or cavities (AOR=1.74, 95%CI=1.14-2.65) compared to those with no home TSE, after adjusting for child age, sex, race/ethnicity, premature birth, caregiver education level, family structure, and federal poverty level. Compared to 1-11-year-olds with no home TSE, children with home SHS and THS exposure were 2.22 times more likely (95%CI=1.01-4.87) to have not received needed dental care, but at decreased odds to have had any kind of dental care visit (AOR=0.55, 95%CI=0.32-0.95) including a preventive dental care visit (AOR=0.60, 95%CI=0.36-0.99). Conclusion: TSE in toddlers, preschoolers, and school-aged children places them at increased risk of dental caries and inadequate dental care visits. The pediatric dental care visit may be an opportune time to alert caregivers of the risks of TSE on their children's dental health.

PS2-55

FEASIBILITY, ACCEPTABILITY, AND EFFECTIVENESS OF VIRTUAL TOBACCO CESSATION INTERVENTION IN DISADVANTAGED, URBAN SMOKERS

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Significance & Methods: The COVID-19 pandemic led to a rapid transformation in health care delivery from in-person care to telemedicine. In May 2020, the tobacco cessation group program at the University of Chicago, Courage to Quit® (CTQ) transitioned to a virtual, Zoom-based format (CTQ-Virtual). As patients are predominantly medically-compromised, low-income Black/African American smokers with low access to digital therapies, we evaluated the feasibility, acceptability, and effectiveness of the program during the pandemic. **Results:** From May 2020-June 2021, 152 unique smokers attended the program. The average age was 59 (±13 SD) years, 81% identified as Black, 78% female, 73% did not have a college degree, and 71% were not working (i.e., unemployed, retired, or disabled). For smoking, 90% smoked daily and 33% smoked more than ½ pack per day. Most patients had a major medical diagnosis including cancer, pulmonary disease, cardiovascular illness, etc. Acceptability of CTQ-Virtual improved over this time period. From the first quarter to the last quarter, new enrollments increased two-fold (4 *vs* 9 new patients/month) and patients attending by video increased by 15% (34% *vs* 49%). Overall, retention was good, as approximately 63% of patients attended more than one session and 36% completed the four-session program, and these rates were higher than those of the in-person program during the year prior to the pandemic (55% and 25%, respectively). CTQ-Virtual was effective in reducing smoking. Among patients attending two or more sessions, mean (±SD) cigarettes smoked/day decreased 42% from the first to last attended group (10.1±7.0 to 5.9±5.4 cigs/day) and 27% had a successful quit attempt. **Conclusion:** A virtual tobacco cessation intervention is feasible, acceptable, and effective among low-income, low-technology accessible Black

smokers. Notably, the virtual format improved accessibility and program completion rates relative to the in-person format. Findings demonstrate the utility of telehealth to improve tobacco cessation among underserved smokers as it may uniquely address key barriers to care specific to this population.

PS2-56

DEMOGRAPHIC CORRELATES OF TRANSITIONS BETWEEN SINGLE, DUAL, AND POLYTOBACCO USE STATES IN THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY: A MULTISTATE MARKOV TRANSITION ANALYSIS

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Background: In this complex, multiproduct tobacco product landscape, a better understanding of demographic patterns of transition between single, dual, and polytobacco product use may help improve policy intervention targeting. **Methods:** Hazard ratios of transition rates between never, non-current (no past 30-day use), cigarette, e-cigarette, other combustible (OC), smokeless tobacco (SLT), dual, and polytobacco (i.e., three or more categories) use states in adults were estimated for age, sex, and race/ethnicity using a multistate transition model for Waves 1-4 of the Population Assessment of Tobacco and Health (PATH) study, accounting for complex study design. **Results:** Younger age (18-24) was associated with more transient tobacco use behavior, with higher hazards of transitioning from exclusive cigarette, e-cigarette, or SLT use to dual, poly, or non-current use than all other age groups (25-34, 35-54, 55+). Compared to females, males had higher hazards of transitioning from exclusive cigarette use to dual cigarette and OC (HR 1.69, 95% CI 1.43,2.01) or SLT use (HR 6.5, 95% CI 2.80, 14.96), but lower hazard of transitioning to dual cigarette and e-cigarette use (HR 0.80, 95% CI 0.70,0.96). They also had higher hazards of transitioning from dual cigarette and e-cigarette use to exclusive e-cigarette (HR 1.69, 95% CI 1.30,2.18) or poly-use with cigarettes (HR 1.93, 95% CI 1.30,2.86). Black participants had lower hazards of transitioning from exclusive cigarette use to either non-current use (HR 0.09, 95% CI 0.08,0.10) or any dual use state, and a higher hazard of transitioning from exclusive e-cigarette or SLT use to non-current use than White participants. **Conclusions:** Transitions between single, dual, and polytobacco use differ by age, sex, and race/ethnicity, which may influence the impact of current and future tobacco control efforts.

PS2-57

ADDICTION PERCEPTIONS AMONG USERS OF SMOKELESS OR COMBUSTIBLE TOBACCO ATTENDING A TERTIARY CARE HOSPITAL IN INDIA

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Background: Addiction plays a key role in continued tobacco use. The study assessed perceived personal addiction, the perceived addictiveness of different forms of tobacco and explored whether the type of tobacco product used, demographic characteristics or socio-cultural factors were associated with perceived addictiveness in India. **Methods:** Cross-sectional survey of adult tobacco users attending a general medicine out-patient department in Mumbai. **Results:** A total of 607 participants, 454 smokeless tobacco (SLT) users and 153 combustible tobacco users completed the survey. The odds of perceived addiction were lower among SLT users. An increase in the odds of perceived addiction was seen as age increased and participants with secondary education and above had higher odds of perceived addiction compared to participants with no formal education. The odds of perceiving SLT products to be addictive was lower among SLT users compared to combustible tobacco users. The odds of perceiving SLT products to be addictive was lower among females. Participants with secondary education and above had higher odds of perceiving both combustible and SLT products to be addictive compared to no formal schooling. **Conclusion**: There is a need to raise awareness in India of the addictiveness of tobacco, particularly for users of SLT, younger people and those with less education.

PS2-58

PREDICTORS OF ADHERENCE AMONG VULNERABLE POPULATIONS OF ADULTS ASSIGNED TO SMOKE VERY LOW NICOTINE CONTENT CIGARETTES

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Significance: The U.S. Food and Drug Administration is considering a policy reducing the nicotine content in cigarettes to a minimally addictive level. This could particularly benefit smokers from populations vulnerable to heavy smoking and difficulties quitting. In this secondary analysis, we assessed predictors of adherence to a regimen of smoking only assigned very low nicotine content cigarettes (VLNCs) among adult smokers from vulnerable populations in randomized clinical trials. Doing so may help identify characteristics of those who may require additional assistance if a nicotine-reduction policy were to be implemented.**Methods:** Data came from three populations of vulnerable adult smokers assigned to use VLNC cigarettes (0.4 mg/g nicotine) during 12-week randomized controlled trials (n=286): socioeconomically disadvantaged women of reproductive age (n=93), opioid-maintained adults (n=92), and adults with affective disorders (n=101). Linear and logistic regression was used to assess predictors of adherence, defined as a continuous measure of level of adherence based on changes in cotinine relative to baseline, and as a 90% reduction in urine cotinine at Week-6 and -12 assessments relative to baseline (full adherence: yes/no). Predictors included satisfaction with study cigarettes, craving, nicotine-dependence severity, withdrawal, vulnerable population, baseline affective-disorder symptoms, and sociodemographic characteristics.**Results:** Dependence severity was negatively associated with both adherence measures at Week 6 (p<0.01), whereas increased satisfaction with study cigarettes and age were positively associated with both measures at Weeks 6 and 12 (p<0.01). Opioid-maintained adults exhibited reduced adherence and were less likely to reach full adherence at Week 12 compared to socioeconomically disadvantaged women (p<0.05).**Conclusions:** Factors associated with VLNC adherence in vulnerable populations were identified and are similar to those in the general population of smokers. Further studies are indicated investigating nicotine supplements (e.g., NRT) to support highly dependent adults faced with using VLNCs. Some vulnerable populations (e.g., opioid-maintained adults) may be especially in need of supplemental, non-combusted nicotine.

PS2-59

THE ASSOCIATION BETWEEN ADVERSE CHILDHOOD EXPERIENCES AND IMPULSIVITY IN TOBACCO USERS AND TOBACCO-CANNABIS CO-USERS

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Significance: Adverse Childhood Experiences (ACEs) are potentially traumatic childhood events and environments. Previous studies have established both ACEs and impulsivity as predictors of increased substance use and difficulty with cessation. However, there are limited studies exploring the association between ACEs and impulsivity scores within tobacco users. Disentangling the relationship between ACE and impulsivity can inform future cessation interventions for tobacco users. **Methods:** This study investigates whether ACEs are associated with impulsivity for two study populations: tobacco-only users (n = 199) and tobacco-cannabis co-users (n= 57). ACEs were measured using a 10-item screener totaling the number of ACEs experienced in the first 18 years of life. Impulsivity was measured utilizing the Barratt Impulsiveness Scale (BIS; 30-item scale), Brief Self-Control Scale (BSCS; 13-item scale), and Behavioral Inhibition/Activation Scales (BIS/BAS; 4 subscales). Linear regression models with robust standard errors were used to estimate the association between number of ACEs and impulsivity outcomes, adjusted for sex. Models were also fit with an interaction between sex and number of ACEs to test for a varying association of ACEs and impulsivity between males and females. **Results:** Tobacco-cannabis co-users with more ACEs tended to have higher Behavioral Inhibition System scores, indicating more impulsiveness. In particular, each additional ACE was associated with having, on average, a 0.50 points higher score (95% confidence interval [CI]: 0.11-0.90 points higher; p=0.02) on the Behavioral Inhibition System. A similar association was found in tobacco-only users though it was not statistically significant (p=0.13). We also found some evidence of a differing association for men vs. women among the tobacco-only users. Specifically, the association differed significantly by sex between ACEs and BIS (p=0.03) and BSCS (p=0.03). **Conclusion:**

More ACEs are associated with higher BIS scores for impulsivity in both tobacco only users and cannabis co-users, and there is evidence for differing associations by sex between ACEs and impulsivity scores for tobacco only users.

PS2-60

TRENDS IN PAST YEAR CANNABIS USE AMONG U.S. ADULTS WITH AND WITHOUT A HISTORY OF CANCER, 2013-2019 FINDINGS FROM THE PATH STUDY

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Background: Cannabis is often used to manage cancer pain and treatment side effects, formally or informally. Little is known about population-level time trends in cannabis use among those diagnosed with cancer, how trends compare to the general population, and whether differences in prevalence exist between those diagnosed with tobacco-attributable vs non-tobacco attributable cancers. Methods: Data are from Waves 1 (2013-2014) thru 5 (2018-2019) of the PATH Study, a nationally representative survey of non-institutionalized U.S. adults and youth. Weighted estimates of past year cannabis use were computed for each wave among adults (n=40,182), cancer survivors (n=1,788), and those with no cancer history (n=38,394). Prevalence was examined according to diagnosis with tobacco attributable (i.e., cancer of the bladder, cervix, colon, esophagus, kidney, larynx, liver, lung, mouth, pancreas, rectum, stomach, or throat, n=611) vs. non-tobacco attributable (n=1,159) cancers. Generalized Estimation Equations were used to examine whether trends in use significantly changed over time. Results: Overall, prevalence of past year cannabis use increased by 56% (2013-2014: 11.5% 95%CI:10.8-12.2; 2018-2019: 17.9% 95%CI:17.1-18.7; p<0.0001). Past year cannabis use among cancer survivors was lower than for those without a cancer diagnosis (6.6% vs. 11.8% in 2013-14); the rate of increase over time was comparable between the groups (2018-2019: cancer survivors: 10.6%, those with no cancer diagnosis: 18.6%; 61% vs. 58% increase, respectively). Among cancer survivors, past year cannabis use was consistently higher over time among those diagnosed with tobacco-attributable cancers compared to non-tobacco attributable cancers (2013-2014: 8.4% for tobacco-attributable vs. 6.0% non-tobacco attributable; 2018-2019: 13.3% tobacco-attributable vs. 9.2% non-tobacco attributable). Conclusions: While prevalence of cannabis use is lower among those diagnosed with cancer compared to the general population, prevalence among cancer survivors is highest among those diagnosed with tobacco-attributable disease. Findings further inform the literature underscoring linkages between tobacco and cannabis.

PS2-61

PSYCHOMETRIC EVALUATION OF THE SHORT-FORM VAPING CONSEQUENCES QUESTIONNAIRE FOR USE WITH HIGH SCHOOL ADOLESCENTS WHO USE AND DO NOT USE E-CIGARETTES

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Significance. Assessing youth vaping expectancies using a psychometrically sound measure can improve understanding of e-cigarette use as well as e-cigarette susceptibility among youth without vaping experience. **Methods.** We evaluated psychometric properties of the Short-Form Vaping Consequences Questionnaire (SF-VCQ), an expectancy measure previously validated with adults, within a sample of 1,753 high school adolescents who completed an online survey in Fall 2020 (51.6% female; 15.56[1.22] years old; 46.6% non-Hispanic white; 26.1% lifetime e-cigarette use; 9.3% past-month e-cigarette use). Analyses included confirmatory factor analysis, internal consistency, measurement invariance, between-group differences, and test-criterion relationships. **Results.** The 4-factor structure comprising expectancies for negative consequences, positive reinforcement, negative reinforcement, and appetite/weight control was confirmed and scalar invariant by lifetime and past-month vaping status, sex, and race. All subscales were internally reliable (mean α=0.94). The subscales were sensitive to differences based on lifetime and past-month vaping status as well as vaping susceptibility among never users, sex, and race. For example, students who vaped in the past-month held weaker expectancies for negative consequences but stronger expectancies for positive reinforcement, negative reinforcement, and appetite/weight control compared to lifetime vapers. Unadjusted relationships within the subsamples

of lifetime and past-month vapers provided evidence of convergent validity. Evidence for concurrent validity was observed for all samples after accounting for covariates. For example, expectancies for positive reinforcement, negative reinforcement, and appetite/weight control remained significantly associated with past-month vaping frequency. **Conclusions.** The SF-VCQ evidenced excellent internal reliability, scalar measurement invariance, and construct, convergent, and concurrent validity in samples of never, lifetime, and past-month adolescent e-cigarette users. Findings support using the SF-VCQ for assessing vaping-related expectancies among youth who use and do not use e-cigarettes.

PS2-62

PREVALENCE OF TOBACCO PRODUCT IMAGERY IN THE TOP MUSIC VIDEOS OF 2020

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Exposure to tobacco products in on-screen entertainment has been found to be a contributor to youth smoking initiation. This study aims to investigate the prevalence of tobacco imagery in popular music videos in 2020. The top 10 songs of each week of the 2020 calendar year were identified using *Billboard Charts* genres or categories (Hot 100, R&B/Hip-Hop, Country, Rock & Alternative, Dance/Electronic, Pop Airplay). Content analyses were conducted by two independent coders among the top songs with accompanying music videos. Methodology for coding was adapted from previous work investigating tobacco imagery in episodic television and movies. Coders identified each instance of tobacco products (cigarettes, cigars, pipe tobacco, e-cigarettes) and marijuana. Of the 315 top songs, 257 had accompanying music videos. Nearly one-quarter (23.3%, or 60 videos) contained tobacco product imagery. A total of 530 frames with tobacco images were found across the 60 videos. Cigarettes were the most pervasive product, composing 44.9% of occurrences counted in the coding process. More than one-third of identified images (39.8%) were not easily distinguishable as cigars, blunts, and/or marijuana and were classified as "other combustible products". Clear depictions of cigars (including large cigars or little cigars or cigarillos), comprised 10.70% of total tobacco occurrences. Pipes, e-cigarettes, and clear depictions of marijuana, were rare, all comprising less than 2% of total tobacco occurrences (1.9%, 1.1%, and 1.50%respectively). Tobacco imagery was most pervasive in R&B/Hip-Hop and Rock & Alternative genres. Addressing sources of tobacco imagery in popular culture is imperative in the effort to prevent tobacco use among youth and young adults.

PS2-63

DIFFERENCES IN E-CIGARETTE, ALCOHOL, AND CANNABIS USE AMONG CONNECTICUT HIGH SCHOOL STUDENTS WHO VAPE CANNABIS VERSUS USE OTHER CANNABIS MODALITIES

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Background. Tracking with the high rates of e-cigarette use observed among American youth, rates of vaporizing cannabis have increased in recent years; vaping is the second most common modality of cannabis use following smoking. While negative consequences of youth combustible cannabis use are well-documented, less is known about risks associated with using other cannabis modalities. Thus, we examined differences in demographics and substance use behaviors between adolescent cannabis vapers and those using other cannabis modalities. **Methods**. In 2019, 4875 students from six CT high schools completed school-wide, online surveys. Past-month cannabis users (n=931; 52.8% female, 16.38(1.27) years old, 44.9% non-Hispanic White) reported on cannabis modalities used (e.g., combustible, vaporizable, edible) and were classified as cannabis vapers or non-vapers. Cannabis vapers reported on device type used to vape cannabis: cannabis-specific device or modified/hacked e-cigarette. Unadjusted and adjusted relationships were examined to identify demographic and substance-related differences by cannabis vaping status. **Results**. 56.3% of past-month cannabis users reported vaping cannabis. Cannabis vapers reported using cannabis-specific vaporizers (91.9%) and modifying/hacking e-cigarettes for use with cannabis (23.7%). Cannabis vapers, relative to other cannabis users, were more likely to be male, non-Hispanic White, use cannabis at a younger age; endorse past-month use of e-cigarettes, alcohol, and all cannabis modalities; and report using e-cigarettes at a younger age and more frequently; consuming more drinks per drinking day; and smoking and dabbing cannabis more frequently. **Conclusions**. Relative to other cannabis modalities, vap-

ing was associated with increased use of e-cigarettes, alcohol, and several cannabis modalities. Adolescent past-month cannabis users reported modifying e-cigarettes to vape cannabis. Findings suggest that regulations should be implemented to prevent e-cigarettes from being modifiable for use with cannabis and highlight the importance of assessing different cannabis use modalities, as vaping was associated with distinct substance-related risks.

PS2-65

CHEMICAL ANALYSIS OF THE LIQUIDS IN CIGARETTE FLAVOR CAPSULES

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Background Over the last decade, the market share for cigarettes with flavor capsules in the filter has grown exponentially around the globe but particularly in Latin America. This product innovation involves consumers crushing a liquid-filled capsule while smoking, soaking the filter and changing the smoke flavor. Despite their growth, little is known about the chemical constituents of the liquids used and their potential health risks. **Methods** Based on market share estimates and availability across both countries, 31 flavor capsule brand varieties were collected in Mexico and Guatemala (19 and 12, respectively). Since some varieties includes more than 1 capsule (2 or 4) in a stick or pack, a final sample of 50 capsules were chemically analyzed. Gas chromatography with quadrupole time-of-flight mass spectrometry (GC-QTOF, Agilent Inc.) were used for qualitative analysis and gas chromatography with mass spectrometry (GC-MS, Agilent Inc.) for quantitative analysis. **Results** The sample was comprised of Lucky Strike (29.0%), Pall Mall (25.8%), Marlboro (22.6%), L&M (12.9%), and Benson & Hedges (9.7%) varieties. Most varieties included only one capsule (52%), 42% contained two capsules in the same filter, and 6% included single capsules in the filter, but with four flavors in the pack. All capsules contained mint/menthol with fruit flavors also being common. The qualitative analysis found 297 compounds across the different formulations, with 10 to 68 compounds found per liquid sample. In the quantitative analysis, L-Menthol was found in all capsule varieties; DL-Limonene in 84% of varieties (74% of capsules); Eucalyptol in 77% of varieties (66% capsules); Pulegone in 39% of varieties (26% capsules); and Benzyl Alcohol in 32% of varieties (42% capsules). **Conclusion** The liquids in the flavor capsules are dominated by menthol flavorings but span a wide variety of formulations. Some of the most used compounds (such as DL-limonene, pulegone, and benzyl alcohol) are potentially harmful for consumers. More research is required regarding these liquids as well as a strict regulation to avoid the use of toxic or carcinogenic compounds.

PS2-66

VAPOR TAXES AND PRICING ACTIVITIES OF ONLINE VAPING STORES

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Significance: Electronic cigarette use by adolescents has increased dramatically and raised great concern in the past decade. Tobacco control policies that curb the use of electronic cigarettes, such as taxation, have great potential to prevent the initiation and escalation of e-cigarette use. However, little evidence are presented on pricing activities of online vaping stores, and how well are vapor taxes implemented during web-based sales remains unclear. Our study collects price data from five popular online vaping stores through web scraping, and we also present how those stores charge vapor taxes based on shipping addresses in states and local jurisdictions that have e-cigarette excise tax in place.**Methods:** We collect e-cigarette sales prices from online vaping stores using web data extraction, standardize prices for e-liquid products, and present e-liquid price distribution in the whole sample and in each store, as well as variations of vapor taxes across states/local jurisdictions and between stores.**Results:** We present descriptive analyses of data on e-liquid prices from five online vaping stores. The data were scraped from the store websites from February to May in 2021. We collected data of 14,479 e-liquid products from five stores. The average price of e-liquids is $0.25/ml, and the median price is $0.21/ml in our sample. The price distribution is similar across stores. E-liquid products are very affordable, and the price distribution in each store

is right-skewed. Vapor tax charged for a specific e-liquid product varies by store and shipping address. **Conclusion:** We collect price data of e-liquid products from online vaping stores using web data extraction, and present analyses on store pricing activities and variations of vapor taxes across states/local jurisdictions and between stores.

PS2-67

CHANGES IN MARIJUANA AND NICOTINE VAPING PERCEPTIONS AND USE BEHAVIORS AMONG YOUNG ADULTS SINCE THE COVID-19 PANDEMIC

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Significance: Research is lacking on the impact of the COVID-19 pandemic on marijuana vaping behaviors - a notable limitation as marijuana vaping has been previously associated with respiratory issues among young people. Furthermore, research investigating the impact of COVID-19 on nicotine vaping behaviors among young people is equivocal, with some studies noting a decline in use, and others reporting increases in use behaviors. The purpose of this qualitative study was to gain insight into how the COVID-19 pandemic influenced marijuana and nicotine vaping perceptions and behaviors among young adults (18 to 25 years old), as well as to explore reasons, such as boredom and stress, for changes in use behaviors. **Methods:** We conducted in-depth qualitative interviews with 50 regular marijuana vapers from September 2020 to April 2021. Individuals were eligible if they vaped marijuana at least 3-5 days per week (exclusively or dual use with nicotine). Interview transcripts were analyzed using deductive coding processes to identify themes corresponding to the items in the interview guide. Constructs assessed included the impact of COVID-19 on 1) general daily activities, 2) perceptions or attitudes about vaping, and 3) vaping use behaviors, including reasons for changes in use behaviors. **Results:** Of the 50 participants, 20 (40%) were female, and the mean age was 21.4 years [SD=1.89]. Twenty-one participants (42%) were classified as regular marijuana vapers, while 29 (58%) met the criteria for regular dual vapers. Although the pandemic negatively impacted participants' perceptions of vaping, this did not translate into reductions in use, as most (54%) reported increases in vaping. Common changes in use behaviors were increases in both nicotine and marijuana vaping, or increases in marijuana vaping with decreases in nicotine vaping, among others. For both marijuana and nicotine vaping, boredom was a prominent theme for increasing use. Unique to marijuana vaping, relaxation/stress reduction was a common theme for increasing use. Lack of access to marijuana was a reason for decreasing marijuana and increasing nicotine vaping. **Conclusions:** Most participants reported increasing their vaping behaviors since the COVID-19 pandemic despite concerns about the potential for vaping to adversely impact lung and immune health. As the U.S. continues to battle the COVID-19 pandemic, research should assess how the identified factors (e.g. boredom, stress, accessibility to vaping products) continue to influence vaping behaviors. In addition, these factors are relevant for the development of targeted health communication messages aimed at decreasing vaping use among young people.

PS2-68

ISRAELI SMOKING CESSATION PRACTITIONERS' KNOWLEDGE, ATTITUDES AND PRACTICES REGARDING ELECTRONIC CIGARETTES - A CROSS SECTIONAL STUDY

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Significance Electronic cigarettes (e-cig) are regulated in Israel similar to combustible cigarettes. E-cig role in smoking cessation is under scientific debate, with evidence supporting their ability to help smokers quit, albeit concerns over continued nicotine addiction, health harms, and "dual use". This study aimed to: 1) explore Israeli smoking cessation practitioners' knowledge, attitudes, and practices regarding e-cig; 2) identify factors associated with not recommending e-cig as a cessation aid. **Methods** Online cross-sectional survey. Main outcome was whether practitioners did not recommend using an e-cig vs recommending them in all or some circumstances. Knowledge was measured using 10 yes/no questions, for a composite score of 0-100%. General attitudes regarding e-cig, personal attitudes regarding practitioners' role in discussing e-cig, and attitudes regarding e-cig regulation were measured using Likert scale (1 does not agree to 5 agree completely). A logistic regression explored the association between the main outcome and socio-demographic characteristics, professional experience, knowledge, and attitudes. **Results** Of 90 participants, 65.6% were female, mean age 54.7 (SD

10.6), mean years of experience 8.6 (SD 6.3). A third (36.7%) reported they would not recommend using an e-cig, 36.7% would leave it to the clients' decision, 16.7% stated they neither recommend or not recommend due to lack of evidence, and 10% would recommend e-cig under certain circumstances. Mean knowledge score was 65.4 (SD 22.5). Mean attitudes score was 2.2 for general attitudes, 3.5 for personal attitudes, and 4.3 for e-cig regulation attitudes. A higher proportion of those that do not recommend e-cig were from a medical background (OR=6.6, 95% CI1.5-29.0), had a higher mean regulation attitude score (OR=4.9, 95% CI1.1-22.5) and lower mean general attitude score (OR=0.2, 95% CI 0.1-0.9). **Conclusion** A high proportion of Israeli smoking cessation practitioners would not recommend e-cig as a cessation aid under any circumstances. Practical clinical guidelines, with training, are needed to guide practitioners to navigate the controversy around e-cig and better support their clients.

PS2-69

PRICE PROMOTIONS OF VAPING PRODUCTS IN ONLINE STORES

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Significance: The use of electronic cigarettes by adolescents has increased dramatically in the last decade. Based on the model of regulating cigarettes, e-cigarette pricing policies (e.g., taxation and price promotion restrictions) have the greatest potential to prevent e-cigarette use initiation and escalation. As of May 2021, 28 states, DC, and 9 local jurisdictions have imposed excise taxes on e-cigarettes. However, tax increases may be offset by price promotions. In addition, research on evaluating pricing policies has been hindered by the lack of price and price-promotion data from online vaping stores. This study makes a significant contribution to the literature on novel tobacco products by collecting price promotion data of online vape shops, assessing price promotion practices in online stores, and presenting components of final purchase price paid by customers who shop online for vaping products. **Methods:** To address the current knowledge gap on the impact of e-cigarette pricing policies, we collect data on e-cigarette price promotion activities from online stores, using web scraping. Specifically, from February to May 2021, we scraped price promotion data from five popular online vaping stores that sell nationwide to the U.S., and obtained price promotion data for over thirteen thousand e-liquid products in those five stores. We present descriptive analyses of promotional discounts on those products offered by the online stores, including distributions of price promotion as well as after discount price, by store in box plots. **Results:** Price promotional discounts on e-liquid products are prevalent in online vaping stores. 13,328 (99.24%) of the e-liquid products in our sample had promotional discounts, and only 102 products had no discount. Each online store on average offered from 21.14% and 48.38% off discount for its e-liquid products. The distribution of after discount price is largely similar across the five stores, and there is some evidence that each store had adopted different price promotion strategies. **Conclusion:** The effect of e-cigarette excise tax may be offset by price promotion activities in online vape shops, and our study sheds light on future research direction that examines pricing policies on e-cigarettes.

PS2-70

A QUALITATIVE ANALYSIS OF ELECTRONIC NICOTINE DELIVERY SYSTEMS USAGE AMONG ADOLESCENTS AND YOUNG ADULTS DIAGNOSED WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER IN MONROE COUNTY, NY

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Background: Attention Deficit Hyperactivity Disorder (ADHD) symptoms such as hyperactive-impulsivity, poor decision making, and inattention are associated with an increased Electronic Nicotine Delivery Systems (ENDS) use, especially among adolescents and young adults. ENDS usage is 50% higher among youth with parent-reported ADHD diagnosis than youth without ADHD. Due to this association, experts recommend 1) better ENDS screening for youth with ADHD, 2) better intervention programming to target this at-risk population, and 3) better educating this population about the dangers of vaping. **Methods:** Two young-adult vapers with ADHD, two pediatricians, and two family-physicians were interviewed in order to explore the relationship between ENDS use and ADHD in adolescents and young adults of Monroe County and to assess how well expert recommendations are followed to limit the effects of this relationship. These key informant interviews were conducted virtually, and results were analyzed qualitatively

through open coding thematic analysis by two independent coders based on Grounded Theory. **Results:** Results indicate that physicians do not observe a relationship between ADHD and vape use, nor do they screen specifically for vaping in ADHD check-ups. On the other hand, vapers who have ADHD stress that most of their peers with the same condition vape, and that vaping is a method of self-medication for coping with the symptoms that make day-to-day function difficult. As expected, both vapers and physicians asked for better education on this topic in Monroe County schools and on social media platforms. In addition, physicians believe that more confidential and detailed screening on vape use with ADHD patients could facilitate improved physician/patient dialogue. **Conclusion:** Although there is more to be studied, there is a noteworthy and often overlooked association between ADHD and ENDS use. Changing the language used while screening for substance-use, raising awareness with tailored ADHD information on tobacco cessation training websites and quit sites, and producing social media infographics would all be influential first steps in limiting ENDS use in youth with ADHD. Supported by National Cancer Institute (NCI) and the (FDA) #U54CA228110

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PS2-71

E-LIQUID WEB IMAGES FROM ONLINE VAPING STORES AN ANALYSIS OF WARNINGS, COLORS AND FLAVORS ON PRODUCT PACKAGES

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Significance: Electronic cigarette use has increased significantly and raised concern in the past decade. E-cigarettes are heterogeneous in flavor and device type; online vaping stores are one of the most common outlets for e-cig users to purchase vaping products, and over 90% of vapers reported using e-liquid products that contain nicotine. However, there is limited evidence on the marketing strategies of online stores. This study collects e-liquid packaging data with respect to the placement of warnings, colors and flavor descriptions from five popular online vaping stores that sell nationwide to the U.S. **Methods:** We collect data of e-liquid products from five online vaping stores using web data extraction. We then collect information of warnings (including locations on package images), colors and flavor descriptions from the web images of e-liquid packages. We have between 666 to 1,569 unique weblinks to e-liquid package images from each store. **Results:** We document whether the package displays warning, location of warning, colors as well as flavor descriptions on package, based on each web image of e-liquid products. We analyze how e-liquid manufacturers present flavors on packages online, and evaluate how colors of e-liquid packages communicate flavors. We classify flavor data from e-liquid web images, and present the popular flavors in online vaping stores. We also document other information on package images such as logo and design. **Conclusion:** We evaluate how online stores present product information using package images with regards to the display of warnings, colors and flavor descriptions, which could inform e-cigarette regulations.

FUNDING: Academic Institution

PS2-72

PREVALENCE OF TOBACCO USE AMONG YOUTH IN LAO PEOPLE'S DEMOCRATIC REPUBLIC - RESULTS FROM THE GLOBAL YOUTH TOBACCO SURVEY, 2016

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Background: Tobacco consumption among youth is associated with sustained tobacco use and a leading cause of premature mortality, yet there is limited published literature about youth tobacco use in Lao People's Democratic Republic (Lao PDR). This study aims to examine the prevalence of and factors associated with tobacco use among Lao youth. **Methods:** Data were from the 2016 Global Youth Tobacco Survey conducted in Lao PDR. A two-stage cluster sampling design (probability proportional to school enrollment size to select middle and high schools and systematic equal probability sampling to select classes) was used to identify a representative sample of 6550 students from 78

schools nationwide. Weighting was applied to account for the complex sampling design. Ever using tobacco included former tobacco use (used in the past but not in the last 30 days) and current tobacco use (used in the last 30 days). We used multivariable logistic regression models to evaluate the adjusted associations between sociodemographic characteristics and tobacco use. **Results**: The prevalence of tobacco use among Lao youth was 7.8% for cigarette smoking (boys, 13.6%; girls, 2.4%), 2.2% for electronic cigarettes (boys, 2.7%; girls, 1.7%), 1.5% for shisha (boys, 2.1%; girls, 0.8%). Adjusted analysis showed that the prevalence of ever smoking cigarettes was higher among older age groups (P-trend<0.001), among boys (compared with girls, odds ratio [OR], 4.15 [95% confidence interval (CI): 3.55-4.85]), and among those who had an average weekly allowance of ≥50 Kip to spend by themselves (compared with those with <50 Kip, OR, 1.93 [95% CI: 1.57-2.36]). Ever using tobacco was also associated with seeing tobacco use on television or in movies (OR, 1.98 [95% CI: 1.64-2.38]), seeing advertisements for tobacco products (OR, 1.69 [95% CI: 1.43-2.00]), and the belief that tobacco smoking is not harmful (OR, 1.78 [95% CI: 1.49-2.13]). **Conclusion**: Cigarette smoking prevalence among Lao youth is high compared to other countries in the region, particularly among boys. Further national tobacco control efforts are needed to prevent smoking initiation and support tobacco cessation for this population.

FUNDING: Federal; Nonprofit grant funding entity

PS2-73

NICOTINE POUCHES: A STRATEGY TO HOOK A NEW COHORT ON NICOTINE WHILE MAINTAINING ADDICTED SMOKERS

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Significance: Nicotine pouches are an emerging segment of tobacco products. Little is known about how these products are perceived. We qualitatively investigated the impressions and risk perceptions of a nicotine pouch product among adults who smoke. **Methods:** We conducted semi-structured Zoom interviews with 30 adults who smoke cigarettes. We showed participants a brochure for the 'on!' nicotine pouch product and a photograph of the product and asked their impressions. We coded transcripts using a thematic content analysis approach. We then summarized participants' perceptions of the advertisement and product. **Results:** Of the 30 participants, 13 were male, 15 were female, and were 2 non-binary and the mean age was 43. Central themes that emerged included: 1) current smokers perceived that the on! brochure and the product targets youth and adults who smoke, and 2) participants reported hesitancy towards using 'on!' because of health concerns (i.e., oral cancers), and product composition and functionality (i.e., contents and delivery mechanism). Participants identified various aspects of the on! brochure and product as potentially appealing to youth, including the concealability, flavor options, and colorful design. Participants also discussed how adults who smoke may use on! as a substitute for smoking in restricted areas or potentially as a way to quit smoking. Quite a few participants expressed hesitancy to use on! nicotine pouches because they were concerned about oral cancer and other possible health effects. **Conclusions:** Adults who smoke perceived that the on! product may appeal to youth or may be used by adults who smoke in restricted areas. Given the possible appeal to youth and available product flavors, FDA may need to closely monitor this class of nicotine products and enact regulations as needed to prevent a surge of youth use.

FUNDING: Federal

PS2-74

CIGARETTE SMOKING ATTRIBUTABLE INCOME LOSS IN THE U.S., 2019: NATIONAL AND STATE-LEVEL ESTIMATES

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Significance: The economic burden of smoking is reflected in health expenditures and productivity loss from smoking-attributable morbidity and all-cause mortality. There are also spillover effects of smoking-related risky behavior. These economic effects propagate into future through past income levels imposing significant cumulative burden. Data on the economic burden of smoking in the U.S. are limited and dated. This study used a comprehensive approach to provide contemporary estimates of the economic burden of cigarette smoking in the U.S. **Methods:** The elasticity of per capita personal income with respect to adult smoking prevalence was estimated using a reduced-form Cobb-Douglas production function in a mixed-effects generalized linear model of state-level panel data for 2011-2019, controlling for determinants of income. The annual economic burden of smoking in 2019 by state was estimated in $2021, applying the estimated elasticity to the counterfactual of 100% smoke-free state. The cumulative

burden of smoking over 2011-2019 was estimated in $2021 based on the coefficient of lagged income. The state-level estimates were summed to obtain the national estimate. State-level smoking prevalence data were from the Behavioral Risk Factor Surveillance System. Per capita personal income data were from the Bureau of Economic Analysis. **Results:** The elasticity of per capita personal income with respect to cigarette smoking prevalence is -0.048 (P<0.05), suggesting that a 100% reduction in smoking prevalence can result in a 4.8% income gain. At the national level, the annual total income loss due to cigarette smoking was $890 billion (4.1% of GDP), and the cumulative income loss was $3.9 trillion (17.8% of GDP) in 2019. By state, annual per capita income loss ranged from $1867 in Mississippi to $3989 in the District of Columbia. Annual total income loss ranged from $1.6 million in Vermont to $126.3 million in California, the most populous state. Cumulative income loss ranged from $7.7 billion in Vermont to $561.6 billion in California. **Conclusion:** Income loss from smoking was substantial and far exceeded prior estimates. Mitigating this economic loss will require stronger evidence-based tobacco control measures.

PS2-75

DAILY FLUCTUATIONS IN DRINKING INTENSITY--LINKS WITH VAPING AND COMBUSTIBLE USE OF NICOTINE AND MARIJUANA

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Background: Differences in alcohol use are associated with nicotine or marijuana use between-persons, but there is less understanding about how *within*-person differences in alcohol use across days relate to nicotine or marijuana use. Modes of nicotine and marijuana use have changed: There is a nicotine vaping epidemic among adolescents and young adults, and marijuana vaping increased in prevalence in 2018 and 2019. Traditional modes also still deserve attention, as cigarette smoking initiation and escalation is also increasingly occurring in young adulthood. Consequently, smoking and vaping of nicotine or marijuana among young adults are now critical public health issues. Yet, limited extant research uses national samples of young adults to explore how alcohol use is associated with different modes of nicotine and marijuana use on the same days. **Methods:** Participants were past 30-day drinkers in the U.S. nationally representative Monitoring the Future study of 12th graders in 2018 who also reported alcohol use during a 14-day data collection one year later in the Young Adult Daily Life Study in 2019 (N=487). Weighted multilevel modeling estimated within- and between-person associations of drinking intensity with cigarette smoking, nicotine vaping, marijuana smoking, and marijuana vaping. **Results:** Within-person increases in drinking intensity on a given day were associated with cigarette smoking, nicotine vaping, and marijuana smoking, but not marijuana vaping. There were significant between-person associations of greater means of drinking intensity (across the entire 14-day study period) and every outcome, except for cigarette smoking. **Conclusion:** Drinking intensity on a given day was associated with multiple modes of nicotine use and marijuana smoking that day. Nicotine and marijuana use remain critical areas of concern for public health, and future research and interventions should consider the comorbidity of drinking intensity and modes of nicotine and marijuana use. Focusing on the same-day use of alcohol may provide a tailored avenue for preventing and reducing nicotine and marijuana use in young adulthood.

PS2-76

PROTECTIVE FACTORS FOR NICOTINE AND MARIJUANA VAPING AMONG US ADOLESCENTS

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Introduction: Nicotine and marijuana vaping among U.S. adolescents are public health priorities. Research has assessed demographic and risk factors related to vaping, but there is a dearth of research on protective factors for vaping in a national sample. Based on the healthy youth development (HYD) perspective, the developmental assets framework was used to assess cumulative protective factors and vaping in a national sample of adolescents. Methods: Data came from the nationally representative Monitoring the Future (MTF) study, consisting of 12th graders (N=6982) from the 48 contiguous U.S. states (2017-2019). Past 30-day nicotine and marijuana vaping and developmental assets (low, medium, or high) were examined. Covariates included demographics and other substance use. Weighted descriptive statistics, logistic regression, post-estimation analyses, and multiple imputation for missing data were used. Results: Students with

higher assets had lower odds of nicotine and marijuana vaping, even after adjusting for covariates. The odds of nicotine vaping were lower for students with medium assets (AOR=0.65; 95% CI=0.54, 0.78) and high assets (AOR=0.22; 95% CI=0.16, 0.29) compared to students with low assets. Similarly, the odds of marijuana vaping were lower for youth with medium assets (AOR=0.54; 95% CI=0.42, 0.69) and high assets (AOR=0.09; 95% CI=0.05, 0.18) compared to low assets. The individual assets of social competence and positive peer norms were especially important as they were strongly protective against both forms of vaping. Conclusions: The HYD perspective and the developmental assets framework apply to the critical issues of nicotine and marijuana vaping among U.S. adolescents. Promoting cumulative assets may help prevent vaping among U.S. adolescents, and increasing the specific assets of social competence and positive peer norms could be particularly fruitful.

PS2-77

QUITLINE AND QUITSITE RESOURCES FOR LGBT NICOTINE USERS

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Background: The LGBTQ population has had a historically higher rate of nicotine/ tobacco product use when compared to the general population. Cigarette smoking prevalence was 20.3% among LGBTQ adults compared to 15.3 among straight adults, according to 2016 data. Efforts aimed at providing education on LGBTQ and tobacco use have grown. This may come In an age where web-based media is the main form of connecting with the world, it is important to have quality cessation support available online because that may be the one and only contact an individual may have with a cessation support service. An LGBTQ individual may be seeking out a service that will support them in their unique needs, but if they do not see that, they may be less likely to interact with that service. The difference in tobacco use across subgroups of the sexual minorities makes the issue more complicated. Targeted outreach efforts have been noted, but it does not seem to be a concerted effort across all quitlines and respective quitsites. This study aimed to assess the availability of specialized tobacco cessation support for the LGBTQ population. **Methods:** A qualitative analysis of quitlines and quitsites was conducted to determine if LGBTQ-specific cessation support was available. Each state quitsite was studied to determine what information was there and in what form it was presented. Semi-structured interviews were conducted with four representatives from North American Quitline Consortium-associated quitlines and four physicians in Monroe County, NY. Open coding based on grounded theory allowed for a closer analysis of interview data. **Results:** Only 23 of the 51 states and districts studied had anything LGBTQ-related on their respective quitsites. Despite most states' quit line profiles listing having LGBTQ specific material available, over half do not have anything regarding this on their quitsites. The key informant interviews gave a general idea of the efforts of the various quitlines to develop and improve existing protocols and outreach programming. Emerging themes of Training/Coaching, Special Populations, LGBTQ+, Tailored Approach, Technology/Social Media, Building Rapport, Dialogue and Accessibility were noted across all interviews. **Conclusion:** The overall study demonstrates how tobacco control efforts have branched out to focus more on vulnerable populations, including LGBTQ. The present availability of LGBTQ-specific material through quitsites and quitlines could be improved to include all states. Through a collaborative effort between the quitlines, the development of a more centralized way to convey this information could occur. Supported by National Cancer Institute (NCI) and the (FDA) # U54CA228110.

PS2-78

OTHER TOBACCO PRODUCTS AND CANNABINOIDS USED BY REGULAR E-CIGARETTE USERS

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Significance: It is estimated that up to 26% of tobacco users in the U.S. use more than one kind of tobacco product (dual or poly-use). Little is known about poly- tobacco and/or cannabinoid use among those who use e-cigarettes. In this study we assess the average number of and most common tobacco and cannabinoid products used by regular e-cigarette (ECIG) users by varying cigarette smoking status. **Methods:** 1209 U.S. adults

[21+] using ECIGs 5+ days/week completed a survey between May and October 2020. Participants were categorized into two groups: ECIG users with no concurrent cigarette use in past 30 days [n=711] and ECIG users with concurrent cigarette use in past 30 days [n=498]. All were asked about past 30-day use of other products, including cigars, pipes with tobacco, cigarillos/filtered cigars, chew tobacco or dip/snuff/snus, hookah/shisha, marijuana (dry herb+THC), and CBD. Descriptive analyses, Mann-Whitney U, and Chi-squared tests were utilized. **Results:** 71.7% of ECIG users who smoked cigarettes and 52.7% of ECIG users who did not smoke cigarettes used at least 1 other product. ECIG users who smoked cigarettes co-used significantly [p<0.0001] more products [mean=1.50] compared to those who did not smoke cigarettes [mean=0.91]. ECIG users who smoked cigarettes were significantly [p<0.05] more likely to use each product compared to those who did not smoke cigarettes: marijuana (dry herb + THC) [60.4% vs. 43.6%], CBD [49.0% vs. 30.2%], cigarillos/filtered cigars [21.9% vs. 7.5%], hookah/shisha [9.2% vs. 5.1%], chewing tobacco or dip/snuff/snus [8.8% vs. 3.1%], cigars [8.0% vs. 3.1%], and pipes with tobacco [4.2% vs. 1.8%]. **Conclusion:** ECIG users who smoked cigarettes used more tobacco/cannabinoid products on average and were more likely to use each product individually. Marijuana and CBD were the most widely used products by both groups. Among tobacco products, cigarillos/filtered cigars and hookah/shisha were the most widely used for both groups, respectively.

PS2-79

NICOTINE/TOBACCO USE AMONG GENDER-FLUID AND GENDER-STABLE ADOLESCENTS AND ADULTS IN THE U.S.

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Significance: Prior work has shown that nicotine/tobacco use is more prevalent among transgender populations (individuals whose gender identity differs from their assigned sex at birth) relative to cisgender populations. Despite increased research on transgender health in recent years, there remains a paucity of information on gender-fluid individuals (i.e., persons who experience changes in their gender identity). We aimed to estimate the prevalence of nicotine/tobacco use among U.S. adolescents and adults who are fluid versus stable in their gender identities. Methods: We fit multivariable logistic regression models to data from Waves 2 to 4 (2014/15 to 2016/18) of the Population Assessment of Tobacco and Health (PATH) Study (n=33,197 U.S. individuals aged 14 years and older). We examined associations of gender stability/fluidity over three waves with nicotine/tobacco use at wave 4. Differences in any past 30-day tobacco, cigarette, e-cigarette, other tobacco, and poly-tobacco use were assessed among cisgender-stable, transgender-stable, and gender-fluid participants. We also examined tobacco use among gender-fluid subgroups (i.e., cisgender-to-transgender, transgender-to-cisgender, and multi- or trans-to-trans fluid). All models adjusted for sex, age, race/ethnicity, geographic region, sexual stability/fluidity, and past-year psychological distress. Results: Prevalence of any past 30-day tobacco use was higher among gender-fluid individuals (cisgender-to-transgender, 46.0%; multi- or trans-to-trans fluid, 44%; and transgender-to-cisgender, 38.4%) and lower among gender-stable individuals (transgender-stable, 37.8% and cisgender-stable, 26.7%). Gender-fluid individuals had significantly increased odds of all past 30-day tobacco use outcomes (adjusted odds ratios ranged from 1.9 to 2.9), compared with cisgender-stable individuals. Conclusion: Gender-fluid individuals are at higher risk for nicotine/tobacco use, placing them at greater risk for smoking-related health consequences. Creating tobacco prevention supportive of gender diversity may reduce nicotine/tobacco use among gender-fluid people.

PS2-80

ACTIVE SMOKERS ARE AT HIGHER RISK OF COVID-19 DEATH

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Significance: Current evidence indicates that smoking worsens COVID-19 outcomes. However, when studies restricted their analyses to current smokers, the risks for COVID-19 severity and death are inconsistent. This meta-analysis explored the association between current smoking and the risk for mortality based on the studies that reported all three categories of smoking (current, former, and never smokers) to overcome the limitation of the previous meta-analyses which former smokers might have been classified as non-smokers. **Methods:** We searched PubMed, Embase, and the interrelated articles up to June 2021. We included studies reporting all three categories of smoking behaviors of COVID-19 patients and mortality outcomes. We

used a random-effects meta-analysis and meta-regression to examine relationships in the data. **Results:** A total of 35 articles with 37,185 COVID-19 patients was included in this meta-analysis. The meta-analysis confirmed the association between current smoking (OR 1.27, 95% CI: 1.03-1.58, p<0.001), former smoking (OR 1.75, 95% CI: 1.53-2.00, p<0.001) and COVID-19 mortality. We also found that the risk for COVID-19 death in current smokers does not vary by age, but significantly drops by age in former smokers. Moreover, current smokers in non-high-income countries have higher risks of COVID-19 death compared with high-income countries (OR 2.38, 95% CI: 1.59-3.56 vs. OR 1.14, 95% CI: 0.91-1.43). **Conclusions:** Current and former smokers are at higher risk of dying from COVID-19. The effects seem to be lower among older adults who had quitted smoking. Tobacco control should be strengthened to encourage current smokers to quit and prevent the initiation of smoking. The government, physicians, and public health professionals should take the COVID-19 pandemic as an opportunity to promote smoking prevention and cession.

PS2-81

CHANGE IN INTERNET SEARCHES FOR SMOKING CESSATION DURING THE COVID-19 PANDEMIC IN THE UNITED STATES

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Background: Historically, natural disasters have resulted in decreased tobacco cessation, but it remains unclear how the COVID-19 pandemic is influencing intention to quit smoking in the United States at the population level. This research explores the impact of the COVID-19 pandemic on smoking cessation interest using internet search behavior in the United States. **Method:** Publicly available Google search trends data were used to assess change in interest in smoking cessation. The data were a scaled time series indicating the relative volume of search queries containing either "quit smoking" or "stop smoking" in the United States. The data were compiled at weekly intervals from January 1, 2016 to January 1, 2021. The pre-Covid onset portion of the data was used to establish a forecast that was used to set expectations for the post-Covid onset search trends. These expectations were then compared to the actual search trends to evaluate the extent actual search trends differ from what would have been expected in the absence of COVID-19. We explored 140 combinations of start dates and end dates defining the post-onset periods (February 2, 2020 to December 20, 2020) to account for the fact that the onset of COVID-19 in the United States occurred in a series of cascading events and not a single moment. We replicated this process using the search term "weather" as a control for comparison. **Results:** In 101 (72.1%) of the 140 iterations, the volume of actual searches for "quit smoking" or "stop smoking" after the onset of COVID-19 was lower than 90% of the respective iteration's 1000 counterfactual simulations of internet search volume, each representing a plausible expectation had COVID-19 not occurred. In contrast, the actual volume of searches for "weather" after the onset of COVID-19 deviated this dramatically from expected values in only 9% of the 140 iterations. This suggests a specific and robust attenuating effect of the COVID-19 pandemic on smoking cessation search behavior. **Conclusion:** These findings suggest that interest in smoking cessation substantially decreased as a result of the COVID-19 pandemic in the United States.

PS2-82

EXAMINATION OF GENDER DIFFERENCES IN IMPACT OF SINGLE/DUAL USE OF ELECTRONIC VAPOR PRODUCTS AND CANNABIS ON MENTAL HEALTH SYMPTOMS

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Significance: Unlike traditional cigarettes and cannabis, the impact of nicotine and cannabis vaping on adolescents' mental health is not well-known. Recent evidence indicates increased odds of depressive symptoms and suicide ideation among e-cigarette and marijuana users, however, there is no indication whether these odds are similar for male and female adolescents. To address this gap, this study aimed to identify gender differences in suicide ideation and depression symptoms among US adolescents who use e-cigarettes and/or marijuana. Methods: Data from the most recent (2019) national Youth Risk Behavior Survey were used, including 12,346 participants (51.4% female) with complete data. Multivariable logistic regression analyses were conducted to explore gender differences in the associations between single or dual use of e-cigarette and marijuana on depression and suicidal symptoms in the past 12 months adjusting for

grade and race/ethnicity. Results: Compared to non-use and dual-using males, female dual users were more likely to report they felt sad/hopeless (aOR=3.21 95%CI=2.51-4.12), considered suicide (aOR=3.53 95%CI=2.74-4.55), planned suicide (aOR=3.23 95%CI=2.64-3.95), attempted suicide (aOR=4.41 95%=3.12-6.22), and suffered an injury following a suicide attempt (aOR=6.62 95%CI=3.96-11.05). Similarly, female single users of cannabis and EVP had increased odds (ranging from 1.88-7.43) of reporting depression and suicidal symptoms compared to males and non-users. Conclusion: Gender-based differences in mental health outcomes among EVP and/or cannabis users exists and may result from biomedical (genetic, hormonal, anatomical, physiological), psychological (personality, coping mechanisms), or epidemiological (population-based risk factors) indicators. Results suggest the need for targeted research and interventions to address this problem among female users who are at most risk for mental health issues.

PS2-83

DEVELOPMENT AND PSYCHOMETRIC EVALUATION OF THE KHAINI SMOKELESS TOBACCO DEPENDENCE SCALE (KSLTDS)

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Background: There is a need for SLT scales which have been robustly developed and tested with SLT users. Khaini is a smokeless tobacco product commonly used in the Southeast Asia region. To assist with cessation of khaini use it is crucial to assess the severity of dependence. No measures exist to assess dependence on khaini use and this study aimed to develop a valid and reliable scale to serve this purpose. **Methods:** The study was carried out using recommended methods for scale development in three phases: item development, scale development and scale evaluation. Scale development was guided by a theoretical framework, a literature review of existing measures and in-depth interviews with 21 khaini users recruited from a tertiary care hospital in Mumbai. The development process resulted in identification of domains for dependence and development of an item pool. Cognitive interviews and pre-testing were conducted with 20 khaini users to assess content validity. A cross sectional survey with 323 khaini users was conducted and exploratory factor analysis (EFA) was used to determine the factor structure of the draft scale. A systematic reduction method using decisions based on psychometric robustness and clinical importance was used to exclude redundant items to develop the final scale. Concurrent validity, criterion validity, convergent validity and internal consistency of the total scale and sub-scales were assessed. **Results:** A 20 item scale, the Khaini SLT Dependence Scale (KSLTDS) was developed. EFA indicated a three-factor structure with craving, habit and routine subscales. The KSLTDS showed evidence of acceptable criterion validity, concurrent validity and convergent validity. The KSLTDS showed high internal consistency (Cronbach's alpha 0.94). **Conclusion:** The KSLTDS is a valid and reliable scale for assessing dependence on khaini and can be used for clinical and research purposes. Further studies are required to revalidate the psychometric properties of the KSLTDS with different khaini user populations.

PS2-84

DETERMINANTS OF WEIGHT CONCERNS AMONG SMOKERS IN A PHYSICAL ACTIVITY (PA)-BASED CESSATION PROGRAM

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Significance: Concern about weight gain is a barrier to smoking cessation, but how it relates to PA behavior and perceptions is unclear. This has implications for targeting PA as a cessation strategy. Method: Baseline data were analyzed from a cessation trial of 392 adults who received nicotine patch and cessation counseling and were randomized to community-based PA or general wellness counseling. Outcomes were 1) use of smoking to control weight ("control"; continuous score) and 2) anticipating relapse if weight gain occurred ("relapse"; yes vs. no) using validated instruments. Exposures were self-reported PA and PA perceptions (self-efficacy, enjoyment of organized and unorganized PA, personal and environmental barriers). Covariates were treatment group and known determinants of post-cessation weight concerns including socio-demographics, smoking behavior, diet, and BMI. From bivariate models examining main and sex interaction effects, significant variables were entered into a generalized linear regression model or a logistic regression model to identify determinants most strongly associated with control and relapse, respectively. Results: Both control and relapse were significantly (p<0.05) associated with being female (standardized b= 0.52, SE=0.10), white (-0.12, 0.05), and less motivated to quit (-0.14, 0.05). Higher control scores also

were associated with engaging in less moderate intensity physical activity (-0.10, 0.05) and higher BMI (0.21, 0.05). A significant interaction indicated that men with higher BMI anticipated relapsing if weight gain occurred, but no such association was found for women (OR=2.54, 95% CI= 1.42-4.56). No other PA behaviors or perceptions were associated with weight concerns. Conclusion: Smoking to control weight was associated with engaging in less moderate intensity PA, but was not associated with perceptions about PA. Anticipating relapse if weight gain occurred was not associated with PA behavior or perceptions. These results indicate that concerns about post-cessation weight gain are unlikely to influence engagement in PA in the context of a community-based smoking cessation program.

PS2-85

LONGITUDINAL TRANSITIONS IN YOUTH TOBACCO USE, FINDINGS FROM WAVES 1-4 OF THE PATH STUDY

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Significance: The landscape of youth tobacco use is both multifaceted and dynamic. A latent transition analysis identified classes of tobacco use and the likelihood of transitioning between classes over time. Methods: Data derive from Waves 1-4 (2013-2018) of the Population Assessment of Tobacco and Health Study. The sample consisted of youth aged 12-17 (54.2% male; 54.5% White, 25.3% Hispanic) who self-reported past 30-day use of at least one tobacco product (e.g., cigarettes, electronic cigarettes [ECIGs], smokeless tobacco [SLT]) at one or more waves (N=975). Results: Six latent classes were identified. Four classes were consistent across waves: Nonusers, Cigarette, ECIG, and SLT Users. The remaining classes showed variable interpretations: at early waves, there were Hookah and Experimental Polytobacco Users, whereas later these resolved more specifically into Cigarillo and Polytobacco Users. The Nonuser class decreased in size over time (86-25%), whereas all other classes increased over time (e.g., ECIG: 3%-29%). Of the three consistent classes, SLT Users were most stable in their use (50-80% of users continued use), followed by Cigarette Users (40-59%). Considerable movement occurred among Nonusers and ECIG Users. ECIG Users were less likely to transition to Nonusers over time (80-45%), whereas Nonusers were more likely to transition to ECIG Users over time (8-44%). For the more variable classes, early Hookah Users tended to remain Hookah Users or transition to Nonusers (41-59%), but later transitioned more to Polytobacco Use (37-80%). Experimental Polytobacco Users maintained class stability in early waves (31-57%) but later transitioned to Cigarillo Users or Nonusers (7-81%). Conclusion: While adolescent cigarette and SLT use remained relatively stable over time, the likelihood of continuing ECIG use increased whereas the likelihood of remaining a nonuser decreased. These latter findings reflect recent changes in the tobacco marketplace and demonstrate the importance of interventions and regulations targeted toward youth ECIG use.

PS2-86

CUSTOM AND NON-CUSTOM E-CIGARETTE LIQUID USERS' DEVICE/LIQUID CHARACTERISTICS AND HEALTH OUTCOMES: IMPLICATIONS FOR E-CIGARETTE REGULATIONS

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Significance Some e-cigarette users mix or order custom liquids for their devices. Regulatory actions (e.g. banning flavored liquids) may result in increased use of custom liquids. Understanding device/liquid characteristics and health outcomes of custom and non-custom e-cigarette liquid users can inform product regulation, including potential unintended consequences. We examined differences in e-cigarette device/liquid characteristics and health outcomes of custom (CLUs) vs non-custom (NCLUs) liquid users to understand potential consequences of e-cigarette device/liquid regulations. **Methods** From May-October 2020, adults aged 21+ (n=1209) using e-cigarettes 5+ times/week responded to a survey about health outcomes and submitted photos of their most used device and liquid. Photo data were prioritized; if unavailable, self-report data were used. Chi-squared and Mann-Whitney U tests were used to examine differences

between CLUs (n=294) and NCLUs (n=915). **Results** 75.7% (n=915) of the sample used non-custom liquids, 17.3% (n=209) used custom liquids mixed by someone else, and 7% (n=85) used self-mixed custom liquids. CLUs more often used devices with adjustable wattage/voltage (67.7% vs 37.1%; p<0.05), adjustable airflow (58.5% vs 33.6%; p<0.05), and customizable adaptive power (27.9% vs 14%; p<0.05). CLUs used lower nicotine concentrations (14.3 vs 30.1 mg/mL; p<0.05) and more often used free-base nicotine (72.8% vs 39.6%; p<0.05) than NCLUs. No statistically significant differences were found for e-cigarette dependence or shortness of breath between CLUs and NCLUs. **Conclusions** Custom and non-custom liquid users vary in the devices, nicotine concentrations, and formulations they use, but not in their e-cigarette dependence or shortness of breath. Regulations may differentially impact these two groups (e.g. nicotine concentration limits may lead to more compensatory vaping behavior changes among NCLUs). Future research is needed to understand other characteristics of CLUs (e.g. demographics, smoking status, e-cigarette device and liquid sources, reasons for use) and potential health outcomes from custom liquids (e.g. accidental skin/eye exposure).

PS2-87

SMOKING, E-CIGARETTES AND THE EFFECT ON RESPIRATORY SYMPTOMS AMONG A POPULATION SAMPLE OF YOUTH

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Significance E-cigarettes have been steadily increasing in popularity, both as cessation methods for smoking and for recreational and social reasons. This increase in vaping prevalence is especially concerning in youth and non-smokers, due to avoidable nicotine addiction, as well as cardiovascular and respiratory risks. We aimed to assess respiratory symptoms in youth dual users of cigarettes and e-cigarettes compared to smokers, vapers, and non-users. Methods A cross-sectional survey design was utilized to assess Canadian youth aged 16-25 years old. Participants were recruited from the Ontario Tobacco Research Unit Youth and Young Adult Research Registration Panel November 2020 to March 2021. A total of 3,082 subjects completed the baseline survey and were included in the analysis. The exposure of interest was smoking/vaping behaviour, and the outcome of interest was respiratory symptoms. Respiratory symptoms were measured using the five-item Canadian Lung Health Test. Vaping, smoking, and dual use behaviours were assessed based on frequency and dosage (cigarettes/puffs per session or per day). Poisson regression analyses were performed while adjusting for demographic confounders. We assessed the association between vaping frequency and respiratory symptoms, the interaction between cigarette smoking frequency and vaping frequency on respiratory health, as well as vaping device type, e-liquid flavour, and years vaping. **Results** An increase in daily dosage by 1 puff per day increased the rate ratio of respiratory symptoms by a factor of 1.00072 (95%CI: 1.00051-1.00093; p<0.001). For every additional cigarette smoked per day, the rate of respiratory symptoms increased by a factor of 1.01627 (95%CI: 1.00832-1.02428; p<0·001). Daily cigarette smokers exhibited a rate ratio of 1.41591 (95%CI: 1.24101-1.61545; p<0.001) compared to former smokers, while never-smokers had a decreased rate ratio by a factor of 0.74711 (95%CI: 0.68015-0.82066; p<0.001) compared to former smokers. For every additional cigarette smoked per day, each additional e-cigarette puff per day was associated with a decrease in rate of symptoms by a factor of 0.99995 (95%CI: 0.99991-0.99999). There was no significant association between vaping device or e-liquid flavour and respiratory symptoms. Each year of vaping was found to increase rate of respiratory symptoms by a factor of 1.11722 (95%CI: 1.06542-1.17155; p<0·001). **Conclusion** Mediation of risk of respiratory symptoms was found amongst dual users of e-cigarettes and cigarettes compared to exclusive cigarette smokers, but additional analysis is necessary to assess the effectiveness of dual use for cessation, and the mechanisms behind this interaction. However, non-smokers should not partake in e-cigarette vaping, as vaping does carry negative health risks of its own.

PS2-88

PERCEIVED MESSAGE EFFECTIVENESS AND SOURCE TRUST FOR E-CIGARETTE AND SNUS MODIFIED RISK MESSAGES

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Significance: Modified risk tobacco product (MRTP) messages may promote harm reduction for smokers but also unintended product appeal among young non-users. We examined reactions to potential MRTP messages for snus and e-cigarettes in an online experiment. Methods: In January 2021, we randomly assigned 1018 adult smokers and 1051 young adult (ages 18-29) non-smokers to view one of three MRTP messages about snus and e-cigarettes that claimed: 1) reduced exposure to chemicals; 2) a qualitative risk reduction (e.g., that switching can reduce health harms); or 3) a quantitative risk reduction ("95% less harmful than smoking"). Participants rated whether the message was understandable, believable, and made them want to learn more about the product and use the product ("perceived effectiveness"). Participants then viewed all three messages together and chose which would make them most interested in that product. Participants also selected the most and least trusted potential claim source from six options.Results: In the snus experiment, there were no differences by claim type on perceived effectiveness variables. For e-cigarettes, participants rated the 95% less harmful message as least believable and the chemical message as most believable (no other differences were found by claim type). Regardless of message type, there was low agreement that the message viewed made participants interested in the product (lower for snus versus e-cigarette messages and for young adult non-smokers versus current smokers). Across both experiments, 54-70% agreed the message viewed was understandable, but fewer found it believable (17-39%). In the forced-choice comparison, most (46%) selected the qualitative risk reduction claim as the most impactful for snus, followed by the "95% less harmful" (35%) and reduced chemicals (19%) claims; for e-cigarettes, most (46%) selected the "95% less harmful" as the most impactful claim. Most indicated that the CDC or their doctor would be the most trusted claim source and industry the least trusted source. Conclusions: The impact of MRTP messages may depend on an interplay of the product, message content, source and believability.

PS2-89

VALIDITY OF A LITTLE CIGARS/CIGARILLOS PURCHASE TASK IN DUAL USERS OF CIGARS AND CIGARETTES

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Introduction: Little cigars and cigarillos (LCCs) have become increasingly popular in the US, but measures of their abuse liability are needed. We sought to validate a behavioral economic purchase task for assessing the reinforcement value of LCCs in a population of experienced LCC smokers. Methods: At baseline, 65 young adult (18-34 years) dual users of LCCs and cigarettes provided a breath carbon monoxide (CO) sample and completed a usual-brand LCC purchase task (LCCPT), past 30-day cigar use, and several LCC dependence measures. From the LCCPT we calculated four observed demand indices: intensity (consumption at \$0), breakpoint (BP, first price at which consumption reaches 0), O_{max} (maximum expenditure), and P_{max} (price at which O_{max} occurred). Using the exponentiated demand model we estimated two derived demand indices from the demand curves: Q0 (predicted consumption as price approaches \$0) and elasticity (α, sensitivity of consumption to price changes). We examined Spearman correlations between LCCPT demand indices and LCC use, dependence, and CO. Using multivariable regression we assessed demand indices as a function of dependence. Results: Correlations between the demand indices and smoking and dependence variables were in expected directions. All demand indices except BP and P_{max} were correlated with LCC use, and all indices were correlated with multiple measures of dependence. Overall, greater demand for LCCs and less sensitivity to price changes were correlated with greater LCC use and dependence. Intensity and O_{max} often had the strongest magnitudes of correlations with dependence and use. No correlations with CO were seen. For the regression results, higher intensity, O_{max}, and Q0 and lower price sensitivity (lower α) were related to higher dependence. No associations were found for BP and P_{max}. Conclusions: Our findings support the validity of the LCCPT in a sample of experienced LCC smokers. The purchase task was able to quantify the reinforcement value of LCCs, and predict levels of dependence. Validated measures of LCC abuse liability are important for determining which product characteristics (e.g., flavor) contribute to their reinforcing value.

PS2-90

DO HETEROSEXUAL WOMEN RESPOND NEGATIVELY TO ANTI-TOBACCO MESSAGING TARGETING SEXUAL MINORITY WOMEN

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Significance: Targeted health campaigns intended for minoritized populations may produce undesirable "boomerang" effects on populations outside of the focus of the campaign. Examples of such unintended effects include lowered effectiveness or increased negative affect. In this study, we examined the perceptions of anti-smoking messages designed for sexual minority women among samples of heterosexual and sexual minority women. This analysis aimed to test whether heterosexual participants would respond more negatively to messages that were designed specifically for sexual minority women. **Methods**: We used a two (cue-condition: LGBTQ group cue vs. control group cue) by six (message repetition) mixed factorial experimental design. We created a corpus of 28 anti-smoking messages and randomly showed participants six of these messages in each condition. Messages in the cue condition included a tagline referencing LGBTQ health and a rainbow logo while messages in the control cue condition included references to women's health and a dark pink logo. Using validated scales we measured perceived message effectiveness (PME), perceived targetedness and reactance. We ran separate ANOVA analyses for each dependent variable, including the interaction between cue condition and sexual orientation. **Results**: Participants (M_{age}=24.13, SD_{age}= 3.68) were between 18 and 30 (N=306) and identified as either bisexual (N=74), lesbian (N=103), or heterosexual (N=125). Five women were daily smokers, 22 were non-daily smokers, and 275 were non-smokers. There were no significant interactions between cue condition and sexual orientation. We found a statistically significant main effect of sexual orientation on targetedness F(2, 269) = 5.375, p = .005, η2 = 0.017, but no other main effects across outcomes of interest. **Discussion**: Our results suggest that exposure to LGBTQ group cues within anti-smoking messages designed for sexual minority women did not result in heterosexual women reporting more negative responses than sexual minority women. Therefore, heterosexual women viewing messages designed for sexual minority women did experience the messages as less effective.

PS2-91

USING THE PURCHASE TASK TO DETERMINE SUBSTITUTABILITY OF LITTLE CIGARS/CIGARILLOS AND CIGARETTES IN YOUNG ADULT DUAL USERS

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Introduction: Little is known about the relative addiction potential of cigarettes and little cigars/cigarillos (LCCs) among young adults who smoke both products. This study examined demand for cigarettes and LCCs, substitutability of LCCs for cigarettes, and factors associated with demand and substitution. **Methods**: At baseline, 65 dual users ages 18-34 completed single-commodity purchase tasks (PTs) for usual brand cigarettes and LCCs and a cross-price purchase task in which both products were available simultaneously (CPT). We calculated demand intensity (consumption when free), O_{max} (max daily expenditure), P_{max} (price at O_{max}), Breakpoint (BP, highest price willing to pay), and elasticity (α, sensitivity of consumption to price increases) for each product. From the CPT we estimated cross-price elasticity (CPE, sensitivity of LCC consumption to cigarette price increases). Cigarette and LCC demand indices were compared using non-parametric tests. In multivariable regression, we examined intensity, α, and CPE as a function of dependence, smoking, and demographics. **Results:** Cigarettes had greater median demand intensity, lower P_{max} and BP, and similar O_{max} and α relative to LCCs. The mean (SD) CPE was 0.27 (0.49), indicating that LCCs were partial substitutes for cigarettes. For each product, higher intensity was associated with higher smoking and dependence. Cigarette consumption was less sensitive to price changes (lower α) with higher cigarette dependence and intensity and lower LCC intensity. LCC consumption was less sensitive to price changes with higher LCC intensity and lower cigarette intensity, but was not related to dependence. As consumption of one product became more sensitive to price increases, consumption of the other product also became more sensitive. Substitutability of LCCs for cigarettes increased (higher CPE) with higher LCC intensity and price sensitivity, and was higher for flavored than unflavored LCCs. However, use, dependence, and cigarette demand were not associated with CPE.

Conclusions: Among young adult dual users, demand for LCCs and cigarettes were interrelated. LCCs were substitutes for cigarettes, particularly flavored LCCs. Demand for LCCs, but not cigarettes, was associated with greater substitutability.

PS2-92

ATTITUDES AND PERCEPTIONS ABOUT SMOKING CESSATION IN UK INDIVIDUALS UNDERGOING TARGETED LUNG CANCER SCREENING WHO RECEIVED A NEGATIVE ('CLEAR') RESULT: A QUALITATIVE INTERVIEW STUDY

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Significance The UK is piloting 'targeted' lung cancer screening in adults aged 55-75 years with 30 pack-years smoking history. Half of those who attend lung screening continue to smoke. There is lack of agreement on how best to integrate stop smoking services, and quit rates remain low (around 9%) following screening. Receiving abnormal screening results appears to motivate quit attempts, yet most screening participants receive negative (clear) results. It is important to understand factors that motivate smoking cessation in individuals who receive a normal result following screening. **Method** Qualitative study theoretically framed by the Health Belief Model. Seven participants who attended a targeted lung screening programme in London, UK, took part in semi-structured interviews. Framework Analysis was used to identify perceptions of harms caused by smoking, perceived benefits of quitting, motivation, and confidence to quit. **Results** There was some awareness of the risks and harms of smoking but a lack of concern. Participants were either unaware of or were in denial about the critical role smoking plays in lung cancer risk. Feeling well and having no perceptible signs of smoking damage equated to having nothing to worry about. Receiving a clear result confirmed this, resulting in low motivation to quit. Beyond living longer there were few perceived benefits to quitting, rather the loss of pleasure or risk of developing cancer regardless. In the context of clear screening results, this compounded the challenge of quitting or made it futile. Participants consistently self-identified as strong-willed in all respects except quitting smoking. Age and nicotine addiction were viewed as insurmountable barriers. **Conclusion** In the context of a negative screening result, increasing awareness about links between lung cancer, smoking and other smoking-related diseases is important for long-term smokers to accurately assess their risk for lung cancer. This study provides insight for screening professionals to integrate effective, tailored smoking cessation into lung screening programmes.

PS2-93

DEVELOPMENT OF A NEW PERCEIVED EFFECTIVENESS SCALE FOR YOUTH TOBACCO PREVENTION MESSAGES

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Significance. Tobacco prevention media campaigns are an important tool to address youth tobacco use. We developed a theory-based perceived message effectiveness (PME) scale to use when vetting messages for campaigns. **Methods.** Participants were a national sample of *n*=623 US adolescents (ages 13-17) recruited from a national probability-based panel. In an online experiment, we randomized adolescents to view vaping or smoking prevention ads. All participants viewed an ad from the FDA *The Real Cost* campaign and a control video, in a random order. After ad exposure, the survey assessed 9 candidate PME items and variables used to assess convergent and criterion validity. We used confirmatory factor analysis and examined the information curves to select items for the scale. **Results.** Analyses identified a short PME scale with 3 items (α=.95) that worked equally well for diverse adolescents with different patterns of tobacco use. *The Real Cost* ads generated higher PME scores than the control videos for both vaping and smoking (convergent validity; *p*<.05). Higher PME scores were associated with greater attention, fear, cognitive elaboration, and anticipated social interactions (convergent validity; *r*=.31-.66), as well as more negative attitudes toward and lower susceptibility to vaping and smoking (criterion validity; *r*= -.14 - -.37). A single-item PME measure performed similarly as the 3-item version. **Conclusions.** The UNC PME Scale

for Youth is a reliable and valid measure of the potential effectiveness of vaping and smoking prevention ads. Employing PME scales during message development can enhance the effectiveness of youth tobacco prevention campaigns.

PS2-94

NICOTINE DEPENDENCE MILESTONES IN THE NATURAL COURSE OF ONSET OF VAPING DEPENDENCE AMONG YOUTH AND YOUNG ADULTS- A RETROSPECTIVE COHORT SURVEY ANALYSIS

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Significance Vaping dependence in adolescent and young adult non-smoking populations is a growing public health concern. In this study, we used measures of nicotine dependence milestones to determine the natural timing of onset of vaping dependence in cigarette-smokers and non-smokers. **Methods** We conducted a cross-sectional survey of Canadian youth aged 16-25 years old. We derived dependence milestones from the Penn State E-Cigarette Dependence Index, the E-Cigarette Dependence Scale, and a self-perceived measure of vaping dependence. We used Kaplan-Meier analysis to assess the number of months after vaping initiation at which the cumulative probability of attaining each milestone was 25%. A survival analysis was conducted to assess relative time to e-cigarette dependence milestones from initiation of vaping by cigarette smoking status, age, and sex. **Results** Among 3082 participants, 2,105 were current at-least-monthly vapers. Ever-smokers were more likely to achieve frequency-related milestones than never smokers (p < 0.01), but less likely to attain behaviour-related milestones compared to never-smokers (p < 0.001). Ten of the twelve behavioural milestones were attained at 24 months, along with monthly (95%CI:24.00-24.00) and weekly vaping (95%CI:24.00-30.33). Daily vaping and difficulty resisting vaping were both attained at 30.33 months (95%CI: 30.33-30.33). Waking at night to vape was attained at 66.83 months (95%CI: 54.67-66.83). **Conclusion** Behaviour-related milestones and symptoms of vaping dependence can occur sooner than frequency-related symptoms but may take two years or more to be reported by youth. Future longitudinal studies assessing onset of symptoms among never vapers are needed to assess the natural history of vaping dependence.

PS2-95

A SYSTEMATIC REVIEW OF RESPONSES TO REDUCED NICOTINE CIGARETTE MARKETING FEATURES

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Background: The Tobacco Control Act gave the Food and Drug Administration (FDA) the authority to reduce nicotine levels in cigarettes. The agency is considering enacting a reduced nicotine product standard. We systematically reviewed the literature regarding responses to commercial and public health marketing features for reduced nicotine cigarettes (RNC) to anticipate potential industry and regulatory actions should a RNC product standard be issued. **Methods:** We searched PubMed for English language articles using several keywords for reduced nicotine products, cigarettes, and marketing features published through 2020. Of 4,092 records, 26 studies were retained for review that met criteria focusing on responses to reduced nicotine cigarette marketing features. Search terms created by the research team were used for review and included independent extraction and coding by two reviewers. Coding was categorized using study design terminology, commercial and public health features in tobacco regulatory science, and their association with individual responses outlined by several message processing outcomes. **Results:** Most studies focused on current cigarette smokers and were cross-sectional. Reactions to RNCs and attitudes and beliefs were the most common outcomes measured. For commercial features, articles generally studied RNC advertisements, products, and/or descriptors. For public health features, articles studied counter-messaging (e.g., warning labels) or general descriptors about nicotine or a reduced nicotine product standard. Commercial features were generally associated with favorable responses. Public health features offset favorable responses across most outcomes, though their efficacy was mixed. Contrasts in results by smoking status are

discussed. **Conclusions:** Commercial marketing of RNCs is appealing and may need stronger regulations or communication campaigns to accurately convey risks. Opportunities exist for future research in light of tobacco regulatory science competencies. This research contributes to the knowledge base for understanding marketing influences of reduced nicotine cigarette products.

PS2-96

HOW ABSOLUTE HARM INFORMATION, RELATIVE HARM INFORMATION, AND COMBINATIONS OF BOTH AFFECT E-CIGARETTE HARM PERCEPTIONS AND MESSAGE CREDIBILITY AMONG PEOPLE WHO SMOKE DAILY

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SIGNIFICANCE: Misperceiving e-cigarette use as equally or more harmful than cigarette smoking may discourage some people who smoke from switching. Health messaging about e-cigarette risk can contain absolute harm information, relative harm information anchored to cigarettes, or combinations of both. This study investigates how altering the presence/emphasis of absolute and relative harm statements affects acute perceptions of harm and message credibility. **METHODS:** A convenience sample of U.S. based mTurk users who smoke daily, ages 21+, viewed one of five messages about e-cigarettes: Absolute harm statements (AH only); Relative harm statements (RH only); Both sets of statements, absolute harm emphasized (AH+rh); Both sets, relative harm emphasized (ah+RH); or unrelated content (control). Emphasis was added using bolded text and placement at the beginning and end of the message, where attention is directed when reading. All participants then indicated their e-cigarette harm perceptions and their strength of agreement with statements about message features such as believability. **RESULTS:** 873 participants completed the survey and passed quality control validation checks. Seeing a message with relative harm information increased the likelihood of responding that e-cigarette use is safer than smoking (message, odds ratio, 95% CI; RH only, 7.0, 4.3-11.1; AH+rh, 8.2, 5.0-13.4; ah+RH, 8.6, 5.2-14.1) vs. the control message, while those who saw the AH only message had a lower likelihood (0.5, 0.3-0.8). However, those assigned to the RH only and ah+RH conditions were less likely to agree the message was believable (RH, 0.3, 0.2-0.5; ah+RH, 0.4, 0.2-0.6) and more likely to agree the message was manipulative (RH, 4.2, 2.6-6.8; ah+RH, 2.1, 1.2-3.4), whereas agreement likelihood for the AH only (2.0, 1.1-3.8; 0.7, 0.4-1.3) and AH+rh (0.6, 0.4-1.0; 1.5, 0.9-2.5) conditions did not differ from the control's. **CONCLUSIONS:** Brief exposure to relative harm information may increase the likelihood that adults who smoke perceive e-cigarette use as less harmful than smoking. However, stand-alone or emphasized relative harm information may be less likely to be perceived as credible.

PS2-97

PERCEIVED SMOKING RELATED COVID19 RISKS AND THEIR VARIATIONS BY DEMOGRAPHICS AND SMOKING STATUS AMONG U.S. CURRENT AND FORMER CIGARETTE SMOKERS

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Significance: The U.S. Centers for Disease Control and Prevention (CDC) stated that current and former smokers have increased risks for severe COVID-19 symptoms. We examined the correlates of U.S. adult current and recent former cigarette smokers who believe that combustible tobacco use increases risks of contracting COVID-19 infection, severe symptoms, hospitalization, and death. **Methods:** Data were from a U.S. representative sample of adult (≥21 years) current and recent former cigarette smokers (n=1,589) from an online panel in January-February 2021. In four items, participants reported if smoking combustible tobacco products (e.g., cigarettes, cigars) would increase risk of contracting COVID-19 infection, having severe symptoms, hospitalization, and dying from COVID-19. Demographic and current smoking status information was also collected. Weighted multivariate logistic regression models were used to examine the relationship between demographics, smoking status, and each COVID-19 risk belief. **Results:** Overall, 63.1%, 78.9%, 79.6%, and 76.9% of U.S. adult current and recent former smokers believed that combustible tobacco use increased the risks of COVID-19 infection, severe symptoms, hospitalization, and death. Those with high school education or less were less likely than those with college education to believe that combustible tobacco use increased the risk of COVID-19 severe symptoms (AOR=0.57, 95%CI=0.34-0.96),

hospitalization (AOR=0.58, 95%CI=0.34-0.99), and death (AOR=0.58 95%CI=0.36-0.96). Additionally, compared to recent former smokers, current smokers were less likely to believe that combustible tobacco use increased the risk of COVID-19 infection (AOR=0.54, 95%CI=0.38-0.77), severe symptoms (AOR=0.46, 95%CI=0.31-0.70), hospitalization (AOR=0.48, 95%CI=0.31-0.72), and death (AOR=0.54, 95%CI=0.37-0.80). **Conclusion:** U.S. adult current smokers and those with low education were less likely than former smokers and those with high education to agree that smoking increases COVID-19 risks. Further research is needed to examine if these beliefs are related to vaccination and other preventive behaviors against COVID-19.

PS2-98

CONTENT ANALYSIS OF NICOTINE SICKNESS/NIC SICK VIDEOS ON TIKTOK

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Significance: TikTok is a micro-video social media platform experiencing exponential growth with 60% of its monthly users between ages 16-24. Recent studies have found that increased exposure to e-cigarette content on social media may influence patterns of use. However, there is limited research assessing the characteristics of nicotine poisoning content posted on social media. This study aims to examine the specific characteristics of nicotine sickness-related content on TikTok in order to assess potential public safety issues and health communication/outreach opportunities.**Methods**: The study collected TikTok posts associated with the #nicsick hashtag and used inductive coding to conduct content analysis for video characteristics. Videos were manually annotated to generate a codebook of nicotine sickness-related themes. Statistical analysis was used to compare continuous characteristics of videos with and without active nicotine sickness TikTok topics.**Results**: A total of 132 TikTok videos with the hashtag #nicsick were manually coded, with 52.3% (n=69) identified as discussing first-hand and second-hand reports of suspected nicotine poisoning symptoms. Among these videos were users who documented their experiences with adverse events, users actively vaping; trends; and story times. Videos depicting adverse events and/or nicotine poisoning symptoms were longer in duration than those for other #nicsick-related topics (p=0.08). **Conclusion**: Exposure to promotional e-cigarette social media content may facilitate overconsumption of nicotine, leading to nicotine poisoning. The appeal of "going viral" may encourage TikTok users to spread novel and potentially dangerous e-cigarette use patterns in addition to discussions and experiences with nicotine poisoning.

PS2-99

FACILITATORS OF SMOKING CESSATION LAPSE AMONG YOUTH EXPERIENCING HOMELESSNESS

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Significance: In the United States, nearly three times more youth (aged 14-24) experiencing homelessness smoke cigarettes compared to the general population. Many youth experiencing homelessness report past quit attempts; however, little is known about the contextual factors influencing cessation lapse in this population. This study, part of a larger project to develop an optimized smoking cessation intervention for homeless youth, aimed to describe how opportunity, stress, and coping influence cessation lapse among youth experiencing homelessness. Methods: Thirty-six youth experiencing homelessness aged 14-24 and who reported smoking combustible tobacco within the past week were recruited from a drop-in center in Ohio. Our analytic sample comprised the 26 study participants who reported a past quit attempt. We conducted semi-structured qualitative interviews with the intent to describe structural and psychosocial factors contributing to cessation lapse following participants' most recent quit attempt. Team-based thematic coding followed deductive template and inductive approaches. Results: Most youth described smoking reflexively in-the-moment to cope with stressful and traumatic life events (e.g., loss and death of family members; employment instability). Reflexive stress coping was exacerbated by nicotine dependence. Some participants described actively choosing to smoke to regulate stress-induced emotions and in lieu of engaging in other harmful behavior (e.g., physical violence). Social and environmental opportunities provided easy access to tobacco, which facilitated cessation lapse independently and also during stressful events. Conclusions: Stress was a primary driver of cessation lapse among youth experiencing homelessness; however, easy access to tobacco also thwarted quit attempts. Interventions to prevent cessation lapse among youth experiencing homelessness should target sources of stress, coping skills, nicotine dependence, and the social environment.

PS2-100

RETROSPECTIVE ANALYSIS AND INFOVEILLANCE OF NICOTINE SICKNESS/NIC SICK TWEETS

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Significance: Social media exposure to tobacco marketing and online trends such as vape challenges can lead to overconsumption of various nicotine products increasing the likelihood of possible nicotine poisoning and overdose. Surveillance of social media platforms can help in assessing the volume of user-generated content discussing suspected nicotine poisoning, which may not be reported to poison control centers. This study aims to examine trends and distinct characteristics of nicotine sickness content on Twitter between 2018 and 2020.**Methods:** Tweets were collected retrospectively from the Twitter Academic Research Application Programming Interface (API) stream filtered for keywords "nic sick", "nicsick", "vape sick", and "vapesick" between 2018-2020. The collected tweets were manually annotated to identify reports of suspected nicotine sickness and related themes using an inductive coding approach. The Augmented Dickey-Fuller (ADF) test was used to assess stationarity in the monthly variation of the volume of tweets reporting suspected nicotine sickness between 2018 and 2020. **Results:** A total of 5,651 tweets that contained nicotine-sickness-related keywords were manually annotated, with 18.29% (n=1,034) tweets reporting one or more suspected nicotine sickness symptoms of varied severity such as vomiting, nausea, headache, burning sensation in throat, and fatigue. The volume of tweets reporting suspected nicotine sickness increased throughout the study period, except between February-April 2020. Stationarity in the volume of "nicsick" tweets between 2018-2020 was not statistically significant (Dickey-Fuller = -0.32, p=0.98) indicating a non-stationary change in the volume of tweets. These tweets were grouped into three main categories including first- and secondhand reports of symptoms, intentional excessive use of nicotine ("nic buzz"), and users seeking help for symptoms after nicotine use.**Conclusions:** Increasing volume of user-reported nicotine sickness and intentional overdose of nicotine highlights the need for targeted health communication strategies and effective anti-tobacco campaigns against impulsive behaviors among vape users on social media platforms.

PS2-101

HOW MEDIA STORIES IN LOW- AND MIDDLE-INCOME COUNTRIES (LMICS) DISCUSSED THE FDA'S AUTHORIZATION OF THE MARKETING OF IQOS AS A MODIFIED RISK TOBACCO PRODUCT WITH "REDUCED EXPOSURE" INFORMATION

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Significance: On July 7, 2020, the US Food and Drug Administration (FDA) authorized the marketing of Philip Morris Products S.A's IQOS Tobacco Heating System as a modified risk tobacco product (MRTP), the first tobacco product to receive "exposure modification" orders. We examined how the FDA's authorization was presented in media in low- and middle-income countries (LMICs). **Methods**: News articles published between 7/7/2020 and 1/7/2021 were obtained by systematically searching Tobacco Watcher (www.tobaccowatcher.org), a surveillance platform that compiles tobacco-related news. Articles were considered eligible if they mentioned the FDA authorization about IQOS and were published in an LMIC. Articles not in English were professionally translated. Articles were coded by two coders to identify country of origin, use of the term MRTP as well as presence of reduced risk language or reduced exposure language when discussing the FDA authorization, and presence of quotes from tobacco industry employees and/or public health or medical professionals. **Results**: We identified 50 unique eligible articles published in 20 LMICs, including in all 6 WHO regions. 36 articles (72%) used the term 'modified risk tobacco product' or 'MRTP', 26 (52%) included reduced exposure language only, 4 (8%) included reduced risk language only, and 8 (16%) included both reduced risk and reduced exposure language. 30 articles (60%) included only tobacco industry quotes, 7 (14%) included only quotes from public health or medical professionals, and 2 (4%) included quotes from both tobacco industry and public health or medical professionals. **Conclusion**: Our study found that the FDA authorization to market IQOS as an MRTP was discussed in LMICs around the world; almost one quarter (24%) of articles

reviewed misrepresented the FDA's authorization by incorrectly suggesting that the FDA determined that IQOS is less harmful than cigarettes. Most articles did not include a quote from a public health or medical professional, while the majority (64%) included tobacco industry quotes. Future research should assess the public's understanding of the distinction between reduced exposure and reduced risk.

PS2-102

TOBACCO RETAIL OUTLETS AND NEIGHBORHOOD DEPRIVATION AND THE RISK OF PRENATAL SMOKE EXPOSURE

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BACKGROUND. Tobacco retail outlets (TRO) and neighborhood deprivation are important environmental factors that influence smoking behaviors and potentially secondhand smoke exposure. Few studies have examined these associations among pregnant women, a vulnerable population with heightened risk for health complications due to smoke exposure. **OBJECTIVE.** Our goal was to estimate the individual and combined associations of TROs and area-level neighborhood deprivation factors with smoke exposure among pregnant mothers as measured by cotinine assayed from prenatal blood samples. **METHODS.** The sample included n=1,055 pregnant mothers with available prenatal cotinine blood measures and covariate data from the Newborn Epigenetics Study (NEST) - a pre-birth cohort recruited from Duke University. We geocoded TROs and estimated a neighborhood deprivation index (NDI) using sociodemographic variables at the block group level. Bayesian index models were used to relate TROs and NDI to cotinine levels controlling for individual level covariates (age, race/ethnicity, education, marital status). **RESULTS.** Results showed a significant positive association between TRO exposure (beta = 0.008, 95% credible interval (CI) = [0.003, 0.013]) and log cotinine after adjusting for individual covariates. TRO exposure was not significant after including the NDI, which was significantly associated with log cotinine (beta = 0.143, 95% CI = [0.030, 0.267]). However, in a low cotinine stratum indicating passive smoke exposure, TRO exposure was significantly associated with log cotinine (beta = 0.005, 95% CI = [0.001, 0.009]), while the NDI was significantly associated with log cotinine (beta = 0.176, 95% CI = [0.005, 0.372]) in high cotinine stratum indicating active smoking. **CONCLUSIONS.** Our data provide novel evidence in support for TROs increasing cotinine concentrations through passive smoke exposure, in contrast to neighborhood deprivation being associated with active smoke exposure. Additionally, our study supports evidence suggesting that educational attainment and neighborhood racial composition are important factors for smoke exposure during pregnancy.

PS2-103

EVALUATING THE MODERATING ROLE OF EDUCATIONAL ATTAINMENT BETWEEN FINANCIAL STRESS AND SMOKING ABSTINENCE AMONG WHITE AND AFRICAN AMERICAN SMOKERS

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Background: Financial stress has been associated with lower smoking abstinence rates and higher chances of relapse after cessation. A potential moderator to smoking abstinence is educational attainment which has been found to be a protective factor from smoking. However, the Minorities' Diminished Returns (MDRs) theory posits that educational attainment may have a weaker effect among racial minorities than White individuals. **Objective**: Examine the moderating role of educational attainment on the relationship between financial stress and smoking abstinence among White and African American smokers. **Methods:** We drew data from the Quit2Live study (N=449), an intervention among White (n=225) and African American (n=224) smokers. Our outcome was cotinine-verified smoking abstinence at week 12 (end of treatment) and week 26. Our primary explanatory variable was financial stress measured as having some mon-

ey left, just enough money to make ends meet, and not enough money to make ends meet at the end of the month. Our moderating variable was educational attainment. A series of logistic regressions were conducted, including educational attainment, race, and relevant demographic covariates, to determine the association between financial stress and smoking abstinence. We also conducted a two-way interaction on financial stress and educational attainment. **Results:** Participants who consistently do not have enough money had decreased odds of abstinence at week 12 in the unadjusted and adjusted models accounting for educational attainment and race. In the fully adjusted model, this effect was no longer present. However, there was a significant two-way interaction, where participants who had enough money to make ends meet and a college degree had increased odds of smoking abstinence at week 26. **Conclusion:** Contrary to MDR, there were no differences in the protective factor of educational attainment between White and African American smokers. However, smokers experiencing financial stress who had higher educational attainment had higher odds of abstinence relative to smokers experiencing financial stress with lower levels of educational attainment.

PS2-104

ADHERENCE TO PROVIDER REFERRALS FOR LUNG CANCER SCREENING WITH LOW DOSE COMPUTED TOMOGRAPHY BEFORE AND DURING COVID-19 PANDEMIC

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Significance Tobacco use is the leading risk factor for lung cancer and causes almost 90% of lung cancers. Despite Medicare coverage for lung cancer screening (LCS) with low-dose computed tomography beginning in 2015, LCS-LDCT uptake remains low due to complex, multi-step processes for patients, providers, and health systems. This study assesses trends in adherence to provider referrals for LCS-LDCT among LCS-eligible/in-eligible patients before and during the COVID-19 pandemic and the multilevel factors influencing completion rate of LCS-LDCT orders. **Methods** We analyzed electronic health record data from a large healthcare system in Northern California between December 2013 and December 2020. For any patient with LCS-LDCT order, trends in the proportion of screening guideline eligible vs. ineligible patients and screening completion rates were compared. Multilevel factors associated with completion of the LCS-LDCT order were explored using Hierarchical Generalized Linear Models. **Results** There were 12,469 LCS-LDCT orders. LCS-LDCT orders increased from 2013 to 2019, dropped dramatically at the start of COVID-19 pandemic, and then slowly increased again in June 2020. The completion rate increased from 0% in December 2013 to almost 70% in 2018-2019 and then declined to 50-60% in 2020 during COVID-19 pandemic. The completion rate of LCS-LDCT was lower for ineligible patients. Patients with severe major comorbidities and those who smoked fewer than 30 pack-years were significantly less likely to complete an order than those without any major comorbidity and or who had smoked 30 pack-years or more. Patients who received the LCS-LDCT order at a Medicare wellness visit or saw a provider with prior experience with LCS-LDCT were more likely to complete LCS-LDCT orders. **Conclusion** LCS-LDCT program should ensure efficient resource utilization and safely manage patients during the COVID-19 pandemic. Those who received orders at Medicare wellness visits, had no major comorbidities, and providers having prior experience were more likely to complete an order suggest opportunities to improve LCS-LDCT process and influence clinical practice at patient, provider, and systems levels.

PS2-105

SOCIODEMOGRAPHIC CORRELATES OF TRANSITIONS IN TOBACCO USE PROFILES AMONG ADOLESCENTS: RESULTS FROM THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY WAVES 3 AND 4

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Significance: Polytobacco use remains common among adolescents; however, little work has examined how adolescents transition in their patterns of polytobacco use over time or which adolescents are at risk for transitioning to profiles of greater versus less risk. **Methods:** Data derive from Waves 3-4 (2015-2018) of the Population Assessment of Tobacco and Health Study. Participants were adolescents who used at least one tobacco product (cigarettes, electronic cigarettes [ECIGs], traditional cigars, cigarillos,

filtered cigars, snus, smokeless tobacco [SLT], hookah) at either Wave 3 or 4 and had Wave 1 data (N=1,072; M_{age}=13.71, SD=1.71, 46.4% female; 56.6% White, 23.2% Hispanic). **Results:** Five latent classes were identified: *Low Users, ECIG Users, Cigarette Users, SLT Users,* and *Polytobacco Users. Cigarette Users* and *SLT Users* were most likely to maintain class stability (66.0%, 59.0% of users, respectively, continued use). *Low Users* were most likely to transition to *ECIG Users* (46.0%) or *Cigarette Users* (27.0%); *Polytobacco Users* were most likely to transition to *Low Users* (54.0%); and *ECIG Users* were most likely to transition to *Low Users* (41.0%) or *Cigarette Users* (27.0%). Adolescents who were older were more likely to remain *Cigarette Users* than transition to *Low Users* or *ECIG Users*. Non-Hispanic White adolescents were less likely to transition to *Low Users* than to remain *ECIG Users* (versus Black or Hispanic), *SLT Users* (versus Black), and *Polytobacco Users* (versus Hispanic). **Conclusion:** While adolescents were likely to maintain their membership in cigarette or SLT classes, adolescents also showed high probabilities for transitioning from classes characterized by less risk to those dominated by ECIG or cigarette use, and from classes characterized by ECIG use to those characterized by cigarette use. As the tobacco market continues to expand, change over time in adolescents' combinations of polytobacco use should be considered carefully as regulations and interventions are implemented.

PS2-106

MEASURING DUAL-VAPING OF NICOTINE AND CANNABIS AMONG ADOLESCENTS IN FIVE NEW ENGLAND STATES

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Significance: The current adolescent vaping culture includes vaping of both nicotine and cannabis (dual-vaping). Improved survey measures could help establish what substances adolescents are vaping and to what extent they may be dual using. This study describes the use of new survey questions that ask more specifically whether adolescents who vape are vaping nicotine, cannabis, cannabidiol (CBD), or another substance. Methods: We recruited adolescents ages 13-17 from Massachusetts, New Hampshire, Vermont, Connecticut, and Rhode Island through the Prodege online survey panel from April to July 2021. Survey questions included standard vaping behavior measures (eg. ever and current use of vape products, types of vape products used) and new measures to ask what substances adolescents were vaping, such as "Have you ever vaped any of the following substances in the past 30 days?" with the possible responses of nicotine, cannabis, CBD, other, and don't know. Dual-vaping of both nicotine and cannabis was defined as vaping of both nicotine and cannabis and/or CBD in the past 30 days, operationalized as a dichotomous outcome. Results: The analytic sample included N=497 adolescent participants (mean age 15.2 years, 51.4% female, 80.6% White, 79.4% heterosexual). Over one in four (27.8% (n=133)) participants reported they ever vaped, 17.1% (n=82) vaped in the past 30 days, and 7.1% (n=34) had dual-vaped in the past 30 days. Among those who ever vaped, 25.6% were dual-vapers. Among those who currently vaped, 41.5% were dual vapers. Among those who ever vaped, 6% of all participants reported vaping "other" and 6% reported "don't know" in the past 30 days. Discussion: Our findings show that a sizable proportion of a sample of New England adolescents who currently vape are dual-vaping nicotine and cannabis. Our study addresses a key gap in adequate survey measures for assessing adolescent vaping of multiple substances and can help in better characterizing and targeting future surveillance and intervention efforts for adolescent vaping.

PS2-107

CIGARILLO PURCHASE TASK COMPARISON OF SEXUAL GENDER MINORITY WOMEN AND THEIR COUNTERPARTS

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Significance: Sexual and gender minorities (SGM), deemed a priority population by Center for Tobacco Products, engage in more risk behaviors than their heterosexual counterparts, including tobacco use, putting them at higher risk for tobacco-related health problems. SGM women have far greater odds of using tobacco products compared to SGM men and heterosexuals. The disparity appears far greater for cigar products. Bisexual and lesbian cisgender women have at least 1.5 times the odds of using cigar products compared to cisgender gay males and gender minorities. To investigate this disparity, we used a cigarillo purchase task, a behavioral economic method used to determine the valuation and demand for cigarillos. Methods: 201 SGM young adult women and 385 young adult participants consisting of other groups completed a novel cigarillo purchase task as part of an online survey. Data were checked for consistency and analyzed using a nonlinear regression equation. Results: The final analytic sample of n=299 (n=93 SGM and n=206 other) excluded those with inconsistent purchase task data (n=108 from the SGM sample and n=179 from the other sample). Contrary to the hypothesis, SGM women showed less demand and valuation for cigarillos (alpha=.03, Q0=4.88) compared to the overall sample (alpha=.04, Q0=7.35; F(3,12)=49.49, p<.001). Conclusions: Despite a higher prevalence of cigarillo use by SGM women, our sample purchased fewer cigarillos in a purchase task suggesting that though more SGM women use cigarillos, they may be using fewer cigarillos than other groups. Understanding the characteristics associated with use that differ between SGM women and their heterosexual counterparts is integral to informing policy that will decrease consumption of harmful tobacco products among the population most likely to use them.

PS2-108

IDENTIFYING PUBLIC HEALTH TOPICS AND USER EXPERIENCES IN VAPING RELATED POSTS ON TWITTER AND REDDIT: AN INTERDISCIPLINARY EXAMINATION

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Significance: Vaping among US youth has been identified as a public health epidemic. Social media platforms, including Twitter and Reddit, have been used in previous literature for surveillance of public sentiment and health concerns related to vaping. Methods: This study leverages an interdisciplinary method including *topic modeling* and *human manual coding* to identify and compare themes found on Twitter and Reddit during the outbreak of e-cigarette, or vaping, product use-associated lung injury (EVALI) in 2019. A total of 794,620 vaping-related tweets were extracted across 2019, and significant increases in the number of tweets in July, August, and September informed additional data collection of 17,320 Reddit posts among 1,016 subreddits from these three months. Results: *Topic modeling* approaches revealed different patterns of discussions around 1) health issues, 2) products/ingredients, 3) marketing, and 4) age groups between platforms. *Human coding* on a sample of tweets (n=583) and Reddit posts (n=614) from July, August, September 2019 also indicated that the frequency with which themes were mentioned differed between Twitter and Reddit. While mentions of adverse health outcomes outweighed positive health outcomes on both platforms, Reddit posts reflected more perceived positive health outcomes from vaping (32% vs. 23%), but also more concerns with addiction to vaping products (21% vs. 10%). Interest in quitting vaping was mentioned nearly three times more frequently on Reddit (22% vs. 6%), and mentions of vaping marijuana/unregulated products were also much more common (36% vs. 13%). Both platforms mentioned teens and young adults in the context of vaping (29% Reddit, 23% Twitter); however, posts on Reddit related to personal use, while tweets were more often related to news/policies surrounding vaping products. Conclusions: Results from both topic modeling and human coding approaches reflected a similar pattern of population-level public health monitoring on Twitter and user-level experiences on Reddit. The differing strengths of both platforms support the potential feasibility of their use in developing real-time public health surveillance related to vaping and automated detection and outreach models for youth interested in vaping cessation.

PS2-109

LONGITUDINAL ASSOCIATION OF EXCLUSIVE AND DUAL USE OF ENDS AND CIGARETTES WITH ASTHMA AMONG US YOUTH - POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY WAVES 1-5 (2013-2019)

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Significance: The increasing prevalence of electronic nicotine delivery systems (ENDS) use among youth in the United States is concerning, especially given that the long-term health effects of ENDS use are not known. Understanding the prospective association between ENDS use and asthma, a common respiratory condition for youth, is of particular importance. **Methods**: Using data from Waves 1-5 (2013-2019) of the Population Assessment of Tobacco and Health (PATH) study, we followed youth aged 12-17 at baseline who had not been diagnosed with asthma. We ran discrete time survival models to analyze the association between time-varying tobacco product use and incident diagnosed asthma. The time-varying exposure variable was lagged by one wave and categorized respondents by current use status (1+ days in the past 30 days): non-users, exclusive ENDS or cigarette users, and dual users. We controlled for sociodemographic (age, sex, race/ethnicity, parental education) and other risk factors (urban/rural setting, secondhand smoking, household combustible tobacco use, body mass index (BMI-for-age)). **Results**: The analytic sample (n=9140) was half female (50.2%) and predominantly non-Hispanic White (55.3%) with a mean age of 14.5 years at baseline. Also at baseline, 3.1% of respondents exclusively smoked cigarettes, 1.7% exclusively used ENDS, and 1.3% used both products. The average annual incidence of diagnosed asthma was 1.4% over the follow-up period examined. Compared to non-use, exclusive cigarette use was associated with increased risk of incident asthma (aHR: 1.68, 95% CI: 1.21-2.32), while exclusive ENDS use (aHR: 1.25, 95% CI: 0.77- 2.04) and dual use (aHR: 1.54, 95% CI: 0.92-2.57) were not. **Conclusion**: Over a five-year period, the risk of incident asthma was higher among youth who used cigarettes exclusively, but not among those who used ENDS, either exclusively or with cigarettes. Strategies aimed at reducing youth cigarette smoking and continual monitoring of youth cigarette and ENDS use prevalence are necessary.

PS2-110

COST EFFECTIVENESS OF A SMOKING CESSATION INTERVENTION FOR DUAL USERS OF COMBUSTIBLE AND ELECTRONIC CIGARETTES

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Significance: Although smokers often initiate vaping with the goal of quitting smoking, many remain users of both products. The efficacy and cost effectiveness of smoking cessation interventions for dual users are largely unstudied. Here we report cost effectiveness from our 3-arm randomized controlled trial of self-help smoking cessation interventions for dual users. **Methods:** We randomized dual users to assessment only (ASSESS; n=575), generic self-help smoking cessation (GENERIC; n=1154), or self-help targeted for dual users (eTARGET; n=1167). Those in the latter two arms received monthly cessation materials for 18 months, with assessments every 6 months through 24 months. We calculated incremental cost effectiveness ratios comparing our GENERIC and eTARGET interventions to ASSESS using smoking abstinence and cost data from our RCT (Martinez et al., 2021, *Lancet Public Health*) along with the literature on quality of life and mortality reduction from quitting smoking. 24-month smoking status was used as a proxy for continuing smoking status. **Results:** The total intervention cost/participant was $0 for ASSESS, $52 for GENERIC, and $52 for eTARGET. The incremental cost/quitter compared to ASSESS was $2369 for GENERIC and $2253 for eTARGET. The average quitter gained 10 expected life years. Given 24-month post-baseline quit rates of 40.0%, 42.2%, and 42.3% in the 3 arms, the average life years gained per participant were 4.00, 4.22, and 4.23. Quality adjusted life years (QALYs) gained for quitters was a combination of increased survival (8.8 QALYs) and increases in quality of life for other years (2.3 QALYs). Thus, compared to ASSESS, the incremental cost per life year gained at 24 months was $237 for GENERIC and $225 for eTARGET. The incremental cost per QALY gained was $213 and $202, respectively. **Conclusions:** Despite modest efficacy by 24 months, these low-cost and easily disseminated self-help interventions for smoking cessation among dual users produced extremely favorable cost effectiveness estimates. As efficacy increases with further treatment refinement, cost-effectiveness should continue to improve.

PS2-111

E-CIGARETTE PRICE PROMOTION RECEIPT AND SUBSEQUENT E-CIGARETTE AND CIGARETTE USE STATUS AMONG U.S. ADULT CIGARETTE SMOKERS

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Background: For cigarette smokers, receiving e-cigarette price promotions may prompt smoking cessation trials and outcomes through using e-cigarettes. This study explored the associations between receiving e-cigarette price promotions and subsequent e-cigarette, cigarette, and dual use status one year later. **Methods:** Longitudinal data (Wave 3: 2015-2016; and Wave 4: 2016-2018) of the Population Assessment of Tobacco and Health (PATH) Study from a nationally representatively sample of U.S. adult current established cigarette smokers (n=7,670) at Wave 3 were used. Multivariate regressions were conducted to examine the associations between receiving e-cigarette price promotions at Wave 3 and current e-cigarette, cigarette, and dual use status as well as past-year cigarette quit attempts and quitting using e-cigarettes at Wave 4, controlling for covariates including socio-demographic backgrounds, tobacco use status, tobacco marketing exposure, nicotine dependence, and past-year quit attempts at Wave 3. **Results:** At Wave 3, 4.0% of respondents received e-cigarette price promotions. At Wave 4, 89.4%, 12.6%, and 11.0% of respondents were current cigarette smokers, e-cigarette users, and dual users, respectively. Multivariable regressions show that receiving e-cigarette price promotions at Wave 3 was associated with an increased likelihood of current use of cigarettes (AOR=1.57; 95% CI=1.07, 2.30), e-cigarettes (AOR=1.68, 95% CI=1.16, 2.42), and both products (AOR=1.65; 95% CI=1.14, 2.38) at Wave 4. Among those who continued to smoke cigarettes at Wave 4 (n=6,889), receiving e-cigarette price promotions at Wave 3 was not associated with having smoking quit attempts (AOR=1.09; 95% CI=0.80, 1.49) or using e-cigarettes to quit smoking (AOR=1.30; 95% CI=0.74, 2.26) in the past year at Wave 4. **Conclusions:** Receiving e-cigarette price promotions may promote or sustain the use of e-cigarettes, cigarettes, and co-use of both products among adult cigarette smokers. It may not increase smokers' attempts to quit cigarettes or using e-cigarettes to quit smoking. Overall, e-cigarette price promotions may not promote cigarette smoking cessation outcomes or trials among adult smokers.

PS2-112

CIGARETTE SMOKERS' AND ELECTRONIC NICOTINE DEVICE USERS' PERCEPTIONS OF AND INTENTIONS TO USE IQOS: A QUALITATIVE ANALYSIS

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Introduction: Since the FDA authorized the marketing of the IQOS Tobacco Heating System in 2019, IQOS has entered markets throughout Georgia, Virginia, North Carolina, and South Carolina with 1300 retail locations. The objectives of this qualitative study of current/former smokers with varied ENDS use histories was to examine (1) prior awareness and perceptions of IQOS, (2) intentions to try IQOS, and (3) reactions to a reduced-risk exposure statement. Methods: Participants were 61 adults representing four subpopulations of U.S. adults recruited from three U.S. cities and defined by their cigarette and ENDS use: current smokers who never used ENDS (Never Triers); current smokers who discontinued ENDS (Rejectors); current dual users of cigarettes and ENDS (Dual Users); and former smokers who switched to ENDS (Switchers). Focus group participants were shown IQOS marketing material and probed on awareness, knowledge, and perceptions of IQOS; intentions to try IQOS; and a reduced exposure statement. A hybrid inductive/deductive approach was used to identify and code themes. Results: Awareness and knowledge of IQOS was low with impressions varying by subgroup. Never Triers reacted mostly negatively to IQOS, Switchers were disinterested in returning to "real tobacco" use, Dual Users were curious but had mixed feelings, and Rejectors exhibited the greatest interest but were concerned about its perceived cost. All groups expressed uncertainty about IQOS, how it works, and its health effects. Reactions to the reduced exposure statement were mixed across groups, with some viewing it as a

meaningful endorsement of harm reduction benefits while others were highly skeptical. Conclusions: These findings present a mixed picture of smokers' interest and inclination to try IQOS and by extension, in their potential as a complete substitute for combustible cigarettes. IQOS may be adopted by smokers with ENDS use history, but its entry cost will likely be a barrier to uptake.

PS2-113

CONTENT ANALYSIS OF YOUTUBE VAPING VIDEOS RELATED TO COVID-19

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BACKGROUND E-cigarettes are frequently portrayed on YouTube videos. Despite the growing body of research on how e-cigarettes are portrayed on YouTube, none of the previous studies analyzed YouTube videos related to Covid-19. Understanding e-cigarette content related to Covid-19 on YouTube may inform tobacco regulatory action such as correcting misinformation on e-cigarette use and identifying marketing and sales strategies used during the pandemic. This study identified the themes of the Covid-19-related e-cigarette YouTube videos. **METHODS** We searched for "e-cigarettes", "vape" along with "corona", "covid", and "Wuhan" on YouTube's API which uses the relevance algorithm, in July 2021. We randomly selected videos to identify the themes related to e-cigarettes and Covid-19. **RESULTS** The main themes of videos related to e-cigarette and Covid-19 were: (1) health information related to the risk and benefit of e-cigarette use and Covid-19 (e.g., e-cigarette use may increase the risk of Covid-19; or e-cigarette use may protect one contracting Covid-19), (2) instructions for vaping safely to reduce the spread of Covid-19 (e.g., how to sanitize the device), (3) mask and e-cigarette use (e.g., conduct vape tricks involving masks), (4) e-cigarette sales and access issues during the pandemic (e.g., in-person vape shops are closed during the pandemic). **CONCLUSION** This study identified themes related to e-cigarettes and Covid-19 on YouTube. Themes included a variety of topic areas including health (mis) information and instructional videos that may increase (vape tricks inside the mask) or decrease (sanitizing the devices) health risks, as well as issues related to accessing and purchasing e-cigarettes during the pandemic. These findings suggest that communication efforts need to focus on accurate health information regarding e-cigarettes and Covid-19 to reduce harm from both Covid-19 and e-cigarette use. Understanding e-cigarette purchasing/access behaviors during the pandemic is important to inform regulations in this new ennvironment.

PS2-114

JUUL VS CIGARETTES' IMPACT ON VASCULAR FUNCTION LUNG FUNCTION AND SUBJECTIVE EXPERIENCES

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Significance The increasing rates of electronic cigarette (e-cigarettes) use among youth in the US have been largely attributed to the recent emergence of the high-nicotine-delivery pod-based devices such as JUUL. While these devices continue to be promoted as safer alternatives to combustible cigarettes, their impact on on vascular function, lung function and subjective experiences remains almost entirely unknown. This study aim to assess the impact of JULL vaping on lung function, vascular function and subjective experiences compared with combustible cigarette among adult smokers. **Methods:** A total of 14 adult smokers (21-39 yrs) attended two instructed smoking/vaping sessions (cigarette vs e-cigarette) in a crossover design study. Participants completed a battery of questions assessing subjective smoking experiences. Endothelial function (via Femoral Mediated Dilation (FMD)), cerebral function using (via Transcranial Doppler (TCD)) and lung function (via spirometer) were assessed before and after each sessions. **Results:** There was a significant reduction in lung-function both after smoking and vaping (P<0.05) with no significant differences between the two study conditions. Similarly, there was a significant reduction in FMD and TCD both after JUUL and combustible cigarette use (Ps<0.05). Participants scored higher for measures of satisfaction, enjoyment and suppression of craving after smoking the combustible cigarette compared with JUUL. **Conclusions:** Our results indicate that similar to combustible cigarette, acute exposure to JUUL is associated with a decrease in lung and vascular function, while providing a reduced subjective experience than cigarette among regular smokers. Therefore our

pilot study suggest that JUUL vaping may not be a safe alternative to cigarette smoking. There is a need for longitudinal design studies to assess the long-term impact of JUUL use on cardiopulmonary function compared with cigarette.

PS2-115

THE ROLES OF TOBACCO AND CANNABIS USE IN YOUNG ADULTS' EVERYDAY LIVES: TWO QUALITATIVE STUDIES FROM NORTHERN CALIFORNIA

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Significance: Regular use of tobacco and cannabis is prevalent among young people. Most tobacco treatment programs do not focus on tobacco's interplay with cannabis, possibly reducing treatment efficacy for co-using groups. We draw from two qualitative studies to compare the integrated and complementary roles of cannabis and tobacco use in young adults' everyday lives. Methods: Participants (n=66) were ages 18-30, lived in Northern California, and reported past month current use of both cannabis and tobacco (Study 1: n=32; Study 2: n=34). In both studies: (i) In-depth interviews explored participants' routines and everyday use contexts; and (ii) a tandem transcript reading method identified a priori and emergent themes regarding roles and experiences of tobacco and cannabis use in everyday life. Results: Young adults described tobacco and cannabis as serving many shared roles, including: coping with overwhelming emotion, pleasure/fun, transitioning between activities, facilitating social interaction and/or belonging, and self-soothing (e.g., from boredom). Tobacco's uniquely prominent roles were: structuring activities (e.g., stabilizing routines), satisfying addiction, and providing protected breaks. Cannabis' uniquely prominent roles were: therapeutic/medicinal, enhancing experience (e.g., feeling a stereo bass), lowering inhibitions, perceived tobacco cessation aid, and use in tobacco-prohibited settings. When combined, tobacco complemented cannabis by controlling psychoactive effects and economizing cannabis consumption. Conclusion: The diverse and complementary roles that cannabis and tobacco play in young adults' lives seem to relate to mitigating the characteristic everyday challenges of young adulthood: learning to navigate difficulties independently, finding a community after transitioning out of the childhood home, and making due on limited budgets. Substance use interventions should address the roles of cannabis and tobacco dual use as they relate to the developmental experiences of young adulthood.

PS2-116

TOBACCO 21 MISCOMMUNICATION AND LOOPHOLES, TWITTER DISCUSSIONS BEFORE ENACTMENT OF THE FEDERAL LAW

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Significance. The U.S. restricts the minimum legal sales age (MLSA) of tobacco products to those under 21 years of age, a policy commonly referred to as Tobacco 21. While Tobacco 21 policies are credited with decreasing tobacco use and sales among youth, these MLSA laws are often confused with purchase, use, and possession (PUP) laws that impose a penalty on the underage purchaser rather than the retailer. The objective of this study is to explore Twitter discussions about Tobacco 21 leading up to and immediately after the federal Tobacco 21 law was enacted. Methods. Twitter messages (tweets) about Tobacco 21 posted between September-December 2019 were independently reviewed by two coders using a content analysis approach. All codes were found to have acceptable agreement (κ values ranged from 0.673 to 1.00), and discrepancies were discussed among both coders and an adjudicator until consensus was met. Results. Findings included three primary categories: Miscommunication Spread by the News, Youth and Young Adults, and Methods of Avoiding the Law. Most News-related tweets incorrectly described the law as a purchase law (54.7%). About one-fourth (27%) of tweets involved youth and young adults, with some discussing young audiences' use of and addiction to novel tobacco products. Further, Twitter discussions included policy loopholes that allow these addicted youth and young adults to access tobacco products. Albeit few (2.5%), some Twitter users discussed methods of avoiding the Tobacco 21 law by buying tobacco for someone who was under 21 years, asking someone else to buy tobacco products for them, or by attempting to purchase tobacco

products with or without a fake identification. Conclusions. Tobacco 21 is a sales law that penalizes tobacco retailers who sell to underage purchasers rather than a PUP law, as described by most news articles. PUP laws have shown to have mixed results when examining efficacy to reduce youth purchase and use of tobacco products. They also create health disparities by disproportionally putting vulnerable populations at risk of racial discrimination and brutality. Claims that youth will circumvent Tobacco 21 laws by simply purchasing from older peers have been propagated by the tobacco industry as justification for not passing such laws; however, decreasing the availability and accessibility of tobacco has been found to effectively reduce the use and sales of tobacco products to those under 21. Our findings suggest that policy enactment should be coupled with communication strategies to maximize policy compliance.

FUNDING: Federal

PS2-117

AN IMPROVED ESTIMATION FOR THE AGE OF INITIATION OF TOBACCO AMONG U.S. YOUTH: FINDING FROM THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY

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Objectives: Using the Population Assessment of Tobacco and Health (PATH) youth dataset (wave 1-4), we conducted a novel analysis using advanced statistical methods that incorporated users and non-users to provide an improved estimation of the age of initiation of ever use of several tobacco products. **Methods:** We combined "left truncated"(users) and "right censored" (non-users) at wave of entry to estimate the age of initiation of ever use of cigarettes, e-cigarettes, and cigarillos. Combining information collected from these users and non-users, the age of initiation of these tobacco products was estimated using weighted interval-censored survival analyses. Then, weighted interval censoring Cox-proportional hazards regression models was used to assess the differences in the age of initiation of ever use of these tobacco products by sex, race/ethnicity, and ever use of the tobacco product at wave of entry. This unique statistical method is possible because the PATH data recorded the participants' age and the number of weeks between relevant subsequent waves to provide an estimate of age of initiation among non-users; and the recalled age of initiation of ever use of these tobacco products among users. **Results**: Our results showed substantial increase in ever use of all tobacco products after the age of 14. At age 14, 9.1% (CI:7.9, 10.2), 7.1% (CI:4.6, 9.5) and 2.3% (CI:1.1, 3.5) ever use e-cigarettes, cigarettes and cigarillos respectively. By age 18, the cumulative incidence increased to 49.9% (CI:46.3, 53.5), 37.1% (CI:34.3, 40.0) and 15.9% (CI:14.8, 17.0) ever use of e-cigarettes, cigarettes and cigarillos respectively. The adjusted Cox model showed that boys had an earlier age of initiation than girls for all tobacco products. Similarly, non-Hispanic Whites had earlier age of initiation for each of these tobacco products compared to Hispanics, non-Hispanic Blacks, and non-Hispanic Other. Conclusion: Our results showed higher proportion of initiation at every age as compared to previously published studies that were limited to non-users at wave of entry. These analyses can help elucidate population selection criteria for estimating the age of initiation of tobacco products.

FUNDING: Federal

PS2-118

DISPARITIES IN SPATIAL PROXIMITY TO VAPE AND TOBACCO OUTLETS: AN ANALYSIS OF CALIFORNIA MIDDLE AND HIGH SCHOOLS

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Significance: Previous literature suggests that proximity of schools to tobacco and vaping storefronts encourages students to initiate use of tobacco/vaping products and to use these products more frequently. The association of school/community characteristics with proximity to tobacco/vaping storefronts may encourage disparities and risks associated with tobacco use. We sought to determine the school and community characteristics associated with proximity to tobacco and vaping storefronts within a 0.5-kilometer radius in California. **Methods:** A list of licensed tobacco retailers was obtained from the California Department of Tax and Fee Administration; retailer names and addresses were used to scrape Yelp in order to determine sub-categorization of

business as a "Vape Shop" or "Tobacco Shop." US Census Bureau data was used to assess community characteristics at the census tract level, and the California Department of Education provided school characteristics. Logistic regression with backward selection was used to assess associations of these characteristics. **Results:** The final regression model included six community variables which were all negatively associated with retailer proximity (percent male, percent age 5-10, percent age 15-20, percent age 25-30, percent age 55-60, and percent age 60-65) as well as four school characteristics which were all positively associated (percent female students, percent Hispanic students, percent White students, percent eligible for free and reduced priced meals [FRPM]). Identified risk characteristics were geospatially assessed for the Los Angeles Basin area due to its population size and variation in school density. **Conclusions:** In our multivariable model, variation in demographics (among both students and the school community) reflected most of the risk associated with school proximity to tobacco/vaping storefronts. FRPM was also associated with storefront proximity indicating that schools with a higher burden of lower socioeconomic status may be at higher exposure to tobacco retailing. Further studies are needed to confirm how retail density may exacerbate socioeconomic disparities in tobacco/vape use.

FUNDING: State

PS2-119

E-CIGARETTE DEPENDENCE IN YOUTH

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Significance: The majority of e-cigarette smoking youth use nicotine when vaping. Some then become dependent on the nicotine, resulting in increased concentrations and frequency of use, which can then result in subsequent respiratory and cardiovascular health effects. There has been limited evaluation of convergent validity of e-cigarette dependence measures for use specifically in youth. The objective of this study was to investigate and validate the effectiveness of various e-cigarette dependence measures for use specifically in adolescent and young adult populations. Methods: A cross-sectional survey design was used to recruit and assess subjects via social media from August 2020 to February 2021. The study sample included 3,082 Canadian subjects aged 16-24 who had completed the recruitment and baseline surveys. Of those 3,082, 1,205 reported vaping at least monthly and were thus included in this study and assessed for e-cigarette dependence. E-cigarette dependence was assessed using a modified 11-item Penn-State Electronic Cigarette Dependence Index (PS-ECDI), the 4-item E-Cigarette Dependence Scale (EDS), and a 1-item self-perceived vaping dependence question. Demographic and vaping behaviour data were also collected. Results: Both the PS-ECDI and the EDS exhibited a good degree of internal consistency (α= 0.8472 and 0.8405, respectively). All three measures exhibited convergent validity against each other and against time to first vape upon waking (p<0.001). Concurrent validity between each of the three measures and vaping frequency and nicotine use was significant (p<0.001 for all measures). When controlling for demographic variables and combustible cigarette smoking status, the PS-ECDI was superior to both the EDS and the self-perceived measure when predicting vaping frequency and nicotine use, while the self-perceived measure was superior to the EDS only when predicting monthly vaping frequency and nicotine concentrations among nicotine users. Conclusion: All three measures exhibit convergent and concurrent validity, as well as internal consistency (where applicable). Depending on the needs of the study, it would be appropriate to use any of these measures when assessing e-cigarette dependence in adolescent and young adult populations. While the PS-ECDI is a better predictor of vaping frequency and nicotine use when controlling for demographic variables, the self-perceived measure still exhibited sufficient convergent and concurrent validity. Thus, the one-item self-perceived measure of dependence is appropriate for use and preferable to the 10-item PS-ECDI or the 4-item EDS in situations of limited time or where subjects are at risk of respondent fatigue.

FUNDING: Federal

PS2-120

SWITCHING SMOKERS TO UNFILTERED CIGARETTES PERCEPTIONS, ADDICTION, AND BEHAVIORAL EFFECTS IN A CROSS-OVER RANDOMIZED CONTROLLED TRIAL

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Significance: Despite no evidence that cigarette filters reduce harms for smokers, 99% of commercially sold cigarettes in the United States are filtered. Consequently, cigarette filters are the most toxic littered item globally each year. Banning the sale of

filtered cigarettes as an environmental intervention may change smokers' perceptions and behaviors to reduce cigarette consumption and hence support behavioral efforts toward the tobacco endgame. This is the first randomized clinical trial testing the effects of filtered compared to unfiltered cigarettes on smokers' cigarette perceptions, nicotine dependence, and smoking behavior. **Method:** This cross-over trial involved 43 filtered cigarette smokers (41.9% women, mean age 36.7 years). Participants were provided two weeks supply of filtered cigarettes, two-weeks of the same brand of unfiltered cigarettes, and randomly assigned to starting conditions. Measures included the Modified Cigarette Evaluation Questionnaire; single-item cigarette perception questions; Fagerström Test of Nicotine Dependence; seven-day cigarette consumption, urinary cotinine, and intention to quit. Statistical analysis included linear and ordinal repeated measures mixed effects models and paired t-tests. **Results:** Filtered cigarettes were perceived as better tasting, more satisfying, more enjoyable, less aversive, less harsh, less potent, and less negatively reinforcing than unfiltered cigarettes ($p \leq 0.05$). Filtered cigarettes were smoked at a higher rate during the trial than unfiltered cigarettes ($p \leq 0.05$). There was no difference in urinary cotinine, dependence, or intention to quit between filtered vs. unfiltered cigarette conditions ($p > 0.05$). **Conclusion:** Smokers perceived unfiltered cigarettes as having greater nicotine effects and less desirable sensory effects than filtered cigarettes, and they smoked fewer of these during the trial. Although cotinine, dependence, and intention to quit were similar for smoking unfiltered and filtered cigarettes in this small trial, results suggest that banning the sale of filtered cigarettes might make smoking less attractive to smokers in the long run.

PS2-121

APPEALING CHARACTERISTICS OF RETAIL AND ONLINE E-CIGARETTE MARKETING FOR ADOLESCENTS AND YOUNG ADULTS

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Background: Nearly 3.6 million U.S. adolescents use e-cigarettes, despite known health harms and laws prohibiting sales to people below 21 years. Adolescents and young adults (AYAs) report purchasing e-cigarettes from retail stores and online. Although studies show that e-cigarette marketing appeals to AYAs, these studies have not directly asked AYAs to identify characteristics of retail, online and social media e-cigarette marketing that they find most appealing and influential in determining e-cigarette purchases. **Methods:** 90-minute, online focus groups with 14-19 year olds (May-Aug 2021). Photographs were used to help participants recall e-cigarette marketing. Participants were recruited through an Instagram post targeting 30 major U.S. cities (n=25 recruited in 3 focus groups from across 10 cities thus far; recruitment ongoing). Thematic analysis was used to identify themes related to appealing marketing characteristics. **Results:** In addition to bright colors of e-cigarette advertising and names of flavors, participants described appealing e-cigarette marketing characteristics. Appealing characteristics in retails stores: pricing coupons, free smelling samples, individual brands displayed in separate containers, displays at the checkout counter (e.g., "*there's a big difference between being at the counter, where you can pick it up yourself, and being behind the counter because I don't want to have to ask the person at the Walgreens -'can you hand me that?'"*). On social media: AYAs were attracted by youth/influencers explaining product safety (e.g., "*A lot of influencers market like 'Oh yeah, they don't have any cancer-causing chemicals'*"); and inability to trace messages (e.g., Snapchat). Participants also listed ways to purchase e-cigarettes using gift cards, debit cards and using fake or other people's IDs. **Conclusion:** Our data show that specific appealing e-cigarette marketing characteristics in retail stores and online can and should inform FDA, state, and local regulation. Notifications on social media, similar to those created to combat misinformation about COVID-19 vaccines, may be developed and tested to prevent AYAs from accessing e-cigarette-related misinformation.

PS2-122

WHICH SOCIODEMOGRAPHIC FACTORS ARE RELATED TO ADOLESCENTS' AND YOUNG ADULTS' SUSCEPTIBILITY, USE AND FUTURE USE OF DIFFERENT E-CIGARETTE DEVICES?

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Background: Adolescent and young adult (AYA) e-cigarette use is a major public health concern. Studies have examined sociodemographic factors associated with AYAs' susceptibility and use of JUUL and other e-cigarettes. However, no studies report sociodemographic factors associated with initiation, experimentation, and current use by device types (e.g., disposables, pod-based, tanks). Such research can inform targeted AYA e-cigarette prevention. **Methods:** An online cross-sectional survey of 13-24 year olds (n=4,351; 50:50 e-cigarette ever-users/never-users). We assessed sociodemographic factors associated with AYA: 1) susceptibility among never users, 2) ever vs. never use, 3) former use (ever users who did not use in the past 30 days) vs. past-30-day use among ever-users, and 4) intent to use in the next six months among ever users, by a. former users and b. past 30-day users, by device types (any; pod-based; disposable; other). **Results:** Our sample included 2,168 never users and 2,183 ever-users. Among ever-users, 912 were former users and 1092 were past 30-day e-cigarette users. 32.5% of never-users were susceptible to using in the future, 66.3% of former users and 94.5% of 1034 past-30-day-users intended to use in the next six months. Never users' susceptibility to use all device types increased among AYAs identifying as LGBTQ compared to others and among non-Hispanic African American (AA)/Black AYAs compared to non-Hispanic White AYAs. AYAs identifying as LGBTQ compared to others were more likely to ever-use a pod-based device (aOR=2.38, 1.07-5.30) and AYAs aged 13-20 versus 21-24 years-old were less likely to use other devices (aOR=0.60, 0.43-0.85). Across devices, AYAs were less likely to be past 30-day users compared to former users if they were younger, female, and non-Hispanic multi-race/other compared to non-Hispanic White. Future use intent among past 30-day users was lower among non-Hispanic AA/Black AYAs for disposables and other devices. **Conclusion:** Sociodemographic factors are related to initiation, experimentation and past-30-day use of different devices. However, sociodemographic factors have limited influence on past-30-day users' intent to use in the future, where the role of stress, flavors and e-cigarette marketing may be more important.

PS2-123

INTENTION TO QUIT VAPING AMONG CANADIAN YOUTH AND YOUNG ADULTS- A MACHINE LEARNING APPROACH

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Introduction: Vaping has been increasing in prevalence and popularity in recent years, especially amongst youth and young adults. It is essential to develop our understanding of influential factors that impact one's intention to quit vaping to drive tailored and targeted treatment development that will be most successful in those with an existing intention to quit, to maximize quit attempts and quitting success. We developed a random forest algorithm to predict intention to quit vaping within six months among Canadian youth and young adults, followed by examination of predictor importance. Methods: This cross-sectional study used a representative sample of 1,068 Canadian youth and young adults aged 16-25 that reported vaping at least monthly. Participants were assessed via a survey on their intention to quit vaping within six months. Using cross-validation, we developed random forest algorithms to predict the intention to quit vaping, with model performance evaluated via the AUC. The top 10 most influential variables on intention to quit were identified by relative importance score calculation. Results: 31.8% of participants reported an intention to quit vaping within six months. The random forest algorithm achieved good performance with ROC-AUC over 0.60. The top 10 predictors of intention to quit vaping within six months were related to vaping frequency, vaping expenses, cannabis use, or perceived risks of vaping. Conclusion: Machine learning is a promising methodology to identify influential variables on intention to quit vaping. Knowledge of factors that influence one's intention to quit vaping, and thus openness to treatment, will be of benefit in the development and tailoring of targeted treatment options for e-cigarette dependent vapers.

PS2-124

CHANGING PATTERNS AND CORRELATES OF POLYTOBACCO USE AMONG NATIONALLY REPRESENTATIVE SAMPLES OF US ADOLESCENTS OVER 6 YEARS: A LATENT CLASS ANALYSIS

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Introduction and Aims: Youth polytobacco use of multiple product types is associated with increased risks of adverse health effects and nicotine dependence. We identified changes in patterns of polytobacco use among US youth between 2014 and 2020. **Design and Methods:** Repeated cross-sectional data of the National Youth Tobacco Survey from 2014-2020 (N_{total} >100,000) were used. Latent class models identified classes based on past-month use of nine tobacco products (e.g. cigarettes, cigars, chewing tobacco/snuff, hookah, e-cigarettes, pipe, snus, dissolvable and bidis). We tested if patterns of polytobacco use changed over time. The demographic and tobacco-related characteristics of each class were examined using multinomial logistic regression. **Results:** We identified three distinct classes of polytobacco use: 'Non-use' (NU, ~90.17 %), 'occasional e-cigarette, cigarette, cigar, and hookah use' (ECCCH: ~ 8.8 %), and 'Extended range polytobacco use' (POLY, ~1.04 %), There was a decrease in combustible cigarette use in all classes (p < 0.05), while e-cigarette use increased in all classes (p < 0.05). Factors associated with both ECCCH, and POLY included being male, difficulties in concentrating, remembering, or making decisions, tobacco use at home, and perceiving tobacco products as harmless. **Discussions and Conclusions:** Our findings are consistent with recent shifts in adolescent tobacco product use, demonstrating the decrease in combustible cigarette smoking, and the increase in e-cigarette use among all three groups, over time. Continuous monitoring of the patterns and correlates of tobacco use is warranted for interventions targeting youth tobacco control. **Implications for Practice or Policy:** Public health interventions to discourage the uptake of e-cigarettes to consume nicotine in youth are warranted.

PS2-125

USING TOBACCO AND OTHER SUBSTANCES IN THE PAST 30 DAYS: WHAT IS ASSOCIATED WITH DEPRESSION?

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Background: Adolescents and young adults (AYAs) report that stress is a key reason for using different types of substances, including tobacco, alcohol and cannabis. However, since adolescents may have used a range of substances in the past 30 days, it is unknown as to whether the odds of depression are greater among those who used particular products. **Methods:** We conducted an online cross-sectional survey of 13-24 year olds in May 2020 (50:50 e-cigarette ever-users/never-users). We used a weighted ordered logistic regression to examine whether depression (Patient Health Questionnaire-2 scores>3) was associated with past 30-day use of 8 substances (cigarettes; e-cigarettes; little cigars, cigarillos and cigars; smoked marijuana; edible marijuana; blunts; alcohol; and hookah), including covariates of age, sex, LGBTQ, race/ethnicity and whether participants were complying with sheltering-in-place orders since staying at home may be correlated with feeling depressed. **Results:** In our sample of 4,315 AYAs, 1,449 (33.6%) were depressed, including 442 13-17-year-olds, 937 females, 377 AYAs identifying as LGBTQ, 230 non-Hispanic African American/Black and 819 non-Hispanic Whites. Percentage of AYAs who were depressed out of the whole sample of 4,315 participants, by substance use status: 1) cigarettes: 839 never-users (19.4%), 262 used but not in the past 30 days (former users) (6.1%) and 327 past 30-day users (7.6%); 2) e-cigarettes: 585 never-users (13.5%), 355 former users (8.2%) and 509 past 30-day users (11.8%); 3) little cigars, cigarillos and cigars: 1,021 never-users (23.7%), 188 former users (4.3%) and 219 past 30-day users (5.1%); 4) smoked marijuana: 702 never-users (16.3%), 266 former users (6.1%) and 458 past 30-day users (10.6%); edible marijuana: 840 never-users (19.5%), 266 former users (6.1%) and 319 past 30-day users (7.4%); blunts: 810 never-users (18.8%), 481 former users (11.1%) and 131 past 30-day users (3.0%); alcohol: 400 never-users (9.3%), 341 former users (7.9%) and 691 past 30-day users (16.0%); and hookah: 1,006 never-users (23.3%), 201 former users (4.6%) and 219 past 30-day users (5.1%). In a model including past 30-day-use of eight substances, depression was more likely among those who used e-cigarettes in the past 30-days compared to never users (aOR=6.90, 1.74-27.38) and was less likely among non-Hispanic Asian American Pacific Islander (aOR=0.05, <0.01-0.97). Depression was not associated with past 30-day-use of any other substances or other sociodemographic factors in this model. **Conclusion:** From a range of substances used by AYAs in the past 30 days, past 30-day-use of e-cigarettes was particularly associated with depression. Thus, while substance use issues should be co-investigated with depression, for e-cigarette cessation among past-30-day users mental health needs should be addressed.

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ELECTRONIC CIGARETTE DEPENDENCE- ASSOCIATION WITH DEVICE AND USER CHARACTERISTICS

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Significance: The ability of an electronic cigarette (ECIG) to produce dependence likely varies as a function of its ability to deliver nicotine. Consequently, ECIG dependence may be associated with device/liquid and user characteristics that have shown to impact nicotine delivery. This study examined the association between ECIG device and liquid characteristics and ECIG dependence among non-smoking ECIG users. **Methods:** Daily users of a nicotine-containing ECIG who smoked <100 cigarettes in their lifetime (N=134) completed an online survey between November 2020 and May 2021. Respondents answered questions about their ECIG device type (e.g., vape pen, pod-based system, mod, disposable) and individual characteristics (e.g., rechargeable, refillable, adjustable power), and uploaded a picture of their device/liquid for verification of survey responses. They also reported on their ECIG use behaviors (e.g., duration and frequency of use) and completed the Penn State Electronic Cigarette Dependence Index. Multivariable linear regressions examined these device and user features as predictors of dependence, controlling for demographic factors (i.e., age, gender, race/ethnicity). **Results:** Participants had a mean age of 23.4 (SD=5.6) years, and identified largely as White (79.9%) and women (56.7%). Preferred ECIG device types were pod-based systems (56.0%), disposables (20.1%), mods (15.7%), and vape pens (3.7%). Higher ECIG dependence scores were associated significantly with longer durations of use (B=1.03, SE=0.25), more use days/week (B=1.90 SE=0.39), as well as using pods (B=2.76, SE=.97) or disposables (B=2.82, SE=1.17) relative to mods (all p's<.05). No individual device/liquid features significantly predicted dependence level. **Conclusions:** Findings reflect the complexity of the ECIG marketplace, which is inundated with an abundance of device and liquid characteristics that combine in different ways to determine nicotine delivery. To reduce the dependence potential of ECIGs via restricting their nicotine delivery ability, regulatory efforts might focus on the nicotine emissions of these products regardless of their combination of device and liquid features.

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SALIENT BEHAVIORAL BELIEFS UNDERLYING FLAVORED E-CIGARETTE USE: RESULTS FROM AN ELICITATION SURVEY WITH YOUNG ADULT VAPERS

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Significance: The tobacco industry's marketing efforts on promoting flavored e-cigarettes have successfully recruited a new generation of tobacco users, with > 70% of young adults (YAs) being current users of flavored vapes, and 60% reporting flavors as a reason for continued use. Media campaigns continue to be an effective and cost-efficient approach to remedy the strong negative marketing influence. Identifying the salient beliefs underlying YAs' flavored e-cigarette use serves as the first step of effective anti-vaping campaign message design. **Methods:** An elicitation survey was conducted among 396 18-25-year-old (M=19.66, SD=1.45) ever vapers, with the majority (70.3%) having vaped in the past 6 months. Participants were asked to list in open-ended format the advantages and disadvantages of using flavored vapes, yielding a total of 3,641 belief items. Thematic analysis was conducted by two coders ($alphas$=0.81-1.00) to identify commonly held and novel themes. **Results:** Among a total of 28 themes identified, the most commonly shared benefit was enjoyment and mood (i.e., flavoring better facilitates stress relief; 33.1%), followed by pleasurable sensations (e.g., the various pleasing orosensory and olfactory stimulations generated by vaping flavors; 31.9%) and the perceived lower risk compared to other substance use (10%). The most frequently noted concerns that may dissuade YAs from using flavored vapes included negative physical health effects (43.3%), followed by the loss of independence and control caused by addiction (25.1%) and the financial/time costs associated with purchasing flavored e-liquids (13.6%). Amidst the backdrop of the global pandemic, concerns about hygiene and spreading germs through sharing flavored vapes were also saliently noted among

vapers. **Conclusion:** The findings of this study provide a comprehensive list of potentially promising anti-vaping campaign themes targeting e-cigarette flavors among YAs, with a priority ranking based on prevalence. Novel, salient beliefs generated directly from the target audience also provide fresh, innovative angles to fuel effective prevention efforts to counter the powerful allure of appealing flavors.

PS2-128

THE USE OF PROTECTIVE BEHAVIORAL STRATEGIES FOR E-CIGARETTE USE AMONG COLLEGE STUDENTS

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Significance: Prevalence of e-cigarette use (i.e., vaping) among young adults (YAs) has risen exponentially, sparking widespread concern as vaping is often YAs' first introduction to nicotine. Exploring factors that may help mitigate the harms associated with vaping among YAs, such as addiction potential and transition to cigarette smoking, may provide insights for prevention/intervention efforts. The use of protective behavioral strategies (PBS) has been explored for YA cannabis and alcohol use. Those who use PBS more often experience fewer harms from alcohol and cannabis use, and promotion of PBS use can clinically help youth adopt these harm-reduction practices. However, information about PBS for vaping have yet to be gathered. This exploratory study sought to identify PBS that undergraduate college students use for vaping. **Methods**: A sample of 277 students responded to measures of vaping frequency and provided open-ended reports on strategies that they use to avoid or limit vaping. Similar strategies were grouped together into categories created by two independent coders. **Results**: 35.4% of respondents reported past 30-day use, using e-cigarettes on an average of 17.0 days (SD=12.0). The most reported strategies for *avoiding* vaping were "refusal to use" (e.g., "not accept offers to vape," 33.9%), "avoiding vape products" (e.g., "don't buy them," 15.2%), and "selective about social circle" (e.g., "avoid people who vape," 13.0%). The most reported strategies for *limiting* vaping were "refusal to use" (11.6%), "not carrying vape products/keeping them out of sight" (e.g., "don't leave the house with my vape," 10.8%), and "limiting use to certain contexts" (e.g., "don't vape on weekdays," 9.4%). Among those who vaped in the past 30 days, "avoiding vape products" and "not carrying vape products/keeping them out of sight" were the most used PBS to avoid or limit vaping. **Conclusion**: This work is the first step toward generating an item pool for a PBS for vaping scale that will be tested in follow-up work. Such a measure could be used as a clinical tool to assess for PBS use among heavy users, which may then inform intervention efforts for youth.

PS2-129

THE EFFECT OF TOBACCO TAXATION ON PRICES, RECENT EVIDENCE FROM MEXICO

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Significance. There is ample evidence on the effectiveness of tobacco taxation to reduce consumption. This effectiveness, however, depends on the extent to which tax increases are passed on to consumers through higher prices. Since the tobacco industry is highly concentrated, the pass-through of excise taxes can vary between countries, periods, and brands. This study analyzed the most recent tobacco tax increases in Mexico (January 2020 and 2021) to provide evidence on the effect of excise taxes on prices in the presence of a duopoly. **Methods.** Monthly cigarette prices from January 2011 to April 2021 for 46 main cities came from the National Institute of Statistics and Geography (INEGI). This information is part of that collected by INEGI to calculate the national consumer price index (INPC). Prices for packs of different sizes were used to estimate standardized average prices per cigarette, city, and month for the seven most common brands. Panel models regressed prices per cigarette on a linear trend and dummy variables for January 2020, January 2021, January, brand, and city. Interactions terms were also considered. Standard tests were used to determine whether fixed or random effects were more appropriate, as well as the presence of unit roots. **Results.** The analysis of unit roots suggested that a dynamic specification with the first lag of the dependent variable as a regressor was necessary. Likewise, the tests to contrast fixed and random effects indicated the former were more adequate. Both the 14.44 cents and the 1.64 cents excise tax increases implemented in January 2020 and January 2021 increased cigarette prices (17.3 cents and 3.6 on average, respectively). Price increases

were not homogeneous across brands, however (p<0.01). In January 2020, premium brands (Benson, Camel, Marlboro) had the highest price increases (between 19 to 24 cents), followed by discount brands (Chesterfield, Montana; 16 cents). Mid-segment brands (Pall Mall, Lucky Strike) had the lowest increases (13 and 12 cents, respectively). Something similar was observed in January 2021. **Conclusions.** Recent tax increases in Mexico show that the tobacco industry implements pricing strategies to try to moderate their impact. In particular, tax increases for mid-segment brands, those with the fastest growth in the past decade, were partly absorbed to maintain their market share.

PS2-130

ASSOCIATIONS OF CHANGES IN SMOKING-RELATED PRACTICES WITH SMOKING REDUCTION AND QUIT ATTEMPTS AMID THE COVID-19 PANDEMIC

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Significance: The implementation of social-distancing measures to contain the COVID-19 pandemic has disrupted daily life activities, including smoking-related practices in smokers. We examined the associations of changes in smoking-related practices with smoking reduction and quit attempts since the outbreak. Methods: Data were collected from 659 current smokers who responded to a telephone survey conducted from May to June 2020 in Hong Kong. During this period, the Hong Kong government has implemented social-distancing restrictions but no lockdown. Participants reported if they have reduced their smoking consumption, made a quit attempt, and changed several smoking-related practices since the COVID-19 outbreak. We estimated the prevalence ratio (PR) of smoking reduction and quit attempts in relation to changes in the smoking-related practices, adjusting for sex, age, education, chronic disease status, heaviness of smoking, and perceived risk of COVID-19 and mutual adjustment. Results: Since the outbreak, 26.2% of the participants had reduced smoking and 17.9% made a quit attempt; 60.4% reported having avoided smoking on the street, 51.7% avoided smoking with other smokers, 34.3% reduced going out to buy cigarettes, 25.4% increased smoking at home, and 20.0% stockpiled tobacco products. Multivariable models showed that having reduced going out to buy cigarettes was significantly associated with smoking reduction (PR 2.67; 95% CI 1.93-3.68; P<0.001); having avoided smoking on the street (PR 1.93; 95% CI 1.20-3.10; P<0.006) and reduced going out to buy cigarettes (PR 1.97; 95% CI 1.36-2.86; P<0.001) were significantly associated with making a quit attempt; no association between other changes in smoking-related practices and smoking reduction or quit attempt was observed (PR ranges from 0.84 to 1.20; all P>0.05). Conclusion: Many participants reported changes in their smoking-related practices since the COVID-19 outbreak; some changes were associated with smoking reduction and quit attempt, suggesting the outbreak to be an opportune time to promote smoking cessation.

PS2-131

BARRIERS AND CHALLENGES IN CONDUCTING RESEARCH ON TOBACCO USE AMONG YOUTH IN SCHOOLS OF INDIA- A GROUNDED THEORY APPROACH

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Introduction: Educational institutions provide important settings for tobacco control interventions. However, tobacco-related issues remain neglected due to their absence in school curriculum. This study is panned to understand the dynamics in research among youth and the confounding factors in the process of conducting the research from the perspective of students and teachers. **Methods:** Cross sectional qualitative study was planned in eight schools selected by purposive sampling. In depth interviews were conducted for 30 teachers involved in conducting tobacco related study with students and four FGDs were conducted among students. Inductive analysis of the qualitative data was done with grounded theory-based analysis in which repeating themes were identified, grouping the codes were grouped into concepts hierarchically

and then categorization of the concepts was done through relationship. **Results:** The teachers involved in conducting study related to tobacco focused on administrative challenges from school authorities and refraining attitude of parents especially for their girl child. Students were totally aware of tobacco products and were in favour of conducting tobacco related studies in schools. They suggested innovative ideas regarding study settings, method of conducting tobacco studies and agreed to be messengers of tobacco free initiatives in community. Three perspectives of teachers, parents and students were evolved for tobacco related study which will be help in improving further research. **Conclusion:** Behavioural research on attitudes, perceptions and beliefs regarding tobacco-related issues among youth, their parents as well as their teachers in schools are helpful to design appropriate research, strategies and contents for tobacco education. Community approaches incorporating behavioural change communication aimed at reducing tobacco use among youth would be critical.

PS2-132

AN ONLINE EXPERIMENTAL STUDY TESTING THE EFFECT OF PICTORIAL WATERPIPE-SPECIFIC HEALTH WARNING LABELS BASED ON THEIR PLACEMENT IN TUNISIA

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Introduction: Waterpipe (WP) smoking is rapidly increasing among youth in Tunisia. Pictorial health warning labels (HWLs) on tobacco products have been effective in communicating health risks associated with tobacco smoking. However, WP's multiple-components, limited portability, yet long use sessions (≈1 hour) create a unique product configuration and use setting that have not been addressed in implementing HWLs for the WP. This study aimed to test the effectiveness of pictorial HWL versus text-only. HWLs placed on tobacco only versus all WP components (device, tobacco, charcoal). **Methods:** We conducted a factorial online experimental study among young adults in Tunisia (n=100; 64% female; age 18-34 years) to test 4 pictorial HWLs developed in focus group study. Participants were randomly assigned to 3 experimental conditions: 1) pictorial HWL on tobacco, pictorial HWL on all components, or text-only HWL on tobacco (control). Participants evaluated the HWLs on attention, perceived message effectiveness, negative affect, affective risk, experiential risk, reactance, social interaction, avoidance, and perceived HWL effectiveness on others. General linear mixed model (GLMM) were used to analyze outcome data. The models included fixed effects for between-subjects' factors (label placement) and a random intercept was fit with subjects nested within the between-subjects' factors. We also tested interaction between placement and HWLs conditions. A two-tailed alpha level 0.05 was considered significant. **Results:** Overall, 71.7% of participants were non-smokers. Pictorial HWLs on tobacco were significantly more effective than text-only warnings for the following outcomes: attention (OR: 0.83 95%CI [1.09; 0.58]), believability (0.34 [0.56; 0.11]), negative affect (0.75 [0.97; 0.54]), affective risk (0.38 [0.63; 0.13]), experiential risk (0.53 [0.77; 0.28]) and reactance (0.38 [0.57; 0.18]). Participants rated attention and believability less favorably for pictorial HWL on all components vs. Tobacco only (-0.5 [-0.75; -0.24]; -0.27 [-0.5; - 0.05], respectively). No significant interaction was noted according to HWL conditions. **Conclusion:** This is the first experiment examining pictorial HWLs specific to WP in Tunisia. Findings from this study provided important evidence that pictorial HWLs are more effective than text-only, for six communication outcomes. Nevertheless, we were not able to show the effectiveness of pictorial HWL on all WP components vs. Tobacco only. The online design of the study may have affected our results.

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HOME TOBACCO USE POLICIES AND EXPOSURE TO SECONDHAND TOBACCO SMOKE: FINDINGS FROM WAVES 1 THROUGH 4 OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY

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Significance: The 2006 Surgeon General's Report recommended the elimination of smoking in homes as an effective protective measure against the harmful effects of secondhand tobacco smoke exposure. This study examines trends in the prevalence and levels of adoption of home tobacco use policies specifically for cigarettes, e-cigarettes, smokeless tobacco, and the relationships between home tobacco use policies and

self-reported exposure to secondhand tobacco smoke. **Methods**: This study utilizes data from Wave 1 (2013-2014) through Wave 4 (2016-2018) of the Population Assessment of Tobacco and Health (PATH) Study, a large prospective cohort study of youth and adults in the United States, which collected information about both smoke-free and tobacco-free home policies. We present weighted population-based self-reported prevalence of home tobacco use policies overall and by product, the average number of self-reported hours of secondhand smoke (SHS) exposure by levels of home tobacco policy and by survey wave, and we examine characteristics of those who adopted (yes/no) a home tobacco use ban between survey waves. **Results**: We found a high prevalence of complete tobacco-free home policies (69.5%). However, 10.6% of adults allow the use of any type of tobacco product inside their home, and 19.8% have a policy allowing the use of some types of tobacco products and banning the use of others. Adults with a complete tobacco use ban inside their home were more likely to be nonusers of tobacco (79.9%), living with children in the home (71.8%), at or above the poverty level (70.8%), non-white (76.0%), Hispanic (82.7%), and age 45 or older (71.9%). The adoption of 100% tobacco-free home policies is associated with a 64% decrease in secondhand smoke exposure among youth and a 69% decrease in exposure among adults. **Conclusions:** Most US adults have implemented tobacco-free home policies; however, there is still exposure to SHS in the home, for both adults and children, particularly in the homes of tobacco users. Additional research should investigate tobacco-free home policies for different types of products and what effect this has on future tobacco use behaviors.

PS2-134

PROVIDING TOBACCO CESSATION SERVICES TO ADOLESCENTS IN VULNERABLE SITUATIONS DURING COVID-19: EXPERIENCES FROM MUMBAI, INDIA

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Background: Use of tobacco products increases the risk of coronavirus infection and its spread. World Health Organization recommends and highlights the need to offer help to tobacco users and strengthen cessation measures during pandemic. Emergence of COVID-19 has led implementers to adapt virtual methods to reach the beneficiaries. Is virtual method the solution to reach adolescents residing in slum areas with limited access to mobile phones and internet services and provide accessible cessation support during the pandemic? **Methods:** In 2019-2020, LifeFirst implemented an in-school six-month tobacco and areca-nut cessation programme for students of slum-based schools. that offered six theme-based in-person group counseling sessions. On 25th March 2020, the Government of India announced a nationwide lockdown in response to COVID-19 pandemic. To address this situation LifeFirst modified the programme and adapted telephonic communication to reach the students. Individual telephonic sessions were conducted to sensitize, identify tobacco/areca nut users and register them for counselling services. Six-month telephonic counselling sessions were provided to the registered users. **Results:** From April 2019-March 2020, 5986 students were sensitized and 2236 (37%) of them registered for counseling sessions. From April 2020-March 2021, 4509 students were sensitized and 30 students registered for the counselling sessions. This low reporting of tobacco use could be due to: • Difficulty in building rapport and gaining trust of students in a short time over telephone. • Most of the students spoke with the counsellors from their homes in presence of their parents and were reluctant to talk about their tobacco habit. • Tobacco consumption had reduced due to inaccessibility of tobacco products due to lockdown restrictions (shops closed, increased cost). • Tobacco and areca-nut use is a peer group activity and lack of interactions with peers caused a decrease in use. **Conclusion:** Providing telephonic cessation services to adolescents is a challenge. Implementers need to design and create innovative methods to adapt the situation. Evaluation of new adapted strategies is required.

PS2-135

SMOKING CESSATION TREATMENT OUTCOMES AMONG QUITLINE PARTICIPANTS WITH PHYSICAL AND MENTAL CONDITIONS

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Significance: Research suggests that physical and mental health conditions are associated with higher smoking prevalence. This study examined influence of physical and mental health conditions on smoking cessation among callers to the New York

State Smokers Quitline (NYSSQL). **Methods**: Participants (n=15,018) included adult tobacco users who contacted the NYSSQL and completed an intake assessment. Physical health status was measured with 6 standard items assessing serious difficulty hearing; seeing; concentrating, remembering, or making decisions; walking or climbing stairs; dressing or bathing; doing errands alone. The Kessler Psychological Distress Scale (K6) was used to assess level of psychological distress as a proxy for mental health status. Serious psychological distress (SPD) was defined as K6 score of ≥13; moderate to low psychological distress (MLPD) was defined as K6 score of <13. Seven-day point prevalence abstinence outcome assessments were conducted by email and phone after 7 months. Logistic regression was used to examine the influence of health status accounting for demographics and cigarettes smoked per day. **Results**: Over one-third of callers (34.5%) reported at least one physical health conditions and one in ten (11.8%) met criteria for SPD. Among the 1,921 callers (13.2% of participants) who completed the outcome assessment, those reporting no physical health conditions (37.3%) were more likely to be abstinent from smoking compared with participants reporting at least 1 (30.4%) (chi square p-value=0.002). Those with MLPD (35.6%) were more likely to be abstinent from smoking compared with participants with SPD (27.5%) (chi square p-value=0.02). After controlling for demographics and cigarettes per day, SPD was associated with lower abstinence rates from smoking compared to MLPD (OR=0.67; 95% CI=0.48-0.95). **Conclusions**: Among callers to the NYSSQL, physical and mental health conditions are common and associated with poorer tobacco treatment outcomes. These findings highlight the unmet need for addressing physical and mental health conditions common among Quitline callers as a next step in making successful treatment possible for all smokers.

PS2-136

TESTING AN INTEGRATED THEORY OF VAPING INITIATION IN HISPANIC YOUTH

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Significance. Despite a reduction in overall cigarette smoking rates in the last several decades, recent increases in the use of electronic nicotine delivery systems (ENDS), such as e-cigarettes and Juul devices, prompted the Surgeon General to declare the use of such products to be an "epidemic." Among the increasing rates of vaping, there exist important disparities: for example, Latinx youth may be particularly vulnerable to early initiation. There is evidence, however, that parental influences such as communication and modeling may be uniquely protective against smoking initiation in these vulnerable populations. The present study sought to test an integrated health behavior theory model of early adolescent Hispanic vaping initiation that includes parental and peer influences, perceived norms, risks, and intent to use ENDS. **Methods**. Data from waves 3 and 4 of the Population Assessment of Tobacco and Health (PATH) were used to create and test a longitudinal analysis of covariance structures model examining the influences of parental modeling, communication, and rule-setting on harm perceptions, norm perceptions (*), curiosity and intent-to-use on the initiation of ENDS use one year later. Multigroup model comparisons with non-Hispanic youth were completed and alternative models including peer influences were also tested. **Results**: Findings suggest that ENDS use among parents, household restrictions, and talking about ENDS all increase the perceived harm of ENDS use among Hispanic use; perceptions of harm were directly related to intent to use and use one year later . In non-Hispanic youth, parental use of ENDS and parent-child talks about ENDS use increased youth curiosity to use, which was related to both intent to use and use one year later. **Conclusions:** Differences between parental influence on ENDS use between Hispanic and non-Hispanic youth may inform interventions that are ethnically tailored and include parental involvement. Further research into the the many sub-groups included under the general term "Hispanic" are warranted.

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DIFFERENCES IN CIGARETTE SMOKING AND OTHER COMBUSTIBLE TOBACCO USE BY PATTERNS OF ENDS USE ACROSS ADOLESCENCE

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Signficance. A limited number of studies have modeled stable trajectories of and patterns in ENDS use across adolescence. It is unknown whether and how these trajectories and patterns of ENDS use are related to cigarette smoking and other combustible tobacco product use. **Methods.** This is a longitudinal analysis of tobacco use surveys from the Texas Adolescent Tobacco and Marketing Surveillance System (TATAMS), collected every 6 months from 2014 to 2019 from 3 cohorts of adolescents [n(students)=3,899; N(observations)=24,492]. Growth mixture models (GMMs) were applied to identify stable patterns in trajectories of past 30-day ENDS use, from 11 to 19 years of age. Then, differences in past 30-day cigarette smoking and past 30-day other combustible tobacco product use (cigar products, hookah) from 11 to 19 years of age were examined by patterns in ENDS use using generalized estimating equation methods. All models were adjusted for sex, race/ethnicity, SES, cohort, and survey wave. **Results.** Four stable trajectories of past 30-day ENDS use were identified, from 11 to 19 years of age: (a) non-users (74%) and those whose ENDS use started and then escalated in (b) early (6%), (c) middle (13%), and (d) late (6%) adolescence. Past 30-day cigarette smoking remained negligible among ENDS non-users across adolescence, but escalated rapidly and exponentially for all other ENDS use patterns. By age 19, compared to ENDS non-users (p<0.05), the mean number of days of cigarette smoking in the past 30 was significantly higher among participants who started ENDS use early in adolescence, followed by those who started ENDS use in middle and late adolescence. Similar patterns were observed for past 30-day use of other combustible tobacco products, though differences in the escalation of tobacco use later in adolescence, by ENDS use pattern, were less steep. **Conclusion.** Past 30-day cigarette smoking and combustible tobacco product use varies in important ways across adolescence, given patterns in the onset and progression of ENDS use across this same period. Although ENDS are increasingly prevalent, prevention programs should target all types of tobacco products.

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PERCEPTIONS OF IQOS HEATED TOBACCO PRODUCT ON TWITTER IN THE UNITED STATES

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Significance: After the approval of the sales of IQOS in the United States market, discussions about IQOS have become active on social media. Twitter is a popular social media platform to understand public opinions toward IQOS. This study aims to explore public perceptions toward IQOS on Twitter in the United States. Methods: IQOS related tweets from the United States between November 19, 2019 and August 24, 2020 were collected using a Twitter streaming application programming interface (API). Sentiment analysis was performed to determine whether the public perceptions towards IQOS were positive, neutral, or negative. In addition, topics discussed in these tweets were manually coded. Results: From November 2019 to August 2020, the number of tweets discussing IQOS was relatively constant except for a peak starting from July 7, 2020 that lasted for four days. Among IQOS tweets with positive sentiments, the most popular topic is "IQOS is safer than cigarettes", followed by "IQOS help quit smoking". Among tweets with negative sentiments, the most popular topic is "illegal marketing/selling to youth", followed by "health risks/fire hazards". "FDA approval/regulation" is the most popular topic for tweets with neutral sentiments. After the announcement of the United States Food and Drug Administration (FDA) enforcement policy on unauthorized flavored e-cigarette products on January 2, 2020, the proportion of tweets with positive attitudes toward IQOS significantly increased while the proportion of negative tweets significantly decreased. Conclusion: Our study showed that the public perception of IQOS in the United States became more positive after the FDA enforcement policy on flavored e-cigarettes. While many Twitter users thought IQOS is safer than cigarettes and help quit smoking, some Twitter users complained about the illegal marketing and health risks of IQOS. These findings provide useful information on future tobacco regulation.

PS2-139

THE GERMANY-SMOKING AND VAPING MODEL. EXAMINING THE APPLICATION OF A FLEXIBLE NICOTINE VAPING PRODUCT USE SIMULATION MODEL

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Significance: Nicotine vaping products (NVPs), such as e-cigarettes, are changing the tobacco use landscape. Simulation modeling provides a tool for examining potential public health outcomes of novel tobacco products use. The Smoking and Vaping Model (SAVM) is a generic simulation model, accessible to non-expert modelers, that projects the impact of NVPs on smoking trends and associated deaths of a given population. We illustrate SAVM's adaptation for German population, the Germany-SAVM. **Methods:** Germany-SAVM is a cohort-based discrete-time simulation model, that projects the impact of NVP use from 2012 to 2060 by comparing No-NVP and NVP scenarios. The No-NVP scenario projects smoking rates in the absence of NVPs using German data on population, deaths, life expectancy, and 2012 smoking prevalence. Smoking initiation and cessation rates for the German population were estimated by scaling US rates of age and sex-specific smoking prevalence using the ratio of German and US smoking prevalence in 2012. The NVP scenario models smoking and vaping prevalence once NVPs are introduced using NVP mortality risk at 5% of the smoking risk in the No-NVP scenario, smoking initiation at 75%, NVP initiation at 50%, and cessation at 100% of the No-NVP scenario rates and US derived NVP switching rates. The public health impact is derived as the difference between smoking-attributable deaths in the No-NVP scenario and smoking- and vaping-attributable deaths (SVADs) in the NVP scenario and the difference of life years lost (LYLs) between these two scenarios. Germany-SAVM was validated using smoking data from the 2017 German Microcensus. **Results:** Germany-SAVM slightly underestimated the 2017 smoking prevalence for adult males aged 18+ years (Microcensus: 26.4% vs. SAVM: 25.7%) but overestimated female smoking prevalence (Microcensus: 18.6% vs. SAVM: 20.4%). Compared to the No-NVP scenario, from 2012 to 2060, the NVP scenario projects a decline in smoking prevalence of 81.7% (14.2% to 2.6%) for males and 68.6% (11.8% to 3.7%) for females, and a cumulative total of 0.9 million fewer SVADs and 13.7 million fewer LYLs. **Conclusions:** SAVM is a simulation tool that is easily adaptable for different countries, requires minimum data, and can be used by non-experts. Its evidence will help researchers, policymakers, and other public health stakeholders to analyze the potential population health effects of NVP use.

PS2-140

DEVELOPMENT OF THE STANFORD VAPING INFORMATION, SOLUTIONS, AND INTERVENTIONS TOOLKIT (VISIT) FOR HEALTHCARE PROVIDERS

Bonnie Halpern-Felsher, PhD, Adrienne Lazaro, Richard Daniel Ceballos, Marcia Monica Zorrilla, Bradley Zicherman, Arash Anoshiravani. Stanford University.

Background: Adolescent and young adult (AYA) vaping remains a significant public health issue, yet few evidence-informed resources exist to help healthcare providers prevent and stop youth from vaping, and fewer exist using a community-based participatory research (CBPR) approach. Methods: Using CBPR approaches, we conducted two focus groups with 15 healthcare providers (including physicians, nurses, and therapists), and identified themes and resources they found most important and needed in a new vaping prevention Toolkit. Using these themes and a review of the literature, we drafted the website, which was then given to 10 healthcare clinicians to provide feedback. The goals of the resulting Stanford Vaping Information, Solutions, and Interventions Toolkit (VISIT) for Healthcare Providers are to provide AYA Healthcare Providers with (1) the most up-to-date and relevant information on vaping; (2) youth-friendly printouts for the clinical setting; (3) information to screening, counsel, and support young people who are using e-cigarettes/vapes; and (4) easy-to-share resources for young people ready to quit and families wanting to support them. VISIT is now being disseminated and evaluated. Results: VISIT (https://med.stanford.edu/visit.html) is a free, online set of information, scripts, and resources to help providers. VISIT provides essential information to teach clinicians about vaping, information specific to the clinical encounter including What to Ask, How to ask about Vaping, and What to do if the patient screens positive for vaping. Resources include information on motivational interviewing, prescribing nicotine replacement therapy, and how to ensure a confidential visit. VISIT has been disseminated to healthcare providers in a few states and hospitals. Early evaluations suggest that VISIT is acceptable and feasible. Additional data are being collected and will be presented.

Discussion: VISIT is an evolving Toolkit based on the needs of health-care providers. The initial evaluations show that the materials are effective, and that developing tools with input from clinicians is ideal.

PS2-141

SUPPORTING YOUTH E-CIGARETTE CESSATION: NCI'S SMOKEFREE.GOV RESOURCES

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E-cigarette use among youth is a critical public health concern. In recent years, NCI's Smokefree.gov Initiative (SFGI) and FDA's The Real Cost (TRC) campaign have experienced a noticeable and sustained increase in youth seeking e-cigarette cessation guidance. In response to this emergent need, NCI, in collaboration with FDA, developed a collection of digital e-cigarette resources for the SFGI's SmokefreeTeen website (www.teensmokefree.gov/quit-vaping) that inform youth about the dangers of e-cigarettes and provide support for youth e-cigarette cessation. The e-cigarette cessation content collection, launched in July 2019, consists of 7 webpages with information and advice related to quitting including nicotine addiction and withdrawal, handling triggers and cravings, and managing moods. Content development relied on clinical best practices for treating nicotine dependence, grounded in principles of cognitive behavioral therapy and motivational interviewing. In July 2020, a companion, interactive quit plan builder tool was added. This tool guides users step-by-step to create a personalized plan for quitting e-cigarettes. A robust analytics program was implemented to measure the reach and performance of these resources. Since launch, the e-cigarette content collection has received 2,085,785 page views and has been accessed by 1,330,329 unique users. Integration of the quit plan builder tool resulted in an immediate spike in engagement with 5,612 plans completed in the first month following launch. Quit plan completions have remained at roughly the same level over time (4,000-6,000 monthly). Furthermore, of the unique visits to the quit plan builder since inception (54,010), a high proportion (55%) were completed. User traffic to the SmokefreeTeen resources was driven primarily by organic search queries (e.g., Google) followed by TRC campaign referrals. The rapid and sustained uptake of SmokefreeTeen's e-cigarette cessation resources demonstrate teen's desire for these resources and their resonance with youth. To date, these digital e-cigarette resources have reached millions of youth seeking help to quit e-cigarettes.

PS2-142

A USABILITY STUDY OF TEENS' EXPERIENCES WITH AN INTERACTIVE, ONLINE VAPING QUIT PLAN BUILDER

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Significance: In response to the public health burden posed by increasing youth e-cigarette use, the National Cancer Institute developed an online teen Vaping Quit Plan Builder (VQPB) to address the need for an interactive tool to support e-cigarette cessation among youth. The VQPB guides users step-by-step to create a personalized plan for quitting e-cigarettes. This qualitative user testing study aimed to assess teens' perceptions about the functionality and usability of the VQPB to inform actionable optimizations to the VQPB. Methods: Qualitative interviews were conducted between August and September 2020 with 33 teens who reported current e-cigarette use. The interviews included a participatory design session, during which participants used the VQPB and provided real-time feedback on their perceptions about the functionality and usability of the VQPB. Results: Teens reported positive usability experiences, citing the organization and straightforward layout of the VQPB as facilitators to usability. VQPB features received positively by teens included a calendar function to aid in choosing a quit date and a calculator that showed how much money teens would potentially save by quitting e-cigarettes. Teens also reported feeling that the design of the VQPB was age appropriate and that the integration of visuals (photos, graphics) into the VQPB design enhanced user experience. Identified areas for optimization of the VQPB were decreasing the length of text sections, removing redundant information to streamline quitting recommendations, and increasing the number of visual elements integrated throughout the quit plan. Conclusion: Usability testing of the VQPB with teens showed positive user experiences with the VQPB and appreciation for interactive features of the VQPB that facilitated the selection of a quit date and allowed them to visualize the

monetary benefits of quitting. The usability testing also revealed opportunities to optimize the VQPB by streamlining text sections and quitting recommendations, as well as increasing integration of photos and graphics to enhance user experience.

FUNDING: Federal

PS2-143

REAL-TIME EXPOSURE TO ANTI-TOBACCO MESSAGING AMONG YOUNG ADULTS

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Objective: The tobacco industry has become increasingly adept at marketing targeted to young adults (YAs) that engage in high-risk activities (i.e., on social media), in high-risk locations (i.e., near a tobacco retail outlet), and in minority neighborhoods. Little is known about whether anti-tobacco marketing is reaching young people exposed to such messaging in environments at high risk for this pro-tobacco marketing. This study used ecological momentary assessment (EMA) to assess demographic and real-time correlates of exposure to anti-tobacco marketing among YAs. **Methods:** This study used EMA data to assess context (e.g., location and activity) of anti-tobacco marketing exposure using four mini-surveys per day over two weeks. YA non-current tobacco users living in Washington D.C. (n=145; ages 18-24) recorded 5,219 surveys, including 19 participants (13.1%) living in neighborhoods with high proportions of racial/ethnic minority residents, and high smoking rates. Adjusted multilevel regression models assessed the association between exposure to anti-tobacco marketing, demographics and real-time contextual variables. **Results:** A total of 61 respondents reported at least one exposure to anti-tobacco marketing, for 141 exposures over the EMA period. In adjusted analyses, odds of exposure were higher for those living in a minority neighborhood (aOR=4.3, all p's<.05), in the presence of someone using tobacco products (aOR=1.7), at work/school (aOR=2.3), outside/in transit (aOR=2.1) and online/social media (aOR=1.9) vs. home. There were no significant differences in anti-tobacco exposure by age, sex, race/ethnicity or education, or for other locations and activities (i.e., at a bar/restaurant, clubs, or in a retail store) vs. at home. **Conclusion:** Almost 43% of YA non-current tobacco users were exposed to anti-tobacco messaging in their daily lives. Findings suggest anti-tobacco marketing is reaching young adults in minority neighborhoods and during some high-risk activities like online. Yet improved targeting is needed to reach this population with messages to counter industry marketing when in high-risk environments such as at bars/restaurants and in retail stores.

FUNDING: Federal

PS2-144

EFFECTIVE ONLINE RECRUITMENT AND RETENTION STRATEGIES FOR NEW ADOPTERS OF ENDS WITH RECENT SMOKING HISTORY: THE ADULT CONSUMERS OF TOBACCO STUDY (ACTS)

Scott R. Weaver, PhD. Georgia State University.

Introduction: Intensive longitudinal research of dual cigarette/ENDS users is needed to better understand the causal factors and dynamic processes that determine tobacco use trajectories. However, recruiting smokers early in their use of ENDS is challenging. We will describe the approaches and outcomes for the recruitment and retention of US adult smokers who have recently initiated ENDS for a longitudinal study.Methods: Paid advertisements via multiple social/online media platforms (Facebook/Instagram-FB, Twitter-TW, YouTube-YT, Reddit-RD, Craigslist-CL) were employed December 2020 – August 2021 to recruit US adult (21+) recent or current smokers who initiated ENDS within the past month for an online survey study involving 12 weekly surveys and follow-up surveys at 6-, 9-, and 12-months. Multiple strategies were used to detect survey fraud.Results: More than 10,000 were screened with 3.3 eligible and 1.7 enrolled per 100 screened. Recruitment metrics (ad reach, impressions, & costs; screening, survey fraud, eligibility, and enrollment rates; and respondent demographics) varied by platform

and ad parameters. While FB ads yielded the highest eligibility (6.4) and enrollment (4.0) rates and lower fraud (10.5%), demographics skewed white (82%) and female (62%) despite efforts to target ads. FB ad performance was inconsistent, and misapplied FB tobacco policies resulted in multiple ad rejections and account restrictions. TW, RD and YT generated a combined 2 enrolled, and 17% of RD/YT were fraudulent. CL ads quickly yielded >3500 screened and more males (43%) with modest eligibility (2.3) and enrollment (0.6) rates but was labor-intensive and had greater fraud (24%). Participants varied in ENDS device type: 15% cig-a-like, 16% vape pen, 19% mod, 24% rechargeable pod, 14% disposable pod, 11% other. 74% of those screened were enrolled, and 95% of enrolled have been retained through the 6-month survey.Conclusions: Results demonstrate the feasibility of recruiting and retaining a diverse sample of dual users during their initial ENDS initiation phase using a combination of social and online platforms with strong fraud prevention and data quality controls.

FUNDING: Federal

PS2-145

USING QUALTRICS PANELS TO RECRUIT YOUTH FOR ONLINE SURVEYS OF TOBACCO USE

Bonnie Halpern-Felsher, PhD. Stanford University.

Background: Many studies examining adolescents' and young adults' (AYAs) tobacco-related perceptions, reasons for, marketing, and actual use often rely on school-based, community-based, clinic-based or other methods of convenience sampling. Other studies have used online survey recruitment and implementation platforms (e.g., Amazon mTurk, social media). Since school closures and introduction of hybrid teaching due to the COVID-19 pandemic, we recruited a sample of AYAs from across the U.S. by using Qualtrics panels.Methods: We used Qualtrics to recruit a national, online sample of AYAs. Quota sampling used for age (1:1:1 ratio for age groups of 13-18, 19-20, and 21-24), and sex and race/ethnicity per the US Census. To ensure adequate past-30-day e-cigarette users, we purposively recruited 50% of the sample to be e-cigarette ever-users.Results: Strengths: Successfully recruited a cross-sectional sample, in a relatively short time frame (4,315 AYAs: 1,442 13-17 years; 1,810 18-20 y/o, and 1,063 21-24 y/o). In a typical sample of 4,315 participants, we would expect ~870 past 30-day users (assuming the prevalence of e-cigarette use as 19.6% among high school students), and <300 past 30-day adolescent users (13-17 year-olds; 1/3rd of the total past 30-day users). By oversampling for e-cigarette ever-users, we were able to achieve relatively higher Ns (n=2,167 e-cigarette users) through the Qualtrics sample, thus allowing us to examine research questions in relation to AYAs' recent e-cigarette use. The cost and effort to recruit was significantly lower than recruiting from local connections. Limitations: Qualtrics panels are still a convenience sample; question over whether the sample can be made more representative through weighting strategies; difficulty calculating response rates as hard to know how many people "saw" the invitation to participate; and longitudinal studies using Qualtrics panels are more difficult. Conclusions: Recruiting samples through online survey platforms is a cost-efficient and effective way of obtaining a national, online sample. However, there are considerations of representativeness as with any convenience sample.

FUNDING: Federal; Academic Institution

PS2-146

CROWDSOURCING TOBACCO RESEARCH ON AMAZON'S MECHANICAL TURK: STRATEGIES TO COLLECT VALID DATA QUICKLY

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Background. Crowdsourcing on Amazon's Mechanical Turk (mTurk) to collect data is quick, convenient and affordable. However, uncertainty about who is in "the crowd" and loss of control over the data collection setting is a concern. This presentation describes the mTurk platform and strategies to increase the validity of crowdsourced data for tobacco research.Methods for identifying bots and tobacco users. mTurk workers ("Turkers") are predominately from the US and India and verified by Amazon. However, a large number of "bots" exist on the site that researchers should be mindful of. Methods for detecting bots include analyzing time spent per question, using attention-check questions, reviewing free-response answers, and RECAPTCHA tools. Catching bots is best accomplished with a "swiss-cheese approach" –layering multiple forms of protection. We excluded over 100 suspected bots using these methods. To identify tobacco users, requesters can select a "premium qualification" that only allows turkers verified by Amazon as being a tobacco user to view a HIT. This is associated with additional fees and may substantially restrict the sample of interest. Alternatively, researchers can identify tobacco users using a screening survey. In our studies recruiting current

tobacco users, this screening approach resulted in 53% meeting initial eligibility criteria (n=1200). Screening payments (to ineligibles) were <2% of participant costs.Mturk data collection optimization. Although mTurk has a survey builder, researchers commonly direct turkers to better survey tools (Qualtrics/REDCap/etc.) to collect data. However, the process of reviewing responses, assigning qualifications, and sending payments are time-intensive. Fortunately, researchers can write scripts to automate many of these tasks. Our own Python scripts were used to pay >2000 turkers in minutes. Addressing turker complaints is also important, as ratings can impact whether turkers complete a HIT. Forums on Slack, Reddit, and other social media sites can be used to advertise HITs to turkers.Summary. With proper precautions and workflow, mTurk is a powerful tool to collect valid data from tobacco users.

PS2-147

BOTS AND PROFESSIONAL SURVEY TAKERS: RECRUITMENT CHALLENGES FOR TOBACCO REGULATORY SCIENCE ONLINE SURVEYS

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Background: Online surveys are increasingly common due to lower cost and increased convenience. However, bots that automate survey completions and professional survey takers present recruitment challenges. We describe issues encountered and risk mitigation strategies employed by the Vaping and Patterns of E-cigarette use Research (VAPER) Study.Methods: The VAPER Study is an online cohort survey that recruits adults (21+) who use e-cigarettes 5+ days/week. Initially, we aimed to recruit 1200 participants using social media (e.g., Facebook) ads in three U.S. cities. The survey was anonymous, incentives were delivered by email with minimal review, and fraud detection software was used to prevent multiple completions by each participant.Results: Recruitment began slowly but accelerated quickly, raising concerns that halted data collection. Survey submissions (n=1624) were investigated for evidence of bots or professional survey takers; 363 survey completions were assessed to be valid. We subsequently restarted recruitment and implemented a risk mitigation strategy. Participants were required to undergo identity verification using LexisNexis, CAPTCHA, two-factor authentication, data quality reviews, and were mailed their incentive (via USPS). High costs and slow recruitment also forced a transition to Craigslist postings (125 locations). Subsequently, recruitment pace stabilized and data quality was high. Despite these efforts, a sophisticated bot breached our procedures, in part, by using personal information likely obtained from the dark web; these submissions were removed. Additional mitigation procedures included requiring a photo of participants' e-cigarettes, verifying photos were unique and authentic, and regularly reviewing open-ended responses. We have since completed two waves (53% follow-up rate).Conclusions: Online data collection is a promising methodology but strong risk mitigation strategies must be implemented to ensure data quality. Regulators and researchers can have confidence in the data online surveys provide when these strategies are applied.

PS2-148

INVESTIGATING NON-CIGARETTE TOBACCO MARKETING INFLUENCES AND NON-CIGARETTE TOBACCO PRODUCT USE BEHAVIORS AMONG BLACK ADULTS

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Objective: Black communities are targeted by more cigarette advertisements than White communities, however, little is known about non-cigarette advertisement exposure. This study aims to understand the impact of marketing of non-cigarette tobacco products on non-cigarette tobacco use among Black people. Methods: Participants were 533 Black adults who participated in The Family and Community Health Study in 2016. Participants were asked if they have seen ads on TV or in stores for non-cigarette products (e-cigarettes, snus pouches, filtered cigars, traditional cigars, cigarillos, dissolvable tobacco, smokeless tobacco, hookah and tobacco pipe) and if they have used these products in the past month. For each product, we performed a regression to evaluate the association between usage and seeing ads and the moderation of this relationship by socioeconomic status, age, sex and racial discrimination. Results: Seeing ads on TV or in stores was associated with product use for all products (rs[148 to 507] > .11, ps < .05) except e-cigarettes and dissolvable tobacco. People who were older (p=.006) and

experienced more racial discrimination (p=.011) were more likely to have a relationship between seeing ads and cigarillo use. Use of snus was more strongly related to seeing ads in males than females (p< .001). Cigarette smokers had a stronger relationship between seeing ads and using filtered cigars and tobacco pipes (ps < .001) than non-cigarette smokers. Conclusions: The exposure to various non-cigarette tobacco product ads was associated with use of those non-cigarette tobacco products. Importantly, these relationships were influenced by demographic variables and in regard to cigarillos, racial discrimination. Efforts to reduce non-cigarette tobacco marketing in Black communities may aid in eliminating tobacco-related health disparities.

PS2-149

ACTUAL AND PERCEIVED TOBACCO INDUSTRY TARGETING OF THE LATINO/A/X COMMUNITY

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Latino/a/x youth have high levels of susceptibility to tobacco use, and approximately one-fifth of Hispanic adolescents and young adults (AYAs) have used tobacco. Latino/a/x youth are a target of the tobacco industry, and as a result, these youth are more likely to be exposed to tobacco marketing than non-Hispanic white youth. The current study sought to examine both the content of Latino/a/x targeted tobacco marketing, and youth perceptions of this marketing.We conducted a content analysis of tobacco advertisements run between 2019-2020. Ads were coded by two trained graduate coders for specific targeting practices, such as use of Spanish-language, use of Latino/a/x celebrities, and other cultural references (e.g., foods, music). Concurrently, we hosted qualitative online discussion boards in which 92 youth aged 15-21 were asked their thoughts about the tobacco industry and asked to respond to two advertisements targeting the Latino/a/x community. Data were qualitatively coded by two trained graduate coders and reviewed by a third investigator.The tobacco industry commonly uses tactics such as Spanish-language ads and Latino/a/x characters in their ads to target this community. Many youth note that they are upset with the tobacco industry for making a product that is "killing people". However, few youth perceived that the tobacco industry specifically targeted their ethnic group. More commonly, while several noted that the industry saw the Latino/a/x community as an "easy target", the tobacco industry sees "all groups as a way to make money and don't really care who buys them." Aligned with this, few youth perceived the two tobacco ads they viewed to be specifically targeting the Latino/a/x community, even though both ads leveraged Latino culture (via a musical reference and use of a public figure). Many Latino/a/x youth do not perceive the tobacco industry to be targeting their community. Tobacco countermarketing campaigns that resonate with this population may be a useful way to illustrate the targeted tobacco marketing techniques identified in our content analysis, and reduce tobacco use among this population.

PS2-150

THE PASS-THROUGH OF EXCISE TAXES TO MARKET PRICES OF HEATED TOBACCO (HTPS) AND CIGARETTES - A CROSS-COUNTRY ANALYSIS

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Background and Objective: The market of heated tobacco products (HTPs) has grown exponentially in recent years and many governments have started to tax HTPs to regulate its use. Currently, there is a debate over how HTPs should be taxed, especially whether at the same or lower rates than cigarettes, considering its potential harm reduction impact. As most HTP brands are manufactured and marketed by large cigarette manufacturers the effectiveness of tax policy also depends on companies' strategies for products that are perceived as substitutes by consumers. This study evaluates the combined tax pass-thru of taxes to prices of both products.Data and Methods: We use a unique database on statutory HTP and cigarettes taxes and retail prices of Marlboro branded heated tobacco units and cigarettes from 2014 to 2021, developed by the Campaign of Tobacco Free Kids, in all countries where HTPs are sold. In the majority of countries, HTPs have been taxed at lower rates than cigarettes, yet sold at similar prices, suggesting highly concentrated markets where taxes have little impacts on prices of goods that are sold with extra profit margins (HTPs). To estimate the pass-thru of taxes to prices we use a seemingly unrelated regressions model. We also use an event study to test the impact of introducing HTPs on the cigarette market, as well as

the introduction of HTPs in countries tax codes.Results/Policy Implications: The direct pass-through rates of HTP taxes to prices is much smaller than that of cigarettes in the current nicotine-tobacco market. We also find that the pass through of cigarette taxes to cigarettes prices is larger than unity. The combined pass-through (direct and indirect) of taxes to prices is smaller than unity for HTPs and cigarettes, with a much smaller pass-through for HTPs. Only half of the tax incidence gap is transmitted to the price gap, suggesting that tax policy incentives that favor HTPs over cigarettes to encourage smokers to switch from cigarettes to HTPs are unlikely to be effective. The results overall suggest that increasing taxes on both products and taxing them equivalently could be an option to raise additional tax revenue.

PS2-151

IMPACT OF TAX AND PRICE REFORMS ON COMPANIES' PRICES IN A COMPLEX CIGARETTE TAX SYSTEM

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This study evaluates how changes in various aspects of excise tax systems, including minimum pricelaws, differential price tiers for tax across characteristics and products influence firms' pricing decisions.We apply our model to Indonesia, where the excise tax system is particularly complex for tobacco, withseveral tax tiers and cigarette types. We use a large database of prices over the past decade for all tobaccoproducts currently sold in Indonesia, obtained from the Customs and estimate a model where variousaspects of the tax system jointly explain prices. We find that pricing decisions are significantly affectedby taxes, but this result hides important or larger contribution of other pricing policies that are typicallyignored in research that essentially focus on the tax impacts or aggregates all cigarette types. In particularminimum price policies have a larger impact than excise taxes on tobacco pricing for machine-madeclove cigarettes (kretek) while tax changes have a larger effect on prices for machine-made non-clove(white) cigarettes. For cigarette types and brands that are more likely to be consumed by a very elasticdemand (kretek), companies keep prices close to the minimum price to maintain large market shares, butcompensate with larger tax-pass-thru and higher profit margins for cigarette types that are less elastic toprice changes (white cigarettes). The results imply that a multi-tiered, multi-products tobacco tax systemlikely generates important distortions that likely limit the objective of the government.

PS2-152

HOW VAPING PRODUCTS ARE PRICED BASED ON PRODUCT CHARACTERISTICS: EVIDENCE FROM ONLINE VAPE SHOPS

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Background: The use of electronic cigarettes has increased in the past decade and raised great concern. Online stores are one of the most commonly used outlets for e-cigarette users to purchase vaping products, and over 90% of vapers reported using e-liquid products that contain nicotine. The US Food and Drug Administration has the authority to regulate product characteristics such as flavors and nicotine levels. However, there is limited evidence on how vaping products are priced based on characteristics in online vaping stores.Methods: We collected data on e-liquid sales prices and product attributes, including bottle volume (in ml), nicotine concentration (in mg), VG/PG ratio and product flavor(s), from online vaping stores using web data extraction. We standardized prices for e-liquid products (standardized to $/ml), and used the hedonic pricing model to assess the associations between e-liquid standardized prices and nicotine concentration, product VG/PG ratio, and flavors. In total, we have data of 10,870 e-liquid products from four popular online vaping stores that sell nationwide across the U.S.Results: Higher e-liquid prices are associated with higher nicotine concentrations. E-liquid products with fruit flavors are associated with higher sales prices. E-liquid prices are higher when VG/PG ratio deviates from 70/30 except for 90/10: the prices of e-liquid products with a 90/10 VG/PG ratio are lower than the prices of products with a 70/30 ratio. All of the findings above are statistically significant at a 5% level.Conclusions: Higher nicotine concentration and fruit flavors are associated with higher e-liquid prices in national online vaping stores, suggesting that these are popular attributes. The FDA regulation over these popular attributes will reduce the desirability of vaping products.

PS2-153

IT TAKES A QUITTER TO MAKE A QUITTER: LEVERAGING INSIGHTS FROM CESSATION PROGRAM PARTICIPANTS TO INFORM RECRUITMENT CAMPAIGNS

Megan Jacobs, Elizabeth C. Hair, Jessica M. Rath, Tia Taffer, Amanda L. Graham. Truth Initiative.

Traditional formative research methods (TFRM) (e.g., fact testing, quant/qual concept testing, pre-market testing) have informed truth® campaign social media marketing to promote tobacco prevention messaging to teens and young adults. In FY20, TFRM was used to incorporate tobacco cessation messaging for the first time in the campaign's history. Optimization efforts in FY21 leveraged novel qualitative data gathered from a widely-used, proven-effective cessation text message program, This is Quitting (TIQ). The objective of this research is to explore if marrying qualitative insights from cessation program participants with TFRM findings would increase the effectiveness of social media marketing promoting cessation program enrollment ("lead generation") to 15-24 year-olds. The FY20 lead generation campaign, "Ditch Juul (DJ)," used TFRM only. A new FY21 campaign promoting TIQ, "Quitting Tweets (QT)," added insights gleaned from TIQ participants about barriers to quitting (e.g., seeing peers vaping), user-submitted quitting tips/support messages (e.g., "It'll feel amazing after u quit!"), and the overall sentiment that users liked seeing others quitting. Conversion rate (proportion of website visitors who submitted TIQ signup information) was the primary outcome. Both campaigns were deployed across a similar marketing mix, driving young people online to www.thetruth.com to enroll in TIQ. QT amplified real and poignant tweets that reflected core program value propositions identified through TFRM. Although DJ drove more website visits than QT (N=6,175,651 vs N=1,983,325), the conversion rate for QT was 821% higher (DJ=0.60% conversion rate; 37,222 enrolled vs QT=5.53% conversion rate; 109,645 enrolled). Synthesizing qualitative insights from young people in the process of quitting with TFRM may boost cessation campaign effectiveness. Quit program designers should keep marketing intentions in mind when considering opportunities to solicit user-generated content. Future analyses should explore the impact of social media ads using native platform lead generation forms to enroll participants (e.g., Snapchat Swipe-to-Text) and in multivariable models.

PS2-154

EARLY EVIDENCE OF EFFECTIVE MASS MEDIA CAMPAIGN APPROACHES TO PREVENT E-CIGARETTE USE AND PROMOTE CESSATION AMONG YOUTH AND YOUNG ADULTS

Elizabeth C. Hair, PhD, Jennifer M. Kreslake, Jessica M. Rath, Donna M. Vallone. Truth Initiative.

This study aims to evaluate the early effectiveness of a national mass media campaign to influence e-cigarette-related knowledge, attitudes and beliefs in a social environment where e-cigarette use is increasing. National samples of respondents aged 15-24 years were drawn from a repeated cross-sectional online panel survey of approximately 250 participants per week following the launch of the truth® anti-e-cigarette campaign in October 2018. Separate analyses were conducted for all respondents (n=8,125) and current vape users (n=1,456) to determine the effects of different campaign approaches among targeted audiences. Campaign exposure was measured by self-reported ad awareness aided by a collage. Logistic regression analyses were conducted on individual-level, cross-sectional relationships between ad awareness and outcomes. Outcomes were agreement with facts about e-cigarettes presented in the campaign (knowledge); perceived norms about young people quitting e-cigarette use; and attitudes about e-cigarette product harm, social unacceptability, and anti-industry sentiments. Covariates include respondent demographics, sensation-seeking score, mental health status, current or ever e-cigarette use, and growth in e-cigarette sales. A significant dose-response relationship was observed between ad awareness and knowledge of e-cigarette facts targeted by the truth campaign. High awareness of truth anti-e-cigarette ads was associated with significantly associated with greater perceptions of product harm, social unacceptability, and anti-industry attitudes about e-cigarette companies. Among current vape users, a significant dose-response relationship was observed between level of ad awareness and knowledge of free programs to help people quit vaping as well as intentions to quit e-cigarette use, and high ad awareness was significantly associated with greater perceptions that young people are quitting e-cigarette use. Mass media campaign exposure is associated with targeted knowledge, attitudes and beliefs about e-cigarette use among youth and young adults, even during a phase of growth in e-cigarette sales and popularity among young people.

PS2-155

EFFECTIVENESS OF CROSS-PRODUCT NICOTINE MESSAGING: EVIDENCE OF A NATIONAL TOBACCO PUBLIC EDUCATION CAMPAIGN ON YOUTHS' RISK PERCEPTIONS AND BELIEFS ABOUT E-CIGARETTES AND SMOKING

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This study aims to assess the relationship between youth's exposure to the U.S. Food and Drug Administration's national tobacco public education campaign, The Real Cost, and changes in campaign-targeted e-cigarette and cigarette risk perceptions and beliefs. A nationally representative cohort study of 4,039 youth was conducted during June 2018 to July 2019, consisting of a baseline and two follow-up surveys. We performed logistic regressions to examine the association between campaign exposure and beliefs. Exposure was measured by self-report as the frequency of exposure to individual campaign advertisements about the health consequences of e-cigarette use and of smoking cigarettes. We found that increased levels of exposure to campaign advertising were associated with a significant increase in the odds of reporting agreement with campaign-targeted beliefs. For example, those who were exposed to the campaign ad "Rehacked" (prevention messaging on e-cigarette and cigarette) on had an 18% increase in the odds of agreeing with the belief "The nicotine in vapes may hack your brain" (adjusted odds ratio [aOR] = 1.18, p<.001). Positive patterns of findings were found across multiple items targeted by specific ads, whereas non-related beliefs were not associated with ad exposure. A sustained national tobacco public education campaign can change beliefs about the harms of e-cigarette use and smoking among youth. This study provides early evidence of the effectiveness of one of the first national youth e cigarette prevention campaigns and evidence of the continued effectiveness of cigarette prevention under the same campaign brand. Combined with other findings from The Real Cost, evaluation, this evidence indicates that prevention mass media campaigns continue to be an effective and cost-efficient approach to reduce the health and financial burden of tobacco use in the United States.

PS2-156

DESIGN ISSUES RELATED TO LONGITUDINAL MODELS: GOING BEYOND THE TRADITIONAL RANDOMIZED CONTROLLED TRIAL

James Dziura, PhD. Yale University School of Medicine.

Traditional tobacco cessation trials compare a primary outcome such as abstinence at a single point in time following fully-formed interventions. Although these trials have demonstrated success answering research questions about the efficacy of these interventions, they may not translate into optimal long-term personalized care for a chronic relapsing condition such as tobacco dependence. Alternative designs are available to expand the types of research questions that we can answer in cessation trials. The goal of this talk is to introduce novel approaches to the design of clinical trials, such as MOST and SMART, that address research questions aimed at adapting treatment strategies or optimizing combinations of treatments. Multiphase Optimization Strategy (MOST) studies provide a framework to evaluate questions about which individual components should be used in a multifactorial intervention. Stepped care trials address questions about adapting interventions for non-responders by incrementally increasing aspects of the intervention (i.e., increasing dose/frequency or adding components). Sequential, multiple assignment, randomized trials (SMARTs) allow the researcher to ask multiple questions such as: what intervention should we provide initially or what intervention do we use if a patient does or does not initially respond? As research questions and trial design inform statistical analyses, this talk will bring together considerations related both to the design and analysis of clinical trials for tobacco dependence.

PS2-157

SYNTHETIC COOLING AGENTS IN US-MARKETED E-CIGARETTE REFILL LIQUIDS AND DISPOSABLE E CIGARETTES: CHEMICAL ANALYSIS AND RISK ASSESSMENT

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Significance: Menthol, through its cooling sensory effects, facilitates smoking and tobacco product initiation, which is reflected by the high popularity of mint/menthol-flavored E-cigarettes. More recently, E-cigarette vendors started marketing synthetic cooling agents as additives that impart a cooling effect but lack a characteristic minty odor. Knowledge about content of synthetic coolants in US-marketed E-cigarette products and associated health risks is limited.Methods: E-liquid vendor sites were searched with the terms "koolada", "kool/cool", "ice", or WS-3/WS-23, denoting individual cooling agents, and relevant refill E-liquids were purchased. "Ice" flavor varieties of Puffbar, the popular disposable E-cigarette brand, were compared with non-"Ice" varieties. E-liquids were characterized, and synthetic coolants quantified using GC/MS. Cellular calcium imaging experiments were conducted to evaluate the modulation of airway-sensory ion-channels (TRPM8/TRPA1) by synthetic coolants and E-liquids that contain synthetic coolants. Margin of exposure (MOE), a risk assessment parameter, was calculated to assess the risk associated with synthetic coolant exposure from E-cigarette use. Results: WS-3 was detected in 24/25 of the identified refill E-liquids. Almost all Puffbar disposables flavor varieties contained WS-23 (13/14), with 5/14 also containing WS-3, in both "Ice"- and non-"Ice" flavors. Synthetic coolants and E-liquids that contain coolants, including several Puffbars, robustly activated TRPM8 (Cold/Menthol receptor) and TRPA1 (Acrolein receptor). Modeling exposure to WS-3 from vaped E-liquids resulted in MOEs below the safe margin of 100 for most daily use scenarios (3-mL:14/25 E-liquids;5-mL:18/25;10-mL:20/25). MOEs for WS-23 from 11/13 Puffbar products were <100 in all use scenarios.Conclusions: Synthetic cooling agents (WS-3, WS-23) were present in US-marketed E-cigarettes, at levels that may result in consumer exposures exceeding safety thresholds set by regulatory agencies. Synthetic cooling agents pharmacologically modulate airway-sensory receptors and were found in both mint-or menthol-flavored and fruit- and candy-flavored products

PS2-158

PREVALENCE AND CORRELATES OF ICE FLAVORED E-CIGARETTE USE IN YOUNG PEOPLE

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Significance: 'Ice' e-cigarette flavors—marketed as hybrid flavors combining fruity/sweet and cooling properties (e.g., 'blueberry ice')—recently emerged. This talk reviews two cross-sectional studies on the prevalence and correlates of ice-flavored e-cigarette use in young people. Methods: In May-August 2020, web surveys assessed most commonly used e-cigarette flavor and other factors (e.g., device type, use frequency, dependence, combustible tobacco use) among: (Study 1) past 30-day e-cigarette using young adults from Los Angeles (n=344; M[SD]=21.2[0.4] years old); and (Study 2) a U.S. national, sample of adolescent and young adult e-cigarette current users (n=1516; M[SD]=18.9[1.6] years-old). Results: In Study 1, 48.8% reported using ice-hybrid flavors most often, 33.7% used (non-ice) fruit/sweet, and 17.4% used menthol/mint. Ice hybrid-flavor use was associated with reporting more past-30-day vaping days vs. menthol/mint (b[95%CI]=4.4[1.0-7.7]) and fruit/sweet (b[95%CI]=3.6[0.8-6.4]) users and more episodes per vaping day vs. fruit/sweet users (b[95%CI]=2.4[0.5-4.3]). Ice hybrid-flavor users were less likely than menthol/mint users to use JUUL/cartridge-based rechargeable (OR[95%CI]=0.1[0.03-0.45]) more likely than sweet/fruit users to use disposable non-cartridge (OR[95%CI]=3.9[2.1-7.4]) devices than refillable/rechargeable tank/pen or other devices. Ice users had greater odds of past 30-day combustible tobacco use vs. menthol/mint users (OR[95%CI]=2.7[1.3-5.7]) and vaping dependence symptoms vs. sweet/ fruit users (OR[95%CI]=2.6[1.5-4.4]). In Study 2, the most commonly used e-cigarette flavor was fruit (46%), followed by ice-hybrid flavors (30%), mint (11%), menthol (10%), and tobacco (3%). E-cigarette users who primarily used disposable e-cigarettes compared to other device types (closed/open-cartridge, tank/box mod) were more likely to predominately use ice-hybrid (58%) vs. fruit flavors. Conclusions: Use of ice flavored e-cigarettes may be common and positively associated with combustible tobacco use, nicotine vaping frequency, and dependence. Further study of the prevalence, determinants, and health effects of ice flavored e-cigarette use is warranted.

PS2-159

COMPARING USERS OF ICE AND NON-ICE E-CIGARETTE FLAVORS: DEVICE CHARACTERISTICS, PUFFING TOPOGRAPHY, NICOTINE INTAKE, PULMONARY FUNCTIONS, AND BIOMARKERS OF POTENTIAL HARM

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Background: "Ice" e-cigarette flavors, or combinations of fruit/sweet and cooling attributes, have gained prominence recently, particularly among young adults. Little is known about this emerging flavor category. This study compared adult users of ice and non-ice flavors on e-cigarette characteristics, pulmonary function, nicotine intake, puffing topography, and biomarkers of potential harm.Methods: Data are from the initial visit of 114 adult e-cigarette users [26 ice (e.g., Pineapple Ice, Grape Freeze); 88 non-ice] enrolled in an ongoing cohort study. Participants self-reported demographics, cigarette/e-cigarette history, and daily use patterns. Participants were assessed on tests of pulmonary function (e.g., spirometry, FeNO) and provided urine, blood, and saliva samples that were analyzed for biomarkers of nicotine exposure, oxidative stress, and inflammation (n=10 ice, n=40 non-ice). Puffing topography was captured using a CReSS Micro during an ad lib puffing bout. Chi-square and independent samples t-tests were utilized to analyze differences between ice and non-ice participants.Results: Ice and non-ice users did not differ on demographics or smoking history. Disposable e-cigarettes were more common among ice than non-ice users (53.9% vs 8.0%), but groups did not differ in nicotine content or e-cigarette consumption. Ice and non-ice users did not differ in nicotine exposure, pulmonary functioning, or puff topography. Ice users, compared to non-ice, had significantly lower levels of HT 8-oxodG (geometric means: 82.07 vs 128.16nM, p=.038), IL-6 (1.00 vs 4.44pg/ml, p<.001), and IL-1ß (24.55 vs 64.31pg/ml, p=.029), but did not differ for F2-Isoprostanes, IL-8, PGE2, MPO, or TXB2. Effects remained significant when controlling for device type.Conclusions: These data provide preliminary evidence of reduced systemic inflammation markers in users of ice flavors compared to non-ice flavors. Further monitoring of these flavors is essential to understanding their constituents and impacts on e-cigarette user health and behavior to make informed regulatory decisions regarding this emerging flavor category.

PS2-160

QUITTING MATTERS: TAILORING AN MHEALTH SMOKING CESSATION INTERVENTION FOR PEOPLE WITH HIV USING A USER-CENTERED DESIGN APPROACH

Roger Vilardaga, Patricia Sabo, Anthony DeVito, Lauren Pacek, Joseph McClernon. Duke University.

Background: Cigarette smoking is disproportionately prevalent among people with HIV (PWH), and is significant contributor to morbidity and mortality in this population. Historically, facilitating cessation among PWH has been challenging. Mobile health applications tailored to PWH can potentially address their low quit rates and provide wider reaching evidence-based treatments for this population. Objective: To develop a smoking cessation app tailored to the needs of PWH, based on an existing app ("Learn to Quit") and conduct a pilot randomized control trial (RCT) to evaluate the feasibility, acceptability, and preliminary efficacy of the new app. Methods: We conducted a user-centered (UX) design study with PWH who smoke to ideate and sketch a new app prototype, then developed a new tailored app ("LTQ-H") in collaboration with an app development partner. We then initiated a pilot RCT to evaluate the feasibility, acceptability, and efficacy of LTQ-H as compared to a standard of care mobile app (NCI QuitGuide).Results: In the UX study, self-reported levels of usability were high: Users' average on the System Usability Scale was 85 (SD=12.2). Key feedback elements suggested the need for modification of the app to better address concerns of the PWH population, including: adding more HIV-specific content; using more relatable words and examples; simplifying the interpretability of data summary screens. Modifications were integrated by our app development partner and LTQ-H was deployed on the iOS and Android app stores. Pilot RCT recruitment was initiated. To date, enrollment has remained steady at approximately n=4/month; n=29 have been enrolled and n=25 have been randomized (n=13 to LTQ-H; n=12 to NCI QuitGuide). Average System Usability Scale scores were high and comparable across the two apps (LTQ-H: 79 [SD=12.4]; NCI QuitGuide: 76 [SD=17.7]) at the 4-week follow-up timepoint. Data collection for the pilot RCT is ongoing.Conclusions: While data collection is still ongoing, our findings highlight the value of tailoring cessation interventions to a specific population.

PS2-161

CHRONIC DISEASE MANAGEMENT, POINT OF CARE BIOCHEMISTRY ASSAYS, AND THE TITRATION OF TOBACCO TREATMENT MEDICATIONS INCREASES QUIT RATES

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Significance: Tobacco dependence has been accurately described as a life-threatening, chronic disease. Yet, one aspect of chronic disease management and treatment, specifically the effective and efficient titration of tobacco treatment medications ad effect is underutilized. Methods: Total Nicotine Equivalents (TNEs) and expired breath carbon monoxide (EtCO) measures both combustible and non-combustible sources of nicotine. Point of care testing based on biochemical nicotine consumption and individual clinical response empowers adaptive treatment protocols. Effective medication titration minimizes withdrawal symptoms and increases quit rates. Results: The biochemical measurement of tobacco and nicotine consumption and resulting medication titration, enabled the Fire Department of the City of New York (FDNY) tobacco treatment program to enjoy a long-term quit rate of 70%. Conclusion: This poster will describe a treatment algorithm emphasizing intake and follow-up visit urinary TNEs, EtCO, tobacco consumption and withdrawal symptoms increasing quit rates. The poster will discuss chronic disease management best practices from the FDNY and the American College of Chest Physicians. Special emphasis will be given to the assessment and treatment of dual users, e-cigarette vapers and Heat not Burn tobacco products.

POSTER SESSION 3

PS3-1

ASSOCIATION BETWEEN TOBACCO USE AND USE OF OTHER SUBSTANCES WITH SLEEP DISTURBANCES

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Introduction: Sleep problems, including sleep disturbance, are associated with substance use (e.g., nicotine, cannabis), though the directionality of this association varies by substance. It is currently less clear how the use of several substances may impact sleep disturbance. The goal of this secondary-data analysis project is to explore the relationship between sleep disturbance with polysubstance use (tobacco, alcohol, cannabis, and pain medications) utilizing data from a recent cross-sectional national, online survey. Methods: Using Facebook to recruit, respondents included individuals who were at least 18 years of age and residing within the United States. Qualtrics was used to collect self-reported information on demographics, substance use (classified as any use versus no use during the last 30 days), and sleep disturbance (using PROMIS version 4a). Analyses included t-tests and logistic regression models. Results: Participants (n=1327) were mostly white (90%), female (67%), and, on average, were 41.9±15.0 years of age. While the use of tobacco within the past 30 days was not associated with sleep disturbance (any use: 25.8±0.4; no use: 25.3±0.4; p=0.3), sleep disturbance was less in those who reported use of alcohol (any use: 25.0±0.3; no use: 26.5±0.3; p<0.01) and cannabis (any use: 24.9±0.3; no use: 27.6±0.4; p<0.01) and higher in those who reported use of pain medication (any use: 26.3±0.3; no use: 23.1±0.5; p<0.01). Overall, when considered together, past 30 day use of tobacco (β=1.03±0.51, p-value=0.043) and pain medication (β=2.83±0.58, p-value<0.001) were associated with greater sleep disturbance whereas use of alcohol (β=-1.41±0.45, p-value=0.002) and cannabis (β=-2.65±0.52, p-value<0.001) were associated with less sleep disturbance. Conclusions: While tobacco use within the past 30 days alone was not related to sleep disturbance, when use of other substances was taken into consideration, tobacco use was associated with an increase in sleep disturbance. Additional research is needed to explore the temporality of this relationship as well as to explore how it may relate to cessation outcomes.

PS3-2

PERCEIVED CONTROL OVER ANXIETY RELATED EVENTS AND NICOTINE WITHDRAWAL AMONG ADOLESCENT SMOKERS

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Nicotine withdrawal symptoms, commonly reported by youth when they try to stop smoking, can negatively affect smoking cessation attempts. A factor which might aid in managing withdrawal is perceived control over anxiety related events (PC), which is one's perception of their ability to regulate or control their anxiety. In this study, we examined the potential association of PC and withdrawal symptoms among adolescent smokers. 207 high school aged adolescents from the New Haven area participated in a behavioral smoking cessation intervention. The analytic sample consisted of 81 participants who had complete data for all the variables of interest (46% female, 89% non-Hispanic White, 4.9% Hispanic, 2.5% Black, 2.5% Asian, and 1.2% Native American, mean age=16.4, SD=1.3). Participants comprised of adolescents who smoked 10 or more cigarettes on a daily basis for at least 6 months, were seeking treatment for smoking cessation, and had a baseline urine cotinine levels above 500 ng/ml. Since withdrawal symptoms are known to peak within 24-48 hours after initiation of abstinence, we assessed withdrawal symptoms using the Minnesota Nicotine Withdrawal Scale one day after their quit day. Multiple regression analysis examined the association between PC obtained at baseline and withdrawal symptoms, controlling for sex, trait anxiety, nicotine dependence, treatment condition, and self-reported abstinence one day after quitting. Overall, 82.7% of the participants (89% of the females and 77% of the males) self-reported being abstinent on the day after the quit day. PC (Mean = 92.22, SD = 18.38) was significantly associated with withdrawal (Mean = 8.44, SD = 5.26) (β = -0.07, t(73) = -2.01, p = 0.048) even after accounting for the covariates. Findings indicate that higher PC is associated with lower withdrawal symptoms. Developing higher perceived control over anxiety-related

PS3-3

AN IDIOGRAPHIC ANALYSIS OF BREATH CO TESTING WITHIN A CONTINGENCY MANAGEMENT INTERVENTION FOR PRESURGICAL CANCER PATIENTS

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Background: Contingency Management (CM) interventions deliver monetary reinforcers contingent upon biochemically verified abstinence from smoking. While CM has been found to be effective, less is known about the varied idiographic behavior patterns underlying group-level findings. The present analysis seeks to characterize and compare these patterns within and between groups receiving CM and treatment as usual. **Methods**: This is a secondary analysis of a randomized controlled pilot trial of presurgical cancer patients who smoke (RCT N=40). Participants were current everyday smokers diagnosed or suspected to have cancer and scheduled for surgery. All participants were enrolled in cessation counseling, offered NRT, and submitted breath CO testing 3 times per week for 2-5 weeks. Participants randomized to the CM group received monetary reinforcers for breath CO ≤6 ppm on an escalating schedule of reinforcement with a reset for positive samples. Sufficient breath CO data exist for 26 participants (i.e. 3 or more CO tests completed; CM = 12; TAU = 14). **Results**: Analysis of available breath CO data indicate that participants randomized to the CM group achieved abstinence more quickly (d=1.22), had a lower percentage of positive tests (d = .95), and experienced fewer lapses following abstinence (d=1.26). While 8 of 12 participants in the CM group achieved abstinence without subsequent lapse by their third breath test, this was only true for 2 of the 14 TAU participants. Additionally, 9 of 10 participants in the CM group who achieved abstinence on a single test maintained that abstinence for the reminder of the trial, this was true for only 4 of the 10 in the TAU condition. **Conclusions**: Those assigned to CM appear to achieve abstinence more quickly and with fewer lapses than those engaged in TAU. This speaks to the efficacy of financial reinforcement within CM interventions. While group-level findings support the efficacy of CM as an intervention, this idiographic secondary analysis provides insight into the behavior patterns underlying successful abstinence within the CM condition.

PS3-4

CLINICIANS WHO PROVIDE MORE CHRONIC AND FREQUENT PRIMARY CARE TO ADULT PATIENTS ADOPT AND IMPLEMENT COMPREHENSIVE CHRONIC TOBACCO TREATMENT AT HIGHER RATES

Deejay Zwaga[1], Danielle E. McCarthy[1], Timothy B. Baker[1], Mark E. Zehner[1], Robert T. Adsit[1], Amy Skora[1], Christian Kastman[2], Hannah Wallenkamp[2], Katherine Coates[2], Michael C. Fiore[1]. [1]University of WI Center for Tobacco Research and Intervention (UW-CTRI), Madison, WI, USA, [2]Group Health Cooperative of South Central Wisconsin, Madison, WI, USA.

Significance: Primary care providers (PCPs) vary in their willingness and/or ability to adopt and implement tobacco dependence treatments. Identifying factors associated with clinician adoption and implementation of smoking cessation treatment may facilitate refinement or targeting of implementation strategies. **Methods:** Secondary analyses of data extracted from electronic health records (EHR) from six primary care clinics that adopted a comprehensive tobacco use treatment system were conducted to identify factors associated with clinician adoption and implementation of EHR tools designed to support the treatment program. Adoption was defined as ever using program tools (i.e., addressing an EHR alert, ordering cessation pharmacotherapy, setting a quit date, providing brief counseling, referring to counseling). Implementation was defined as the proportion of encounters in which patients eligible for the program received treatment. Clinician-level predictors were: mean duration (months) clinicians were the designated PCP for patients, mean number of visits clinicians had with patients, mean proportion of visits at which the BPA last fired with that clinician, and the proportion of patients who activated their patient portal accounts. **Results**: Rates of adopting and implementing quit-date setting, counseling, pharmacotherapy, and referral were positively associated with average number of months patients were assigned to the PCP, proportion of visits

events could help youth deal with withdrawal symptoms. Strategies to improve PC could be included in smoking cessation programs to improve withdrawal coping and alleviate the negative impact of withdrawal on smoking cessation attempts.

with the PCP vs. other clinicians, and proportion of patients who activated their EHR patient portal. Rates of implementing cessation treatments were also higher among clinicians with a greater average number of visits with their patients. **Conclusions**: PCPs with more stable and engaged patient panels adopt and implement chronic, comprehensive smoking cessation treatment at higher rates than do their colleagues with less frequent or sustained contact with patients. Chronic tobacco treatment may be more readily integrated into the practice of PCPs who see patients consistently and frequently over time.

PS3-5

CHARACTERISTICS ASSOCIATED WITH SMOKING DURING PREGNANCY: STUDY METHODS AND BASELINE DATA FROM A COHORT STUDY

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SIGNIFICANCE: One in 10 women smoke during pregnancy in the U.S.; most women who quit return to smoking by one year postpartum. No investigators have prospectively examined mutual changes in risk factors and women's smoking trajectory during pregnancy and postpartum. The aim of this presentation is to describe the methods used to assemble a cohort to examine smoking, determinants of smoking, and quality of tobacco treatment during pregnancy and postpartum and to compare socio-demographic and tobacco-related characteristics among current smokers and recent quitters at baseline. **METHODS**: We recruited current or recent quitters (smoked 6 months prior to pregnancy), aged ≥ 18, during any stage of pregnancy from obstetrics clinics. We screened participants for eligibility via phone and enrolled women who completed an emailed baseline survey. Follow up assessments included emailed surveys and weekly texts up to one year postpartum. Analyses included Chi-square and independent sample t-tests using Cohen's d (to indicate effect size). **RESULTS**: We enrolled 62 women (41 current smokers and 21 recent quitters). Compared to current smokers, more recent quitters were White (52.4% vs 26.8%: Cohen's d=0.61) and employed full time (71% vs 36%: Cohen's d=0.81). Current smokers reported difficulties in having money to pay rent (34.15% vs 9.52%: Cohen's d=0.88) and buy food (34.15% vs 9.52%: Cohen's d=0.88) relative to recent quitters. Current smokers reported co-use of marijuana (27.03% vs 10%: Cohen's d=0.66), alcohol (19.51% vs 4.47%: Cohen's d=0.87) and other tobacco products during pregnancy (24.39% vs 9.52%, Cohen's d=0.62) relative to recent quitters. The proportion of women using e-cigarettes was slightly higher among recent quitters (14.29% vs 9.76%: Cohen's d=0.24). **CONCLUSIONS**: Women who smoke during pregnancy are coping with multiple social determinants of health including housing, food insecurity, and other substance use. Follow up surveys and weekly texts assessing smoking will provide information on socio-demographic changes over time and can be used to inform just-in-time interventions to reduce barriers to cessation during pregnancy and postpartum.

PS3-6

SMOKING AND VAPING BEHAVIORS, EXPECTANCIES, AND CESSATION OUTCOMES OF BISEXUAL AND HETEROSEXUAL INDIVIDUALS

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Significance: Bisexual individuals have a higher prevalence of smoking and vaping than heterosexual individuals, which can contribute to health disparities. We compared 294 bisexual and 2412 heterosexual participants in an RCT testing a smoking cessation intervention for dual users of combustible and electronic cigarettes on baseline smoking and vaping characteristics and expectancies, as well as follow-up smoking/vaping status. **Methods:** Participants were recruited nationwide and self-reported smoking, vaping, and expectancies regarding smoking and vaping. We analyzed 7-day point prevalence smoking and vaping abstinence at 3, 12, and 24 months. **Results:** Compared to heterosexual participants, bisexual participants were more likely (ps<.05) to be younger (26.0 v 30.5 years), female (70.4% v 30.8%), and low income (67.4% v 55.0%). Bisexual participants also reported shorter smoking histories (10.3 v 11.0 years), fewer cigarettes per day pre-vaping (17.8 v 19.6), lower motivation to quit smoking (Contemplation Ladder=5.5 v 5.8), and were less likely to initiate vap-

ing to quit smoking (68.9% v 75.7%), but statistical significance was not maintained when controlling for age. When including all the previous variables as covariates, bisexual individuals reported more positive vaping expectancies than heterosexual individuals regarding satisfaction ($β$=0.073;p<.001), withdrawal ($β$=0.043;p=.043), craving reduction ($β$=0.052;p=.012), cost ($β$=0.057;p=.006), negative affect reduction ($β$=0.059;p=.005), taste ($β$=0.058;p=.005), social facilitation ($β$=0.058;p=.006), health risks ($β$=-0.055;p=.009), and stress reduction ($β$=0.053;p=.013). Bisexual individuals also reported greater positive smoking expectancies than heterosexual individuals on negative affect reduction ($β$=0.054;p=.010) and stimulation ($β$=0.044;p=.035). The only difference between groups on smoking or vaping was on vaping at 3 months with bisexual individuals being more likely to abstain from vaping than heterosexual individuals (19.1% vs. 10.4%, p=.0002), but significance was not retained when controlling for covariates (study condition, demographic, smoking and vaping variables). **Conclusion:** Despite bisexual participants reported greater positive expectancies regarding smoking and vaping than heterosexual participants, rates of smoking, vaping, and dual use were similar over time. There may be greater utility in targeting the disparities via prevention efforts over targeted cessation efforts.

PS3-7

MEDIATORS OF INITIAL ABSTINENCE FOR AN EXTENDED SELF-HELP SMOKING CESSATION INTERVENTION WITH DUAL USERS OF COMBUSTIBLE AND ELECTRONIC CIGARETTES

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Introduction: Approximately 10% of current smokers are dual users of electronic and combustible cigarettes. We recently reported on the efficacy of an extended (18 months) self-help intervention targeting dual users (ETARGET) compared to an assessment only condition (ASSESS; Martinez et al., *The Lancet Public Health*, 2021). The present study analyzed motivational and self-efficacy variables, assessed at baseline and 6 months, as prospective mediators of the efficacy of ETARGET on initial smoking abstinence at 9 months. **Method**: Participants from the parent study who (1) returned at least one of the surveys at 3, 6, or 9 months and (2) did not report smoking abstinence at 3 or 6 months were included (ETARGET n=653, ASSESS n=386). Four mediators were evaluated: readiness to quit (Contemplation Ladder), commitment to a smoke-free life (single item, 1-5 scale), confidence in ability to quit cigarettes (single item, 1-5 scale), and cessation self-efficacy (Smoking Self-Efficacy scale). Models (implemented in Mplus) evaluated change in the proposed mediator from baseline to 6 months on smoking status at 9 months (self-reported 7-day point prevalence), with change assessed using the regression approach. The indirect path was evaluated using the product method. Parallel analyses were performed for 3 different approaches to manage missing data: full information maximum likelihood (FIML, n=1039), complete case (n's=527-655), and missing imputed as smoking (n's=683-846). **Results**: The full sample had the following characteristics: mean age was 31.1 years, mean FTND was 3.9, 59% were male, and 88% were White. Using the FIML approach, the specific indirect effect was statistically significant for readiness to quit (b=.220, SE=.078, p=.005) and commitment (b=.124, SE=.049, p=.012), but not for confidence (b=.024, SE=.049, p=.624) or self-efficacy (b=.074, SE=.047, p=.115). The pattern of results was the same when using the complete case and the missing equals smoking approaches. **Conclusion**: Increases from baseline to 6 months in readiness to quit and commitment to being smoke-free mediated the effect of the extended self-help intervention on initial smoking abstinence at 9 months, whereas confidence and self-efficacy did not. These findings suggest that motivational enhancement may have been more important than skills training as interventional processes. **Funding**: This work was supported by the National Institute on Drug Abuse (R01DA037961) and the National Cancer Institute (P30CA076292).

PS3-8

EFFECTS OF THETA-BURST STIMULATION ON FUNCTIONAL CONNECTIVITY, CRAVING AND CIGARETTE SMOKING

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Background: Nicotine addiction is associated with disturbances in prefrontal mediated attentional control. Theta-burst rTMS (TBS) has been shown to improve attentional control and reduce symptoms in clinical samples; however, the effects of TBS on attentional control brain mechanisms and behavior among smokers remains poorly characterized. The current study tested the effects of two TBS protocols (cTBS, iTBS) to the right inferior frontal gyrus (rIFG) on brain network connectivity, inhibitory control (IC) and craving. **Methods:** Adult (N=37; age=47.6 ± 9.5; female: n=17) nicotine dependent (FTND=5.4 ± 2.1) tobacco smokers (CPD=18.8 ± 5.7; 30 ± 9.8 years) performed a baseline IC task during fMRI. Baseline rIFG IC BOLD was used for neuronavigation and then, in a crossover, repeated measures fMRI assessment, the effects of TBS were assessed on: 1) functional connectivity, 2) task performance and, 3) craving 24hrs. post TBS. **Results:** A significant condition x time interaction of TBS on FC between right fronto-parietal and visual circuitry was observed: cTBS increased and iTBS decreased FC between right lateral PFC (rLPFC) and the occipital pole (OP) (p=.026, η_p^2=.130); and between right posterior parietal cortex (rPPC) and OP (p=.028, η_p^2=.127). Overall, the effect of TBS on rLPFC-OP FC was positively associated with effects on IC task performance (p=.019, R^2=.075; cTBS p=.107, R^2=.046; iTBS p=.444, R^2=.017). Over the post 24hr cTBS period, rPPC-OP FC displayed a negative association with craving (p=.126, R^2=.04). No effect of iTBS changes in FC were associated with smoking outcomes. **Conclusions:** Previous works show that smokers exhibit disrupted function in right parietal-visual circuitry during attentional tasks and right fronto-parietal circuitry during probes of attentional control in the face of emotional distractors. Among nonsmokers, strength of frontoparietal-visual FC corresponds with better performance during tasks of attention and vigilance. Current study findings suggest that TBS may improve prefrontal mediated attentional control and reduce smoking urges. Findings will be discussed in the context of using TBS to improve executive control and reduce craving.

PS3-9

CONVENTIONAL CIGARETTE POLYGENIC SCORE IS ASSOCIATED WITH E-CIGARETTE USE IN YOUTH

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Significance: Prevalence of electronic cigarette use has escalated rapidly in recent years, particularly among youth. Little is known about the genetic influences on e-cigarette use. We aimed to determine whether genetic risk for initiation of regular smoking of conventional cigarettes and average cigarettes smoked per day confers risk for e-cigarette initiation and vaping frequency. **Methods:** Polygenic scores (PGS) of smoking initiation and cigarettes per day were constructed using summary statistics from the two largest available GWAS meta-analysis of conventional cigarette use in European and East Asian ancestry. We tested whether the PGS of smoking tested whether the PGS of regular smoking initiation or cigarettes per day predicted lifetime e-cigarette initiation and frequency of past 30-day e-cigarette use among 9,541 young adults (n=2,034 African (AFR), n=1,196 Admixed American (AMR), n=928 East Asian (EAS), n=4,562 European (EUR), and n=821 South Asian (SAS) ancestry) from the Spit for Science longitudinal cohort study (2011-2019). **Results:** The smoking initiation PGS was associated with e-cigarette initiation in the EUR subsample (OR: 1.27, 95% CI: 1.19 - 1.36, p=7.53x10-12). There was no significant association between the smoking initiation PGS and e-cigarette initiation in other subsamples (p's > 0.12). The PGS for cigarettes per day was not associated with e-cigarette initiation. The PGS for regular smoking initiation and cigarettes per day were not associated past 30-day e-cigarette use in any of the subsamples (p's>0.05). **Conclusions:** Genetic factors associated with regular smoking initiation predict initiation of e-cigarettes in youth of European ancestry. However, shared genetic factors do not appear to influence heaviness of conventional cigarette use and e-cigarette initiation and heaviness of recent use.

PS3-10

CESSATION OUTCOMES FOR EXCLUSIVE VAPERS AND EXCLUSIVE SMOKERS WHO CALL EMPLOYER-SPONSORED TOBACCO QUITLINES IN THE UNITED STATES

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SIGNIFICANCE: Most e-cigarette users in the US are dual users of e-cigarettes and combustible cigarettes. However, the number of exclusive e-cigarettes users (EECUs) is increasing, including the number of callers to tobacco quitlines (QLs) for help quitting vaping. Numerous studies have supported the effectiveness and cost-effectiveness of QLs for smoking cessation, but the effectiveness of QLs for vaping cessation is yet to be established. METHODS: This secondary data analysis of real-world QL data examined participants in employer-sponsored QLs in the US run by Optum who were EECUs or exclusive smokers (ESs) at the time of program registration from January 2017 through October 2020. QL treatment included 5 coaching calls, free nicotine replacement therapy (NRT), and access to integrated text and online cessation support. Participant demographics and tobacco use were collected at program registration. Participant record systems captured program engagement data. Self-reported smoking and vaping 30-day point prevalence abstinence (30dppa) outcomes were collected via an evaluation survey after 6 months. RESULTS: 1194 EECUs and 22,845 ESs enrolled and received QL treatment. EECUs were more likely to be male (EECUs: 60.3%; ESs: 43.2%; p<0.001), were younger on average (EECUs: M=43.0, SD=11.7; ESs: M=49.5, SD=11.2; p<0.001), completed a higher number of coaching calls on average (EECUs: M=3.8, SD=1.7; ESs: M=3.2, SD=1.8; p<0.001) and were less likely to be mailed NRT from the QL program (EECUs: 43.8%; ESs: 69.8%; p<0.001). 488 (40.9%) and 8,382 (36.7%) of EECUs and ESs responded to the 6-month survey, respectively (p<0.01). The respondent 30dppa for EECUs was 62.5% (305/488) and for ESs was 58.5% (4,900/8,382), p=0.08. Assuming those lost to follow-up were continued users, 30dppa for EECUs was 25.5% (305/1194) and for ESs was 21.4% (4,900/22,845), p<0.001. CONCLUSION: Differences exist in demographics and QL treatment engagement for EECUs compared to ESs in this sample. Outcome data suggest QL protocols are effective at supporting EECUs trying to quit vaping. Given the existing infrastructure, QLs have the potential for meaningful vaping cessation reach and impact.

PS3-11

A BEHAVIORAL-ECONOMIC EXAMINATION OF DIFFERENCES IN THE RELATIVE REINFORCING VALUE OF CIGARETTE SMOKING AMONG THOSE WITH CUMULATIVE VULNERABILITIES

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Introduction: Risk for smoking varies in an orderly, cumulative manner in association with the presence of co-occurring vulnerabilities. An important question examined in the present study is how the relative reinforcing effects of smoking vary across individuals with varying levels of cumulative vulnerability. Reinforcement is widely recognized to be the behavioral process underpinning chronic smoking. **Methods:** We used data from 775 adult, daily smokers who participated in a 12-week multisite controlled trial evaluating the addiction potential of cigarettes differing in nicotine content. Vulnerabilities included rural residence, current substance use disorder, current affective disorder, low educational attainment, poverty, unemployment, physical disability. Participants were categorized as having 0-1 (low), 2-3 (moderate), or 4-5 (high) cumulative vulnerabilities. We used the hypothetical cigarette purchase task (CPT) to characterize the relative reinforcing effects of participant usual-brand cigarettes at a trial baseline assessment. The CPT is a valid behavioral-economic measure of the relative reinforcing effects of smoking in which participants estimate how much they would smoke (demand) in a 24-hr period under escalating constraints on cigarettes (price). Demand is characterized using two factors: Amplitude (demand under minimal cost) and Persistence (demand despite increasing cost). Analysis of covariance was used to analyze study results. **Results**: Demand Amplitude (F[2,709]=16.04,p<.0001, η^2=.04) and Persistence (F[2,709]=8.35,p=.0003, η^2=.02) each increased corresponding to increasing cumulative vulnerability, but effect size was larger for Amplitude compared to Persistence. With Amplitude, demand differed significantly between each level of cumulative vulnerability in post-hoc testing. With Persistence, the low and moderate groups each differed from the highest level but not each other. **Conclusions**: Cumulative vulnerability is associated with a pervasive

increase in the relative reinforcing effects of smoking encompassing demand Amplitude and Persistence, although changes in Amplitude are especially robust and may be an important clinical target for reducing smoking in vulnerable populations.

PS3-12

A SCOPING REVIEW OF THE USE OF REMOTE BIOCHEMICAL VERIFICATION METHODS OF SMOKING STATUS

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Significance: Biochemical verification of smoking status is considered the "gold standard" in smoking cessation research. An increasing trend in cessation research is remote collection of cessation outcome data, but little is known about which methods of remote biochemical verification of smoking status are most feasible and accurate. Methods: We conducted a scoping review of studies using remote biochemical verification of smoking status. Publications were included if they reported on remotely obtained (not in-person) biochemical confirmation of smoking status for participants in their study and addressed combustible tobacco use. A medical librarian searched 6 databases from their inception until January 6, 2020. Two independent reviewers screened the titles and abstracts of each of the articles, reviewed full-text articles, and extracted data of included articles. Disagreements were resolved by consensus between the two reviewers or by a third reviewer. Results: We found 7591 articles, and 60 articles met the study criteria and were included in this review. Most studies were smoking cessation intervention studies (83%), which included a large number of contingency management studies (36% of intervention studies). The remaining studies were feasibility and cross-sectional studies (17%). The most frequently collected sample types were saliva (53%), expired air (42%), and urine (7%); the most commonly used biomarkers were cotinine (60%) and carbon monoxide (42%); and the most commonly used confirmation strategies were mail-in samples analyzed in a laboratory (50%) and videos (38%). The rate of returned samples ranged widely from 100% to 24%. A total of 55% of studies provided information on both self-reported and biochemically verified smoking abstinence rates. Biochemically verified abstinence rates in these studies frequently were around only 50% of self-reported ones, but in some examples were up to 5 times lower than self-reported ones. Conclusions: Considering the increase in remote delivery of interventions and data collection in tobacco research, remote biochemical verification of smoking status is of increasing importance to the field. Recommendations for the use of these methods in future studies will be provided in this presentation.

PS3-13

ASSOCIATION OF PAIN CATASTROPHIZING WITH SMOKING DEPENDENCE MOTIVES IN AFRICAN AMERICANS

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Significance: Chronic pain and cigarette smoking both disproportionately impact African American health. While pain-smoking comorbidity is well-documented, its mechanisms are poorly understood, particularly in African Americans. The present cross-sectional study investigated associations of multiple dimensions of pain catastrophizing (cognitive-affective component of pain) with various smoking dependence motives in African American smokers. **Methods**: Non-treatment-seeking African American smokers from Los Angeles (N=508, 41.1% female, $M[SD]: age$=48.0[11.3], cigs/day=15.2) participated in a clinical laboratory study on individual differences in tobacco addiction. Questionnaires assessing pain catastrophizing, smoking dependence motives, and other covariates were assessed and used in this secondary analysis study. Regression analyses examined associations of rumination (constantly thinking about pain), magnification (heightening pain perception), and helplessness (feeling that pain will persist) with each of 11 dependence motives in separate models with and without adjusting for demographic, psychiatric, and pain severity covariates. **Results**: All 3 dimensions of pain catastrophizing were significantly associated with all 11 smoking dependence motive subscales without covariate adjustment (beta range: .13-.25). After covariate adjustment, pain rumination and helplessness were associated with all primary motives indicative of heavy, ritualistic, and compulsive dependent smoking (Automaticity, Craving, Tolerance, Loss of Control; beta range: .11-.19), and magnification was associated with

Automaticity (beta =.13) and Craving (beta =.16) motives. Other secondary motives were weakly, but significantly, associated with some subscales in a non-systematic fashion. **Conclusion**: Heightened pain catastrophizing may have modest, but statistically unique, associations with heavy and compulsive smoking dependence motives in African Americans over and above other co-factors. If these findings were confirmed in experimental or longitudinal designs and clinical populations, they could point to pain catastrophizing as a possible target for further clinical and scientific work dedicated to pain-smoking comorbidity in African Americans.

PS3-14

PREDICTORS OF ADHERENCE TO SMOKING CESSATION MEDICATIONS AMONG CURRENT AND EX-SMOKERS IN AUSTRALIA: FINDINGS FROM A NATIONAL CROSS-SECTIONAL SURVEY

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Background: Adherence to smoking cessation medications improves the rate of successful quitting. This study aimed to evaluate the level of adherence to smoking cessation medications and associated factors among smokers and ex-smokers in Australia. **Method:** A cross-sectional study using an online survey was conducted in Australia from January 2021 to July 2021. Data entered and analysed using Stata software (V16, Stata Corp LP, College Station, TX). Descriptive statistics using frequency and percentage were used to present the overall characteristics of participants. Cross-tabulation with Pearson's chi-square test was done to evaluate the possible association between factors. Univariate and multivariable logistic regressions were employed to explore barriers and facilitators of adherence to smoking cessation medications and a P-value of 0.05 was used as a cut-off point to declare significant association. **Results:** Among the participants, 28.4% participants were found to be adherent to smoking cessation medications. Participants with good social support during their quit attempt were more likely to be adherent (AOR=3.28, 95% CI of 2.30-6.27). Participants who did not experience anxiety symptoms during their quit attempt were more adherent compared to smokers who had anxiety symptoms (AOR=4.41, 95% CI of 3.64-14.68). Having previous experience of using the medications improved adherence by four-fold (AOR=3.87, 95% CI of 1.11-13.44). The level of nicotine dependence showed a positive association with medication adherence (AOR=3.53, 95% CI of 1.40-8.95). Not relapsing while on the medications improved adherence (AOR=2.88, 95% CI of 1.21-6.88). **Discussion:** The rate of adherence to smoking cessation medications is found to be low in Australia. Adherence was associated with social, psychological, smoking, and medication-related factors. Smoking cessation interventions are recommended to include strategies that can address medication adherence. **Keywords:** adherence, factors, quitting, smoking cessation medications

PS3-15

DIGITAL METHYLATION ASSESSMENTS DEMONSTRATE SIGNIFICANT UNDER REPORTING OF SMOKING AND ALCOHOL CONSUMPTION IN AFRICAN AMERICAN YOUNG ADULTS

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African Americans have elevated levels of both cardiovascular disease and cancer that are not well explained by self-reported rates of smoking and alcohol use. In the current investigation, we examined the possibility that rates of some risk behaviors, such as smoking and drinking, may be higher in African Americans than their self-report data indicate. To test that hypothesis, using cutting edge epigenetic technologies and data from a subset of a large longitudinal cohort of 30 year-old African American subjects from Iowa and Georgia (FACHS), we compared the self-reported and objective rates of smoking and heavy alcohol consumption (HAC). In the first 190 subjects from FACHS, using digital DNA methylation testing, > 50% of the participants had evidence of significant demethylation at cg05575921, a CpG site whose methylation status is sensitive and specific for smoking. In contrast, the rate of self-reported smoking tobacco and/or cannabis was only 35%. Furthermore, only 4% of the participants reported drinking three or more drinks per day one or more times per week, but a digital epigenetic test for HAC, using the newly published Alcohol T Score (ATS) metric, found that 10% of the first 190 had ATS >5, 20% had ATS>3.5, and 32% had ATS > 2.35, which are cut-points for diagnosis, suggestive of problem use, and an optimal classifier for HAC, respectively. Finally, consistent with prior epigenetically informed studies showing that heavy drinking

and heavy smoking are highly associated, methylation status at cg05575921 and ATS were highly correlated (r = -0.60), providing convergent validity for both assessments. These data add further evidence that underreporting of health-relevant behaviors is common and may be substantial in communities under particular stress or with potential concerns about reporting substance-use related behavior. Indeed, substantial underreporting of problematic health behavior is likely the norm in all populations. As a result, enhanced, non-self-report assessment of health-relevant behaviors may help account for illness outcomes and may provide a framework for understanding and addressing health promotion challenges.

PS3-16

IMPACT OF TREATING INSOMNIA SYMPTOMS ON ABSTINENCE FROM SMOKING

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Significance: Quitting smoking is the single most impactful health strategy to prevent cancer. Even quitting at the time of diagnosis can increase cancer patients' survivorship by 30-40%. Insomnia symptoms can hinder quit attempts. However, no studies have confirmed if treating insomnia symptoms would increase abstinence rates. We set out to assess the impact of treating insomnia on the ability to abstain from smoking. **Methods:** Data were extracted from the electronic health records of patients who participated in a cancer center's tobacco treatment program. Initial, middle, and late insomnia were assessed with the Jenkins sleep questionnaire, abstinence was based on subject report, and severity of nicotine dependence was assessed using the Fagerström Test of Cigarette Dependence. We report abstinence according to 7-day point prevalence at 3, 6, and 9 months after starting the tobacco treatment program. The relationship between insomnia score and abstinence was evaluated after participants were propensity score matched on age, sex, race, nicotine dependence, alcohol use, panic disorder, depression, and severity of insomnia. **Results:** Patients treated for insomnia were more likely to abstain from smoking than patients not treated for insomnia 9 months after the start of tobacco cessation treatment (p = 0.013). However, at 9 months, patients treated for severe insomnia (sleep scores greater than 14) had lower abstinence rates than patients not treated for insomnia. At 3 and 6 months, treatment for insomnia did not significantly improve abstinence rates compared with the nontreatment group. **Conclusion:** Treating patients with mild/moderate levels of insomnia could benefit their tobacco abstinence, resulting in decreased incidence of cancer and improved outcomes for cancer survivors. Future analyses will aim to control for the co-occurrence of other psychiatric disorders and their impact on the severity of insomnia and therefore the ability to quit smoking.

PS3-17

DUAL USERS IN THE HEALTHCARE SYSTEM: DO THEY QUIT SMOKING OR BENEFIT FROM TREATMENT?

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Significance: It is unclear whether dual use compared with smoking is associated with smoking cessation and whether tobacco treatment increases smoking cessation among dual users. **Methods**: We analyzed the electronic health record (EHR) data from 193,846 smokers and 2,894 dual users in a large healthcare system in US Midwest between June 2, 2018 and June 30, 2021. We analyze the endpoints, including smoking cessation in the following 12 months. **Results**: First, dual use was increasingly documented in the EHR during outpatient visits (396 patients in 6-12/2018, 578 patients in 1-6/2019, 839 patients in 7-12/2019, and 1,081 patients in 1-6/2020 reported dual use of electronic and combustible cigarettes). Second, dual users, compared with smokers, had higher smoking cessation likelihood in the next 12 months (22.0% vs. 16.6%, z=6.32, p<0.00001). Third, among dual users (N=2,894), 314 patients (12.1%) received evidence-based tobacco treatment. Treated dual users, compared with untreated dual users, had higher smoking cessation in the next 12 months (30.7% vs. 19.7%, z=4.05, p=0.000052). **Conclusion**: Real world data suggest that dual use may promote smoking cessation and that dual users appear to benefit from tobacco treatment. These findings may inform future tobacco treatment but interpretation must consider the nonrandomized nature of dual use.

PS3-18

EVER AND CURRENT USE OF E-CIGARETTES AMONG ADULT SMOKERS PARTICIPATING IN AN OUTPATIENT HOSPITAL TOBACCO TREATMENT SERVICE RELATIONS WITH TOBACCO USE OUTCOMES

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Background. E-cigarettes may promote smoking cessation and their use may be increasing among smokers with co-morbid medical conditions. Nevertheless, e-cigarettes have typically been discouraged in this population. More research is needed to understand their e-cigarette use and the link with tobacco use behavior. **Methods.** Exploratory analysis of e-cigarette use among new patients (N=234) enrolled in the Smilow Cancer Hospital Tobacco Treatment Service between January and June 2020 using electronic health record data. Chi-square and Mann Whitney U tests conducted using SPSS 28. **Results.** Patients were 59% female, 65.4% White, 22.2% Black, 18.8% Hispanic, with a median age of 58.0. They reported smoking a median of 15.0 cigarettes daily at their intake visit. Most (78.8%) had a history of cancer, respiratory disease, and/or cardiovascular disease. Nearly a third reported ever use of e-cigarettes; 11 (4.7%) reported current use. Compared to patients who never used e-cigarettes, those who used were significantly younger (Mann-Whitney U=4926.0, n=234, p=.04) and less likely to have a history of cancer, respiratory, and/or cardiovascular disease (X^2(1)=5.1, p=.02). In fact, having 2 or more conditions was associated with a lower likelihood of trying e-cigarettes compared to having none or 1 (X^2(2)=8.7, p=.01). Ever use was significantly associated with attending more TTS visits (Mann-Whitney U=7499.0, n=234, p<.001). However, there was no difference in the amount of smoking reduction between those who had ever tried e-cigarettes versus those who did not during treatment. Of the 11 patients who reported current e-cigarette use: 3 stopped and 2 reduced cigarette use, and 1 switched to a device with no nicotine.**Conclusions**: E-cigarette use is common among medical patients seeking tobacco treatment, but less so among those with more complex medical histories. The findings have important implications for tobacco treatment. Medical patients who tried e-cigarettes may be open to tobacco treatment and a range of treatment options. Patients with more co-morbid medical conditions may be less likely to take advantage of the potential harm reduction opportunity of e-cigarettes.

PS3-19

GENDER EFFECTS IN PREDICTORS OF SMOKING ABSTINENCE AND NEUROPSYCHIATRIC ADVERSE EVENTS IN THE EAGLES TRIAL

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SIGNIFICANCE: Gender effects have been demonstrated in abstinence outcomes across all smoking cessation medications, but there is limited information regarding gender effects on cessation-related neuropsychiatric adverse events (NPSAEs) or interactions with smokers' psychiatric status. METHODS: We conducted a secondary analysis of data from EAGLES of 8144 smokers randomized to varenicline, bupropion, nicotine patch or placebo; 8058 received 1 dose or more of treatment. Design characteristics included region (within/outside US), psychiatric cohort (absent/present), and treatment. Baseline characteristics included gender, age, race, BMI, nicotine dependence, anxiety, depression, aggression, cigarettes per day (CPD), suicidality, psychotropic medication use, prior use of smoking cessation medications, age started to smoke, lives with smoking, contact with smoker, and alcohol or substance use disorder. Design characteristics were forced into logistic regressions models, and then interactions among gender, design elements, and baseline characteristics were evaluated for NPSAEs and 6-month cessation outcomes. RESULTS: Findings demonstrated a significant interaction of gender and race (p<02); black women were more likely to report NPSAEs than black men. There were significant interactions between gender and baseline CPD (p<.03) and gender and prior use of varenicline (p<.04). Women vs men with higher baseline levels of smoking had lower odds of continuous abstinence. Women vs men who used varenicline previously had lower odds of prolonged abstinence. For 6-month point prevalence, gender interacted with baseline cigarettes per day (p<.01) similar to the interaction for continuous abstinence. Gender interacted with medication (p<.03), such that women vs men had relatively greater success at achieving point prevalence abstinence on varenicline. Odds ratios (95%CI's) highlighting significant female vs male interactions will be presented. CONCLUSIONS: Overall, results demonstrated important racial differences in NPSAEs, but psychiatric status did not interact with

gender on treatment outcomes. Findings did support prior work demonstrating relative increased efficacy of varenicline for women. FUNDING: EAGLES was funded by Pfizer and GlaxoSmithKline. Support also provided by NIH grants U54AA027989 (to SAM).

PS3-20

COHORT PROFILE FOR THE LOMA LINDA UNIVERSITY HEALTH BREATHE STUDY OF CONTINUOUSLY INCENTIVIZED EMPLOYEE SMOKING CESSATION

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Significance: Financial incentives are frequently used to enhance the efficacy of workplace smoking cessation programs. The purpose of the LLUH BREATHE Cohort is to test the efficacy of a novel method of continuously incentivizing participation in workplace smoking cessation on participation, long term abstinence, health outcomes, healthcare costs, and health care utilization. Methods: In 2014, Loma Linda University Health (LLUH) - a US academic medical center and university - incentivized participation in a workplace smoking cessation program (LLUH BREATHE) by lowering health plan costs. Specifically, LLUH introduced a Wholeness Health Plan (WHP) option that, for the smokers, continuously incentivizes participation in nicotine screening and the LLUH BREATHE smoking cessation program by offering an "opt-in wellness discount" that consisted of 50-53% lower out of pocket health plan costs (i.e. monthly employee premiums, co-payments). This novel "continuously incentivized" model lowers annual health plan costs for smokers who, on an annual basis, attempt or maintain cessation from tobacco use. The annual WHP cost savings for smokers far exceeds the value of short term incentives that have been tested in workplace cessation trials to date. This ongoing health plan option offered to over 16,000 employees has created an open, dynamic LLUH BREATHE cohort of current and former smokers (n=1,092). Results: Our profile of the LLUH BREATHE cohort indicates that after five years of follow-up in a prospective cohort study (2014-2019), continuously incentivized smoking cessation produced a 74% participation (95% confidence interval=[71% to 77%]) in employer sponsored smoking cessation attempts that were occurring less than a year after the incentive was offered. This participation rate exceeds norms (median of 28%) in more than 20 studies of employee smoking cessation programs in affluent nations. Conclusion: A novel continuously incentivized employee smoking cessation model substantially increased participation of employee smokers. The LLUH BREATHE cohort can be purposed to examine the effect of the continuously incentivized model on cessation outcomes, health plan utilization/costs, use of electronic nicotine delivery systems, and COVID-19 outcomes.

PS3-21

VALIDATION OF SMOKING-RELATED SELF-EVALUATIONS IN A SAMPLE OF PEOPLE LIVING WITH HIV/AIDS IN NAIROBI, KENYA

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INTRODUCTION: The cigarette smoking prevalence for people living with HIV/AIDS (PLWHA) is high especially in developing countries like Kenya. Smoking-related self-evaluations (e.g., self-efficacy, self-concept) are related to smoking cessation outcomes yet most of the work on self-evaluations, including validation of these measures, has been done in developed counties. This study is the first to examine the psychometrics of self-evaluation measures for PLWHA in Kenya. METHODS: Participants were 50 PLWHA who smoke cigarettes recruited from HIV care clinics and methadone clinics in Nairobi, Kenya (68% male, 96% African). Participants completed measures of self-efficacy (adaptation of the Self-Efficacy Questionnaire, SE), self-concept (Smoker and Abstainer Self-Concept Questionnaire, SC), and locus of control (adaptation of the Drinking-Related Locus of Control Scale, LOC). Factor loadings were determined using Horn's parallel analysis and factor analysis, and reliability coefficients were calculated.

RESULTS: The internal consistency reliability for the SE (alpha=0.85) and LOC (alpha=0.85) measures were high and were lower for the SC measure (overall alpha=0.43, smoker SC alpha=0.78, abstainer SC alpha=0.57). The SE questionnaire was found to have a three-factor solution accounting for 51.2% of the overall variance which is similar to the three factors found in previous research. The SC measure was found to have a three-factor solution accounting for 65.49% of the overall which includes an overall smoker SC factor and two abstainer SC factors. The LOC questionnaire was found to have an eight-factor solution accounting for 69.75% of the overall variance, which differed from the three-factor solution found in previous research. CONCLUSION: While the factor structure of the SE questionnaire had similar results to previous research, there were significant differences in the factor structures for the SC and LOC questionnaires. These differences may be useful in identifying cultural differences in smoking-related self-evaluations in Kenya versus other countries. These results will also be important for future smoking research on PLWHA from developing countries.

PS3-22

DESCRIPTION OF A TREATMENT PROTOCOL FOR OPT OUT TOBACCO COUNSELING AND EXAMINATION OF TREATMENT PROCESS OUTCOMES

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Significance. Opt out treatment for tobacco use could increase the reach of evidence-based care, but could alienate patients who are not interested in quitting. Methods. We describe the treatment protocol for a clinical trial of the Opt Out approach, in which patients are provided tobacco treatment regardless of their stated intention to quit versus a standard Opt In approach. We report on therapeutic relationship and treatment utilization by study arm and willingness to quit. Using an adaptive design, 685 hospitalized patients were randomized to receive either Opt Out (n= 440) or Opt In (n= 245) style counseling. Results. Two thirds of participants in both study arms stated they were willing to try to stay quit post-discharge. Two-way ANOVA found a significant interaction between the effects of counseling approach and willingness to quit on therapeutic alliance, $F (1, 663) = 4.20$, $p = .041$. Therapeutic alliance was lower in Opt In compared to Opt Out. The difference was more drastic among those not willing to quit compared to those willing to quit. Simple main effects show that those who are willing to quit compared to not willing form a stronger therapeutic alliance and the Opt Out approach leads to higher therapeutic alliance compared to Opt In ($p<.001$). Satisfaction with the inpatient clinical encounter was high (9.2 out of 10, SD = 1.56) and did not differ by either counseling approach or willingness to quit. When asked about feeling "coerced" into quitting, 1 in 5 felt 'forced' to try to quit. Conversely, 88% endorsed feeling in control of whether they quit. These ratings did not differ by counseling approach or willingness to quit. For all 4 treatment outcomes (i.e., arranging inpatient and outpatient medications, completing a treatment plan and accepting outpatient follow-up counseling), the Opt Out approach significantly increased the odds of the patient accepting treatment, both for those who were willing to quit, as well as for those who were not willing to quit ($p<0001$). Conclusion. Regardless of willingness to quit, the Opt-out approach formed a stronger therapeutic alliance and did not lead to decreased satisfaction or feelings of coercion.

PS3-23

SMOKING, OBESITY, AND REINFORCER PATHOLOGY: THE IMPACT OF BODY MASS INDEX ON DEMAND FOR CIGARETTES AND DISCOUNTING OF DELAYED REWARDS AMONG CIGARETTE SMOKERS

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Significance: The life expectancy of smokers with obesity is considerably shorter than that of normal weight smokers due to the synergistic effects of smoking-related and obesity-related morbidity. This study aimed to determine the impact of Body Mass Index (BMI) on demand for cigarettes and delay discounting among smokers. Methods: Demand for cigarettes was measured using a Cigarette Purchase Task that asked how many cigarettes would be purchased at escalating prices with three demand indices generated: intensity (number of cigarettes desired if they were free), breakpoint (lowest price at which no cigarettes would be purchased), and Omax (the maximum amount of money allocated to cigarettes). The Monetary Choice Questionnaire assessed

preferences between smaller amounts of money available now or larger amounts of money available after a delay (i.e., delay discounting). Participants were categorized as obese (BMI 30 or greater), overweight (BMI 25-29.9), or neither overweight/obese (BMI below 25) using self-reported weight and height. ANOVA was used to compare differences in demand and delay discounting across groups. Regression analyses were used to determine whether BMI was associated with demand and delay discounting when adjusting for relevant demographic variables (e.g., race, age, gender, education). **Results**: Among cigarette smokers (n=1,051), 23% were classified as obese, 26% were overweight, and 51% were neither overweight/obese. Individuals categorized as either overweight or obese reported higher cigarette valuation (higher intensity and Omax) and a greater preference for immediate rewards than those who were neither overweight/obese. In adjusted models, BMI continued to account for a significant amount of variance in intensity of demand only. **Conclusions**: Cigarette smokers with overweight or obesity had greater demand for cigarettes evidenced by a desire to consume a greater number of cigarettes when available at no cost. While it is possible that smokers with obesity have a greater preference for immediate rewards, current findings suggest this is only the case when other relevant demographic characteristics are not considered.

PS3-24

EXAMINING THE VALIDITY OF TWO TYPES OF SELF-ADMINISTERED ELECTRODERMAL STIMULATION BEHAVIORS AS BEHAVIORAL MEASURES OF SENSATION SEEKING IN NICOTINE-DEPENDENT EMERGING ADULTS

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Significance: Although research has investigated relations between nicotine use in its various forms and self-reported sensation seeking tendencies, no research to date has examined relations between nicotine dependence and self-administered electrodermal stimulation (SAES) in an experimental setting. This research not only examines differences in SAES behaviors in nicotine-dependent individuals compared to a non-clinical sample, but also contributes to clinical research by validating a trans-diagnostic behavioral measure of sensation seeking through the examination of the validity and utility of two types of SAES behaviors: shock and vibration. **Methods:** Our between groups design will include 200 participants across two groups: nicotine dependent (*n* = 100) and healthy control subjects (*n* = 100), aged 18-25 years. Participant smoking status will be determined using cotinine saliva test strips and analyzed levels exhaled carbon monoxide. Participants will complete self-report measures of sensation seeking, nicotine use, and psychopathology. Participants will then be instructed to sit in a room for 15 minutes with no form of entertainment or stimulation other than the option to self-administer additional electrodermal stimulation pulses following the administration of test stimulations prior to both conditions (i.e., shock and vibration). **Analyses:** Receiver operating characteristic (ROC) analyses will be used to evaluate the ability of the SAES behaviors to differentiate between nicotine dependent and non-nicotine dependent participants. Ordinary least squares regression analyses will be utilized to examine associations between self-reported sensation seeking and SAES behaviors. Finally, ROC analyses will be used to evaluate the ability of the SAES behaviors to differentiate between high and low scorers on self-report measures of sensation seeking. **Results:** Results are pending. Data collection is anticipated to be complete in October 2021.

PS3-25

IMPACT OF COVID-19 PANDEMIC ON ASSESSING SMOKING STATUS IN COMMUNITY HEALTH CENTERS

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Significance: The COVID-19 pandemic dramatically altered patterns of health care seeking and delivery. In primary care settings, in-person visits plummeted, video and telephone visits increased. Given the relevance of smoking as an exacerbating risk factor for chronic conditions like heart disease and diabetes, and for contracting and more severe symptoms of COVID-19, it is important to understand how the pandemic affected smoking assessment. This is particularly important in the context of Community Health Centers (CHC). CHCs care for patients that are more likely to be poor, non-white, and to smoke. This study describes the COVID-19 pandemic's impact on the assessment of smoking status among patients cared for at Community Health Centers (CHC). **Methods:** Electronic health record (EHR) data from 224 CHCs from the OCHIN Network were examined from January 1, 2019 to July 31, 2021. Data include both telemedicine (phone, web-based) and in-person primary care visits for more than a million adult patients (18 years of age or older) from CHCs across the United States. Monthly rates of smoking assessment per 1000 patients were calculated. **Results:** Across the network, telemedicine visit rates increased by 1237% at the onset of the pandemic. From January 2019-February 2020, rates of smoking assessment per 1,000 patients was 128.9. In March-May 2020, rates of tobacco assessment declined to 61.4 per 1000 patients, a 52% reduction. In June 2020-May 2021, rates of smoking assessment increased but remained 37.5% lower than pre-pandemic levels. **Conclusion**: The decline in rate of smoking assessment during the first wave of the COVID-19 pandemic was substantial and rates have not returned to pre-pandemic levels. These findings are significant given the relevance of smoking to increased severity of COVID-19 and that smoking assessment and provision of assistance in the form of counseling and cessation medications do not require face-to-face interaction with health providers and can be conducted virtually. Careful examination of procedural changes, including the increased use of telemedicine, that promote or impede assessment of smoking is needed.

PS3-26

DETERMINING PRIORITY POPULATIONS IN PUBLIC HEALTH - A PRINCIPLED, PRACTICAL APPROACH TO ADDRESS HEALTH DISPARITIES

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State and local public health agencies face difficult decisions when allocating limited public health resources among populations with widely ranging health statuses, including health disparities. We are unaware of national guidance for these decisions. A population's size presumably influences state and local resource decisions, and the size of nationally recognized populations with health disparities varies widely from state to state. For example, nearly one in five Mississippians (19.6%) but fewer than one in 13 New Hampshirites (7.3%) lived in poverty in 2019; in those same states, Black residents comprised 37.8% and 1.8% of the population, respectively - and less than one percent in Montana. Even wider variation exists at county and municipal levels. A population's health burden level also presumably influences resource decisions, and the burden can be considered in either absolute or relative terms with differing implications. Priority designations among populations with health disparities thus inevitably lie along a size-burden continuum, where decision-makers must balance available resources among more burdened but smaller population groups and less burdened but larger population groups. We have developed a set of multi-dimensional criteria that the State of Colorado is using to guide priority-setting in addressing health disparities in tobacco use and chronic disease prevention. The first two criteria are social justice and relative health burden. Populations with disparities in both dimensions are further assessed to determine programming feasibility and potential impact, using criteria of accessibility, reachability, potential partnerships, and size. These criteria combine practical and ethical considerations. We describe the rationale, limitations, and future directions of this initiative that seeks to translate the goal of reducing health disparities into action.

PS3-27

DECONSTRUCTING THE CESSATION PATHWAY TO ADDRESS ELEVATED SMOKING PREVALENCE AMONG POPULATIONS WITH HEALTH DISPARITIES

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Significance. U.S. public health agencies assign priority to populations that have elevated rates of disease incidence, prevalence, morbidity, or mortality. Cigarette smoking prevalence, an antecedent of increased morbidity and mortality, remains elevated among most nationally designated populations with health disparities. We analyzed six waves of a state's population-level data (n~75,000) from a triennial adult health survey, to quantify each population's participation in steps that characterize the smoking cessation process. The objectives were to identify deficits affecting multiple populations and specific to each population. **Methods.** Measures included quit intentions, confidence and attempts; clinical interactions and telephone coaching; use of cessation medications; co-residence with other smokers; secondhand smoke policies and exposures, and cessation success

(past-12-month quit attempt and ≥ 3 months self-reported abstinence). We estimated rates (2018) and trends (2001-2018), defining populations with health disparities as each racial, ethnic, and sexual orientation minority; people with self-reported mental illness diagnoses, and Medicaid beneficiaries. Reference populations for racial/ethnic minorities were white adults; for other groupings, the reference population was white adults without the defining characteristic. We signified disparities using one standard deviation (nominally lower or higher) or two standard deviations (significantly lower or higher). **Results.** Smokers in all populations with health disparities had higher rates of quit attempts than their reference populations; Spanish-dominant Hispanic smokers had worse rates on most metrics; English- and Spanish-dominant Hispanics consistently used nicotine replacement therapy at lower rates; Black smokers had lower cessation success rates despite comparable use of most evidence-based treatments. **Conclusion.** Quantifying steps in the cessation process among populations with health disparities yields potentially actionable information to address persistently elevated smoking prevalence. The methodology may also be applicable to chronic disease disparities.

PS3-28

IMPLEMENTATION OF A TRAIN-THE-TRAINER PROGRAM AT BEHAVIORAL HEALTH TREATMENT CENTERS AS A MECHANISM TO MAINTAIN ORGANIZATIONAL CAPACITY TO ADDRESS TOBACCO USE FOLLOWING PARTICIPATION IN A COMPREHENSIVE TOBACCO-FREE WORKPLACE PROGRAM

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Significance: Patients with behavioral health disorders are a tobacco health disparities group targeted by Taking Texas Tobacco Free (TTTF), an evidence-based tobacco-free workplace program. Despite prior successful implementation of TTTF in local mental health authorities (LMHAs), post-implementation employee attrition necessitated continuing education on tobacco-free policies and tobacco treatment practices. Here, we report on the processes and outcomes of a TTTF train-the-trainer program in which "champions" from LMHAs were trained to deliver tobacco cessation education at their centers. **Methods:** Three LMHAs participated in program implementation (to be described in the presentation) via 10 champions. TTTF iteratively trained and coached the champions. Measures administered evaluated 4 goals: 1) increase champions' self-efficacy in delivering trainings, 2) achieve program fidelity via TTTF staff evaluation of trainer effectiveness and knowledge increases among attending employees, 3) achieve program acceptability by stakeholders, and 4) achieve program adoption via an increase over baseline in the trainings delivered during follow-up. **Results:** Champions' self-efficacy increased from baseline throughout TTTF training. TTTF staff ratings of champion-led trainings met the targeted "very good" to "excellent" for trainer effectiveness; employees had a significant 29 percent knowledge increase from pre- to post-training. Employees rated the champions' training delivery as "very good" to "excellent"; both champions and employees were "very satisfied" to "extremely satisfied" with the curriculum and training received, meeting pre-set goals. There was an increase over baseline in trainings delivered during follow-up. **Conclusion:** The TTTF train-the-trainer program was effective and acceptable to the targeted stakeholders, tackled the problem of high turnover contributing to organizational knowledge loss, and increased the delivery of tobacco trainings. Ultimately, program implementation supports the sustention of tobacco-free workplace policies and practices. A step-by-step implementation guide is available for dissemination to facilitate designing future programs.

PS3-29

HEARING ABOUT AND HAVING CONCERN FOR POLICE BRUTALITY AND CHANGES IN CIGARETTE USE ACROSS U.S. RACIAL/ETHNIC GROUPS

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SIGNIFICANCE: Recent incidents of police brutality have spawned concerns in the U.S. This study examined associations between race/ethnicity, hearing about these incidents, concerns for being victims of police brutality, and changes in cigarette use. METHODS: Data were from a U.S. nationally representative sample of current and recent former (<12 months) commercial tobacco users (age≥21; N=1,700), collected in Jan.-Feb., 2021. Participants reported if they had heard stories about someone being discriminated, harassed, treated unfairly, or killed by the police (yes/no), and in three items, their level of concern/worry/stress about themselves or their families becoming victims of police brutality (1=Not at all, 5=Extremely); items were then averaged to represent concern for police brutality. Using multivariable linear regression models, we assessed the associations of race/ethnicity with concern for police brutality and concern for police brutality with changes in number of days smoking cigarettes during the past 12 months. We also tested interactions with race/ethnicity in these regression models. All analyses were weighted and adjusted for demographics. RESULTS: Overall, 69.7% of Black, 62.5% of Hispanic, 59.1% of Asian, 57.6% of White, and 44.3% of other-race participants heard stories of police brutality. Black, Asian, and Hispanic individuals had higher levels of concern for police brutality than White individuals (adjusted means=2.80, 2.27, 2.22, and 1.60, respectively; p<0.05). Association between hearing these stories and concerns for police brutality was stronger among Black (ARC=1.25, 95%CI=0.88-1.61) than White individuals (ARC=0.39, 95%CI=0.21-0.56; race/ethnicity*heard stories p<0.01). An increment increase in concern for police brutality was associated with a 1.03-day increase (95%CI=0.36, 1.70) in past-30-day number of days smoking cigarettes, which did not vary by ethnicity. CONCLUSION: U.S. racial/ethnic minorities are more concerned about police brutality, which may increase cigarette use. Future research should evaluate if police reforms reduce concern for police brutality and cigarette use among racial/ethnic minorities.

PS3-30

DOES EXPOSURE TO TOBACCO MARKETING AT TOBACCO RETAIL OUTLETS HAVE CROSS-PRODUCT EFFECTS?

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Significance: Tobacco retail outlet (TRO) marketing for a specific product is a strong predictor of tobacco use behaviors of the same product. However, little work has examined how exposure to marketing at TROs for one product impacts use of other products. This study examined if TRO marketing has cross-product effects, specifically does TRO cigarette marketing predict initiation of current ENDS use and vice versa. **Methods**: Participants were 1310 students (67.3% female; 32.6% white; m age=19.8 [SD=1.66] at wave 1) from 24 2- and 4-year colleges in Texas participating in an nine-wave longitudinal study (2014-2019) who had not initiated ENDS or cigarette use through wave 2 and had completed surveys from waves 1, 2, and 9. Current (past 30-day) product initiation after wave 2 was measured by classifying those who reported never initiation of current use at wave 9 as non-initiators; all others were considered initiators (4.8% and 8.8% for cigarettes and ENDS respectively). TRO marketing exposure at wave 2 was measured with an index of objective counts of product marketing at TROs (cigarette or ENDS) within a mile of each college multiplied by each student's weekly store visit frequency and dichotomized using a median split. Generalized mixed-effects logistic regression analyses, with colleges as the cluster variable, controlling for baseline sex, age, race/ethnicity, depressive symptoms, any other tobacco product use at wave 1 and college type (four vs two-year), examined the association between TRO marketing for each product and subsequent initiation of current product use for the other product. **Results**: ENDS TRO marketing predicted initiation of current cigarette use (OR=2.52, 95% CI=[1.42, 4.48] even after controlling for covariates. Cigarette TRO marketing did not predict current ENDS use initiation (OR=1.44, 95% CI=[0.96, 2.18]. **Conclusions**: Exposure to ENDS TRO marketing increases the risk for cigarette initiation. This may

suggest a pathway for the increased risk of cigarette initiation found among ENDS users. Regulations should take into account the impact of ENDS marketing not only on ENDS use but also on the initiation of cigarette use.

PS3-31

TEEN SMOKING IS A CHALLENGE TO IRELAND'S TOBACCO FREE ENDGAME

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IntroductionSmoking decreased in each of six waves of Irish 16year-olds ESPAD surveys from 1995 to 2015 (1-3). In 2019 teen smoking increased for the first time in 28 years to 14.4% .This increase means that the vision of a Tobacco Free Ireland which demands that the prevalence of tobacco smoking in Ireland be less than 5% by 2025 (4,5) may not be achievable in this group. Objective1) To examine the factors associated with recent increased smoking in Irish teens2) To offer an explanation for the rise and advice on prevention. MethodsData were drawn from the 2015 and 2019 waves of the Irish ESPAD survey. The sample included a total of 3,421 16-year-old students comprising of 1,493 students in 2015 and 1,949 students in 2019. Adjusted poisson regression models were used to examine the prevalence and factors associated with current smoking between the two samples. ResultsAdolescents who were current smokers were significantly more likely to have missed 5 or more days of school (IRR 1.53, 95% CI: 1.32, 1.78), and to have friends who smoke (IRR 1.20, 95% CI:1.06, 1.35). Adolescents from two parent and blended families were significantly less likely to be current smokers (IRR 0.90, 95% CI 0.83, 0.98 for two parents; IRR 0.84, 95% CI 0.71, 0.99 for blended families)The risks of current smoking were significantly higher among ever- e-cigarette users (IRR 1.27, 95% CI: 1.16, 1.40) and current e-cigarette users (IRR 1.4, 95% CI 1.31, 1.61). ConclusionAs in our previous studies we found significant associations between e-cigarette use, truancy, household composition, peer smoking and current smoking (2,6). These risks did not increase and mostly decreased over the years. E-cigarette use greatly increased between 2015 and 2019 and is associated with increased smoking.We suggest that these findings highlight the negative impact of e-cigarette use on teenage smoking and the need to address this factor in ongoing policy and legislative initiatives at national, local, and school levels as well as the other risk factors in order to achieve the Tobacco free Ireland's policy target.

PS3-32

IMPACT OF COVID-19 PANDEMIC ON TOBACCO SALES AND NATIONAL SMOKING CESSATION SERVICE IN KOREA

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The purpose of this study was to describe the impact of the COVID-19 pandemic on tobacco use among the Korean population, particularly, on tobacco consumption and the national smoking cessation service. We obtained a quarterly tobacco sales data from the Ministry of Finance and data of the number of smokers who visited the national smoking cessation clinic in public health centers after the pandemic was obtained from a member of the National Assembly. The COVID-19 pandemic increased tobacco sales in Korea. Unlike the UK where quitting smoking increased, the Korean population smoked more during the pandemic and less people tried to quit smoking during the pandemic in Korea. The number of smokers who visited the national smoking cessation clinic in public health centers sharply decreased in the first half of 2020 with less than 90,000 smokers visiting the centers, whereas in 2017 more than 400,000 smokers participated in the smoking cessation clinics. In addition, 6-months success quit rate also decreased from 38.5% in 2017 to 22.3% in the first half of 2020. During the COVID-19 pandemic, Korean smokers were more likely to increase their consumption, due to the fact that they had more time to smoke while working from home. In addition, the pandemic has led to an increase in the use of heated tobacco products (HTPs) and electronic cigarettes (e-cigs) because people were smoking more during the pandemic and more people were using tobacco products due to working from home. The tobacco industry has never missed this chance to promote their novel tobacco products. The industry has marketed their HTPs with the claim that smokers stayed indoors more and thus more smokers considered quitting due to COVID-19; thus they might want to switch their tobacco products from conventional cigarettes to HTPs to reduce health risks to themselves and the people around them. The pandemic presents an unprecedented opportunity to provide comprehensive smoking cessation services to smokers and

also provide opportunity to reinforce tobacco control policies. It is recognized that a comprehensive smoking cessation service and stronger tobacco control policies are important during the COVID-19 pandemic.

PS3-33

YOUTH ACCESS TO ONLINE SALES OF E-JUICE IN CANADA

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Significance: Youth access to electronic cigarettes is a concern to many jurisdictions including Canada. Recent survey data suggest that among the retail sources youth use to purchase e-cigarettes in Ontario, Canada, internet purchases accounted for 14% of sales. To gain a greater understanding of internet sales, e-liquid products from internet-based retailers from across Canada were purchased to examine compliance with federal regulations on the sale of e-liquids including age verification processes from the initial visit to an online store, to sale, and to delivery. Method: Our sample comprised 20 online retail vape shops spread across Canada including western (8 stores), central (6 stores) and eastern Canada (6 stores), selected by querying a popular search engine for the "best vape shop in [city]." All purchases were made online by a 16-year old confederate, in the presence of an adult researcher. For any given purchase attempt, we made note of what kind of age-restriction protocol was in place when entering the site, whether the youth confederate was able to purchase an e-juice product without age verification, and whether age verification was used by the delivery agent upon delivery. Results: Upon landing on a sites' homepage, the majority had some sort of age-restriction message displayed (19 of 20 retailers or 95%), which typically required a visitor to input their birth date or check a box indicating they were of age. Only 2 of 20 stores prevented our youth confederate from purchasing an e-liquid product (in contrast, 90% of stores completed the sale). Eleven packages (61%) included a statement on the mailing label about requiring an age verification signature. Among deliveries in which such a mailing label was present, 82% of agents asked for a signature. Among all 18 deliveries, delivery agents confirmed age for 50% of packages, with another agent giving a package to a parent without checking the addressees age (the youth confederate). Conclusion: the majority of online stores (61%) were relying on the delivery agent to confirm age appropriate ID. While this step is necessary, it is not sufficient and underscores that retail education/enforcement is needed on both the duty to check age at purchase and to convey to the delivery agent that the product is age restricted and requires an age approved signature.

PS3-34

EVALUATING A TOBACCO RETAILER E-LEARNING PROGRAM THAT EMPLOYS FDA GUIDANCE AND DEEP LEARNING PRINCIPLES

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Significance Merchant education is a key element of an effective strategy to reduce tobacco sales to minors. This study examines the implementation of a tobacco retailer e-learning intervention that employs FDA retail training guidance and the principles of deep learning. Our initial review did not reveal the pre-existence of any retailer training programs that combined best practices in e-learning, adult education and evidence-based retail training guidance. **Methods** We evaluated a newly-developed tobacco retaining training program that reflects best practices in e-learning, adult education, and tobacco retailer training including established compliance factors. The Tobacco Retailer Advanced Compliance (TRAC) training module was produced for the Alberta government to provide an effective, evidence-based online tobacco retailer training program for all retailers in the province. The evaluation involved pre- and post-testing of competency scores among participants before and after completing the eLearning modules among a convenience sample of 75 retail staff in 15 convenience stores. Additionally, acceptability, usability, and function were evaluated among a subset of the retail managers who participated using both quantitative (survey) and qualitative (interview) methods. **Results** Participants found the training to be easy to navigate, engaging, informative, and beneficial to their daily work. Paired t-tests revealed significantly higher post-training test scores compared with the pre-training test score. A higher number of participants achieved the passing score of 80% in the post training test in all groups. **Conclusion** E-learning is an effective, readily accessible and inex-

pensive way to deliver evidence-based retail training that reflects FDA guidelines and deep learning principles. Further evaluation is needed to measure long-term impact on retailer knowledge, behavior and compliance rates among retailers.

PS3-35

EXCLUSIVE E CIGARETTE USER PERCEPTIONS AND USAGE OF FLAVORS BEFORE AND AFTER IMPLEMENTATION OF NEW YORK STATE'S FLAVOR BAN, FINDINGS FROM THE CROFT STUDY

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Significance: E-cigarette flavor bans are under consideration or have been implemented in many jurisdictions. How adult e-cigarette users perceive and respond to flavor bans remains understudied. We evaluated how a cohort of adult exclusive e-cigarette users thought they would respond to a forthcoming flavor ban, and subsequently compared actual flavor use patterns before and after implementation of a flavor ban. Methods: Data (collected 2019-2021) from a prospective study of 114 adult daily exclusive e-cigarette users based in Western New York was analyzed. Perceptions towards tobacco-flavored e-cigarettes and purported reactions to a forthcoming ban on flavors other than tobacco or menthol were assessed at baseline visits. Responses were examined among participants enrolled prior to the May 2020 implementation of New York State's (NYS) ban on non-tobacco e-cigarette flavors (n=52). At subsequent monthly clinical visits, participants reported their most used flavor over the past 30-days (P30D). Pre-post comparisons for most used flavor were conducted among those who completed a study visit approximately two months before and two months after May 2020 (n=19). Results: Of 52 participants enrolled before May 2020, 40.8% indicated they would find a workaround to continue using flavors under a forthcoming ban. Less than half (44.1%) indicated they like or could tolerate tobacco flavored e-liquid, and 23.1% said they would revert to cigarette smoking before using tobacco flavored e-liquids. Of 19 participants completing study visits two months before and after May 2020, 78.9% and 84.0% reported their P30D most used e-cigarette flavor was candy or fruit before and after flavor ban implementation, respectively. Conclusions: Perceptions of adult exclusive e-cigarette users prior to implementation of the NYS flavor ban suggested low levels of planned compliance and limited tolerance for tobacco-flavored e-cigarettes. Use of banned flavors remained common two months after NYS flavor ban implementation. Future research is warranted examining e-cigarette flavor usage at a later timepoint beyond NYS flavor ban implementation.

PS3-36

CHARACTERIZING DISCUSSION OF FLAVORED ELECTRONIC CIGARETTE PRODUCT SALES RESTRICTION WORKAROUNDS ON REDDIT

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Significance: In the aftermath of the 2019 electronic cigarette and vaping-related lung injury outbreak, the regulatory environment around the sales of vaping products has been rapidly evolving on both the state and federal levels to protect public health. In particular sales of flavored cartridge-based and disposable electronic cigarettes has been increasingly restricted. Little is known about the consumer perceptions and response to the new policies as well as the potential strategies used by the manufacturers and vendors to evade these regulations. Analysis of policy-related social media discourse may serve as an effective and unobtrusive way of understanding consumer and industry response to the bans. We aimed to assess the amount and characterize the themes of messages related to flavored nicotine product sales restrictions on Reddit. **Methods:** Keyword rules were used to collect flavored electronic cigarette sales restriction workaround-related posts from the Reddit from an existing third-party archive of Reddit content, pushshift.io API, from 05/01/2019 to 05/31/20202. The amount of relevant posts from the Teenager and JUUL subreddits was calculated to determine discussion trends over time. A sample of posts stratified by month was further coded to identify specific workaround strategies. The number of users cross-posting on Teenager and JUUL subreddits was identified. **Results**: Keyword filters captured 7,429 ban workaround-related posts from the JUUL subreddit messages and 255 Teenager subreddit posts related to the discussion of flavor restriction loopholes and workaround strategies posted over the period of data collection. There were 254 "cross-posters" or users who posted policy

evasion messages on both the JUUL and Teenager subreddits. The amount of discussion peaked in September 2019 with the increased media coverage of vaping-related lung injuries and emerging state-level regulation of flavored nicotine and tobacco products. The amount of discussion continued to rise with increased regulations limiting flavored cartridge-based products sales in the following months. Analysis of a sample relevant posts revealed that the regulation evasion strategies included accessing flavored products online, purchasing products from abroad, seeking advice and information on local store availability of specific flavors; and seeking advice on disposable/refillable substitutes, especially for mango and mint-flavored products. **Conclusion:** Reddit is an important information sharing platform for electronic cigarette consumers and vendors, and is also used by youth. Social media surveillance can enhance understanding of public health needs and policy compliance, as well as inform strategies for correcting misinformation and prevent policy evasion.

PS3-37

YES IT'S THE PERFECT TIME: SINGLES AND LOOSE TOBACCO PRODUCTS BAN IN INDIA DURING COVID-19

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Significance: Globally, coronavirus disease (COVID-19) has unduly affected marginalized populations thereby making them more susceptible to the use of economical and more accessible alternatives of loose cigarettes/beedis/other tobacco products. This paper reviews review the past and current tobacco control policy responses in terms of banning loose tobacco products in India and identify areas of opportunity for policy priorities in context of the ongoing pandemic. **Methods:** Existing policy documents (notifications/orders/letters) banning the loose tobacco products (in any form), were analyzed for their content since the inception of the tobacco control laws in the country (2003). **Results:** In the absence of a national level policy regarding banning singles and loose tobacco products in the country, there are 47 sub-national documents existing in 13 Indian states. While only one notification was issued during the spread of COVID-19 pandemic within the country and 3 documents detail about punishment/penalty of any sort. The analyzed documents have mainly focused on the sales, supply, production and distribution of loose cigarette, and other tobacco products. **Conclusion:** Although it is premature to estimate the impact of restricting singles and/or any other loose tobacco products' trade, sale, and use on the transmission and severity of COVID19; however, this analysis appreciates the efforts made at the subnational level. Urgent need for furthering this cause and development of a nationwide unified policy against ban on loose tobacco products (in any form) or "kiddy packs" is suggested.

PS3-38

POTENTIAL BIOMARKERS OF ELECTRONIC CIGARETTE EXPOSURES IN VITRO AND IN VIVO

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SIGNIFICANCE: Long-term health effects of electronic cigarettes (E-Cigs) remain unknown despite their recent rise in popularity. We have found that E-Cigs produce highly reactive free radicals that could produce damage in exposed tissues. Our current goal is to examine this further by developing novel *in vitro* and *in vivo* biomarkers of E-Cig exposure. METHODS: E-Cig exposure was modeled *in vitro* using human bronchial epithelial cells (BEAS-2B) growing in medium exposed to E-Cig aerosols and *in vivo* using nose-only exposures to C57BL/6 mice. For all studies, E-liquid (60:40; PG:VG) aerosols were compared to cigarette smoke (NRC-102 and 1R6F) and sham (compressed air) controls. Charcoal filters were used to eliminate gas phase radicals from smoke. Oxidative stress biomarkers (REDD1 and GSK3β) and their down-stream (RPS6) as well as up-stream (AKT) target proteins in addition to H2AX were measured by Western blot analysis. Lung function in mice were assessed by flexiVent. RESULTS: Increases in REDD1, pGSK3β and pH2AX levels were observed for cigarette smoke exposures compared to air-alone while only low to moderate changes were observed in E-Cigs following exposure to same number of puffs (N=30). When gas phase radicals were removed from smoke by charcoal, a decrease in REDD1 protein expression in BEAS-2B cells was observed. In mice, preliminary data showed a decreased trend in the inspiratory capacity by E-Cig aerosols (N=40 and 80 puffs) compared to compressed

air. CONCLUSIONS: Differentially expressed oxidative stress/damage-related pathways from *in vitro* and *in vivo* exposures to E-Cig aerosols vs. tobacco smoke can be an effective strategy for identifying E-Cig relevant biomarkers of exposure and potential harm.

PS3-39

THE IMPACT OF USER BEHAVIOR ON IQOS EMISSIONS

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Background. Alternative products to combustible cigarettes have been developed for decades. These tobacco products rely on the central concept of delivering the dependence-producing drug, nicotine while minimizing users' exposure to toxicants in comparison to cigarette smokers. A significant approach to achieve this is by heating tobacco instead of combusting it. One recently introduced heated tobacco product (HTP) that gained remarkable attention and was widely advertised is the IQOS device introduced by Philip Morris International (PMI). However, it is known that toxic emissions from tobacco products do not only depend on product characteristics but also user behavior. This study assessed the influence of user behavior, namely device cleaning and puffing regimen, on the emission of toxicants in IQOS aerosol. **Methods.** Two cleaning protocols (after each stick or after 20 sticks) and several puffing regimens (including International Organization of Standardization (ISO), Health Canada Intense (HCI), and other regimens) were randomized to test the influence of user behavior on the emission of carbonyls and phenols as markers of pyrolysis of IQOS stick constituents. Also, IQOS aerosols generated under selected conditions were directed towards a trapping system constituted of a filter pad and two cryogenic traps for non-targeted analysis on GC-MS. **Results.** Per previous literature, less frequent cleaning of the device led to residue build-up in the heating chamber of IQOS devices. In progress data analysis will show if less frequent device cleaning and/or harsh puffing conditions will lead to the higher formation of carbonyls and phenols, and if new toxicants will form from the break-down of residue build-up on the heating blade. **Conclusion.** The US FDA authorized PMI to make reduced-exposure (but not risk) claims for their IQOS product. This work highlights the necessity to consider the influence of user behavior on tobacco product emissions to ensure a consistent reduction of exposure.

PS3-40

BLOCKADE OF DOPAMINE D1 AND D1/D2 RECEPTORS DECREASES NICOTINE SELF-ADMINISTRATION IN ADULT MALE AND FEMALE RATS

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Significance: The rewarding effects of nicotine are partly mediated by dopamine release in the brain reward system. Administration of dopamine D1 receptor antagonists reduces nicotine self-administration in rats. Studies in humans and rodents indicate that there are sex differences in dopaminergic transmission. Therefore, we investigated the effects of selective dopamine D1 and D2 receptor agonists and antagonists on nicotine intake in male and female rats. **Methods:** Adult male and female Wistar rats were trained to respond for food pellets and were implanted with a catheter in the right jugular vein. The rats were allowed to self-administer nicotine (0.06 mg/kg/inf) for six sessions. Then the effects of SCH-23390 (D1 antagonist; 0, 0.003, 0.01, 0.03 mg/kg, sc), L-741,626 (D2 antagonist; 0, 0.3, 1, 3 mg/kg, sc), flupentixol (D1/D2 antagonist; 0, 0.5, 0.75, 1 mg/kg, ip), and A77636 (D1 agonist; 0, 0.1, 0.3, 1 mg/kg, sc) on nicotine intake were investigated in 1-h daily nicotine self-administration sessions. In a separate study, the effects of these compounds on operant responding for food pellets (20 min sessions/day) was investigated. **Results:** The D1 antagonist SCH-23390 and the D1/D2 antagonist flupentixol dose-dependently decreased nicotine intake in male and female rats. In contrast, the D2 antagonist L-741,626 and the D1 agonist A77636 did not affect the nicotine intake in male and female rats. SCH-23390 and L-741,626 decreased responding for food pellets in males and females, but flupentixol only decreased responding for food pellets in male rats. The D1 agonist A77636 did not affect food responding in males and females. **Conclusions:** Blockade of D1 or D1/D2 receptors induced a similar decrease in nicotine intake in males and females. Blockade of D2 receptors or stimulation of D1 receptors did not affect nicotine intake. There were no sex differences in the effects

of the dopamine agonists/antagonists on nicotine intake. Drug doses that decreased nicotine intake also decreased food responding, except for flupentixol in females, which decreased nicotine intake but not food intake.

PS3-41

NITRATE LEVELS IN TOBACCO INFLUENCE FREE RADICAL PRODUCTION

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Significance/Background: Cigarette smoke contains highly reactive free radicals thought to play an important role in tobacco smoke-induced harm. We found that free radical production varied greatly by tobacco variety and cigarette brand; however, the mechanisms responsible for variation is not understood. Previously, variation in NNK levels in tobacco varieties were found to be dependent upon nitrate concentration. Since nitric oxide is a primary radical produced from burning tobacco, we hypothesized that free radical production may also be dependent upon tobacco nitrate levels. Thus, our current objective was to determine the impact of nitrate on production of radicals and other toxicants in smoke from different varieties of whole leaf and reconstituted tobacco. **Methods:** Different varieties of tobacco were shredded and levels of nitrate were measured. Shredded tobacco was machine packed into single blend cigarettes and smoked according to the Canadian Intense Puffing regiment. Mainstream smoke was analyzed for gas- and particulate-phase radicals using electron paramagnetic resonance. Particulate phase nicotine and NNK were analyzed by GC/FID and LC/MS respectively. In other experiments, different concentrations of nitrate solutions were sprayed onto shredded tobacco before being packed, smoked, and analyzed as described above. **Results:** Despite being manufactured under the same conditions, the puff and smoldering rates varied widely between varieties. NNK, nicotine, and gas-phase radicals varied 210-, 14-, and 7-fold, respectively, by variety. Gas-phase radicals per gram of smoked tobacco were highest in burley tobacco followed by oriental and bright tobacco. Particulate-phase radicals did not differ substantially by variety. Both NNK and gas-phase radicals were strongly correlated with nitrate levels (r=0.84 and r=0.91 respectively). When different levels of nitrate were added to the tobacco, gas-phase radical production increased in a linear fashion. **Conclusions:** Tobacco nitrate levels appear to be a key determinant of gas phase radical production, as well as NNK, in the burning cigarette. Hence, cigarette blends which contain higher nitrate tobaccos (e.g. burley) may pose a greater to smoker due to higher toxicant exposures.

PS3-42

THIRDHAND WATERPIPE SMOKE IS A THREAT TO CARDIOVASCULAR HUMAN HEALTH

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Significance: Even though cigarette smoking (CS) has declined, the popularity of other forms of tobacco, such as waterpipe or hookah continues to increase. This is attributed, at least in part, to the misconception that waterpipes are safe/safer than CS. However, we have recently shown that exposure to waterpipe smoke produces negative cardiovascular health effects, namely thrombogenesis; as was observed with CS. In this connection, we have also provided evidence that thirdhand smoke (THS)-which is a new risk that results from the residual tobacco smoke contaminants that remain after a cigarette is extinguished- increases the risk of thrombotic events. Nonetheless, whether thirdhand waterpipe smoke (THWPS) exposure produces similar negative health effects is not yet known, but warrants investigation. Methods: This was addressed by utilizing a novel exposure protocol, in which mice were exposed to THWPS starting at 10 weeks of age for three months. Two sets of material were exposed to waterpipe smoke in an alternating manner, for one week each time, before the material is placed in the cages to start the THWPS exposure. The exposure waterpipe smoke was as per the Beirut protocol, which is as follows: one-hour session of 171 puffs of 530 mL volume, each puff is 2.6 s duration, and there are a 17 s interpuff interval. Results: Consistent with the notion that our model does indeed result in the exposure of animals to "tobacco", the marker cotinine was detected at significant levels in the urine of the THWPS-exposed mice, but not in that of the controls. In terms of its impact on live animals (*in vivo*), THWPS was found to enhance hemostasis and elevate the risk of thrombus formation, as documented by the decrease in bleeding and occlusion times; which was the case despite THWPS exerting no apparent effects on the number of blood cells. In terms

of a potential mechanism, our *in vitro* analysis showed that agonist-induced platelet aggregation, as well as dense and alpha granules secretion responses are potentiated as a result of THWPS exposure. In addition, we also found that integrin activation, and phosphatidylserine exposure are also enhanced. With regard to biochemical evidence of enhanced platelet activation, Akt and ERK activation/phosphorylation was found to be elevated in the THWPS platelets; which is consistent with the aforementioned findings. Conclusion: Our results demonstrate, for the first time, that THWPS is a real threat to human health, as it triggers a state of thrombogenesis. Additionally, our findings indicate that this is attributed, at least in part, to enhanced platelet activation. Based on these consideration, the negative health consequences of THWPS should not be underestimated, and warrant further investigation. These findings should not only guide therapeutic approaches but also inform means to regulate exposure to waterpipe smoke.

PS3-43

THE EFFECTS OF THE MINOR TOBACCO ALKALOIDS NORNICOTINE AND ANATABINE ON ENERGY BALANCE IN RATS DEPENDS ON SEX AND DIET TYPE

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Significance: Tobacco products prevent weight gain, due primarily to nicotine's effects on appetite. Minor tobacco alkaloids (MTAs), such as anatabine (ANAT), anabasine and nornicotine (NORNIC), are found in low levels in tobacco products and activate nicotinic acetylecholine receptors within the brain. They are much less addictive than nicotine and reduce food intake (FI), making them good candidates for obesity pharmacotherapy. We hypothesized that MTA administration could prevent weight gain, with differences between male and female rats and varying as a function of diet type. **Method**: Study 1: we administered saline, nicotine (0.5mg/kg), NORNIC (6.0mg/kg), ANAT, (3.0mg/kg), and anabasine (3.0mg/kg) to male rats for 7d (i.p; n = 10/group). Study 2: we administered ANAT or NORNIC for 4 weeks in male and female rats (n = 8-10 per group) on chow diet. Study 3: we administered ANAT for 4wks to male and female rats on high fat and high sucrose diets (n = 8-10 per group). Studies were conducted in metabolic cages (Sable Promethion); food intake, weight gain, body composition, physical activity, and energy expenditure were measured. **Results**: Study 1: All compounds reduced weight gain and FI in male rats (p<0.01). The greatest delays in weight gain and reductions in fat mass were seen with NORNIC and ANAT. Study 2: In males and females, ANAT and NORNIC slowed weight gain (*p*<0.01). Administration of both MTAs *reduced* fat mass in males and females (p<0.01). Food intake was reduced in males with both MTAs (*p<0.05*). In females, FI was only reduced during the week 1 of ANAT (*p*<0.05), and NORNIC had no effect. In males and females, both MTAs increased physical activity (*p*<0.01), with NORNIC effects lasting longer. Both MTAs increased EE in males, while only ANAT increased EE in females (p<0.01). Females were more sensitive to MTA effects on PA and EE (*p*<0.05). Study 3: ANAT administration in males prevented weight gain alongside a high sucrose but not high fat diet, whereas ANAT had no effect on weight gain of females with access to diets high in fat and sucrose. **Conclusion**: These results demonstrate that NORNIC and ANAT are potential pharmacotherapy targets for obesity.

PS3-44

FETAL EXPOSURES WITH VAPING DURING PREGNANCY- A NOVEL PREGNANT OVINE MODEL

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Significance: EC use is rapidly increasing among women of reproductive age with misperceptions that these products are safer than tobacco during pregnancy. Epidemiological studies identify high rates of dual use as well as a cohort who switch to vaping during pregnancy. However, fetal exposure to nicotine salts, flavoring and non-flavor chemicals present in ECs remains poorly characterized. A pregnant ovine inhalational exposure model with paired fetal and maternal blood sampling was utilized to evaluate trans-placental exposures and fetal hemodynamics. **Methods:** Pregnant ewes were anesthetized and ventilated at term gestation for fetal delivery by cesarean. Fetal lambs were maintained on placenta but partially exteriorized for instrumentation including placement of invasive catheters for serial blood sampling and hemodynamic monitoring. 10 x 70 ml puffs of aerosolized vapor generated from a menthol-flavored JUUL device were subsequently delivered over 5 minutes to the ewe via a closed ventilator circuit (n=4). Additional ewes were treated with sham control or PGVG alone (n=5). Maternal and fetal blood samples were obtained at baseline and every 5 minutes following

initiation of aerosol delivery for analysis by UPLC and GCMS. Data from continuous hemodynamic monitoring of the fetus was collected. **Results:** Efficient transplacental transfer of nicotine occurred with peak levels at 5 minutes in both the ewe and fetus. Fetal nicotine levels were comparable to maternal (106% ± 62% at 5 min, 130% ± 77% at 10 min), although fetal half-life was prolonged (19.4 vs 4.6 min). Fetal cotinine levels stabilized at 61-66% of maternal at 30-60 min. GCMS identified benzoic acid (a key component of JUUL nicotine salts) and numerous flavoring chemicals in paired maternal and fetal samples. Select flavoring chemicals were found only in maternal or fetal serum. Continuous fetal monitoring identified comparable hemodynamics as compared to controls. **Conclusion:** Gestation exposure to EC aerosol results in efficient transfer of nicotine, non-flavoring and flavoring chemicals to the fetus. Despite limitations of the ovine model, our data suggest slow metabolism of nicotine salts in the fetus and variable transfer of flavoring chemicals. We suggest that chemicals which fail to cross the placenta may be safer options for use in pregnancy.

PS3-45

TESTING THE EFFECTS OF A YOUTH-TARGETED ANTI-VAPING PSA UPON ADULT SMOKERS

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A great deal of controversy surrounds e-cigarettes, with some arguing that protection of youth and non-users is paramount and others maintaining that these products are beneficial from a harm reduction perspective for use by adult smokers for switching from combustible cigarettes and for smoking cessation. Opponents of e-cigarettes have allocated tremendous funds toward advertising campaigns aimed at youth deterrence; however, to date, the effects of these ads upon adult smokers have yet to be examined. The current study used a between-subjects experimental design to investigate the effects of an FDA-distributed youth-targeted anti-vaping PSA, "Vaping is an Epidemic," upon adult smokers who view it. The PSA shows teens vaping and, upon inhalation, parasite-like organisms invading their organs and skin. We hypothesized that the FDA ad - compared to a matched control video - would increase negative health-related expectancies, and because the ad conveys that e-cigarettes are very powerful, it would also increase expectancies concerning potency. We also hypothesized that the anti-vaping PSA would impact other general expectancies of e-cigarettes and additional variables reflecting motivation to quit smoking (i.e., switch to vaping). We found that viewing the PSA produced increases in both health harm and potency expectancies (*ps* < .01), which were correlated (*p* < .001). We also found significant group differences (*ps* < .05) such that viewing the PSA resulted in overall more negative expectancies about e-cigarettes and all other variables related to harm reduction usage. Those who viewed the PSA rated e-cigarettes as more harmful and less effective compared to those who saw the control video. Viewing the PSA also resulted in lower switching motivation (i.e., switching from combustible to e-cigarettes). Overall, our findings indicated that adult smokers who viewed the PSA were less likely to consider e-cigarettes for smoking cessation, thus reducing access to a cessation aid with growing empirical support. Findings suggest that youth-oriented anti-vaping messages may have unintended public health consequences upon adult audiences.

PS3-46

NORMATIVE REFERENTS, TYPICAL USER ATTRIBUTES, AND SOCIAL IMPLICATIONS OF FLAVORED VAPING: A QUALITATIVE EXPLORATION OF YOUNG ADULT VAPERS' EXPERIENCES

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Significance: Flavored vaping is on the rise in young adults (YA). Risky social influence becomes more salient during the critical developmental stage of young adulthood. Through a qualitative study, we sought to understand YA vapers' perceptions about the normative referents, typical user attributes, and social implications associated with vaping flavored e-cigarettes. **Method**: Between March-May 2021, an open-ended elicitation survey was distributed to YA ever vapers (*N*=396; mean age=19.66, *SD*=1.45), with the majority (90%) reporting using flavored e-cigarettes. Participants were asked to indicate social referent groups who they consider as most or least likely to use a flavored vape, typical situational triggers that prompt use, and their perceived social implications attached to vaping flavors. Participants' responses were qualitatively analyzed and coded by two coders (*alphas*=0.81-1.00). **Results**: Participants listed their peers (48.3%) as the most typical users of flavored vapes, followed by siblings (6.8%),

high school students (5.5%), and Greek life members (5.5%). Parents (21.1%), senior family members (18.1%), studious peers (9.2%), and educators (7.5%) were considered typical non-users. Participants tended to use attributes such as "party-goers," "social," "fun," "popular," "rebellious," "laid back," and "youthful," to portray the typical users. They considered social bonding with and gaining respect from their vaper friends through sharing and offering flavored vapes as the leading social benefit (41.4%). They perceived being liked more when they used flavored vapes (36.2%) and considered it a prevalent behavior (19.9%; e.g., "everyone does it"). **Conclusions**: Normative appeals are proven effective strategies to curb tobacco use acquisition and escalation among YAs. Our findings contribute to revealing the glorious social perceptions YA vapers held about the risky behavior of using flavored vapes, while pinpointing the opportunities of leveraging perceived social disapproval from important family members and respectable role models to enhance the efficacy of intervention and campaign efforts utilizing normative appeals.

PS3-47

ASSOCIATION BETWEEN QUITTING SMOKING AND SURVIVAL IN CANCER PATIENTS

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The current study explored the association between smoking abstinence and survival in a large sample who received tobacco cessation treatment at MD Anderson Cancer Center Tobacco Treatment Program (TTP). We hypothesized that cancer patients who quit smoking would have better survival outcomes compared to those who do not quit, and that this effect would vary by cancer diagnosis. We used data from the TTP electronic health records to compare survival outcomes between abstainers versus non-abstainers in the cessation program. To examine associations between smoking abstinence status and 5-year survivorship, we performed survival analysis on N = 4,356 patients using the Cox proportional hazards model controlling for cancer diagnosis, age, sex, depression, anxiety, positive and negative effect, nicotine dependence and years smoked, and time from diagnosis to TTP participation. Those who abstained from smoking had a significantly lower hazard of dying compared to those who did not abstain (HR = 0.65; p < 0.001). The interaction of cancer diagnosis with abstinence status was also significant. Specifically, the effect of abstinence on survival was significant for lung cancer (HR= 0.51; p < 0.001), for breast cancer (HR = 0.74; p = 0.040) for hematologic (HR = 0.68; p = 0.036) and for abdominal cancer (HR = 0.44; p = 0.002). Quitting smoking is associated with improved survival in cancer patients. We found that the benefits are not homogeneous across cancer diagnosis groups. Patients with specific cancer diagnoses, such as lung or abdominal cancer, may benefit the most from quitting.

PS3-48

PERCEPTIONS OF HARMFULNESS AND ADDICTIVENESS OF E-CIGARETTE ON THE AGE OF E-CIGARETTE INITIATION IN THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH YOUTH (2013-2017)

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Objective It is unknown if perceptions of harmfulness and addictiveness increase the risk of an earlier age of e-cigarette initiation in youth. **Methods** Secondary analyses of PATH youth (12-17) waves 1-4 (2013-2017) were conducted. Among never e-cigarette users at the first wave of PATH participation (n=16,143;N=29,349,76), the age of initiation of ever and past 30-day e-cigarette use was calculated from follow-up waves in 2014-2017. Exposures considered: (1) e-cigarette harmfulness (no/little harm, some harm, a lot of harm, don't know, and never heard of e-cigs), (2) e-cigarette addictiveness (very/somewhat unlikely, neither likely/unlikely, somewhat/very likely, don't know, and never heard of e-cigs), (3) the interaction of harm and addiction (neither harmful nor addictive, harmful but not addictive, addictive but not harmful, and both harmful and addictive; youth who answered "don't know" and "never heard of e-cigarettes" were excluded). Weighted interval-censored Cox proportional hazard models were used to estimate the associations of each exposure with the age of initiation of each e-cigarette outcome while adjusting for sex, race/ethnicity, and previous use of other tobacco products. **Results** Youth who perceive e-cigarettes to be of no/little harm had increased risk of an earlier

age of ever (AHR=2.0; 95%CI=1.7-2.4) and past 30-day (AHR=2.6; 95%CI=2.1-3.4) e-cigarette use compared to youth who perceive e-cigarettes to be of a lot of harm. Youth who perceive e-cigarettes to be very/somewhat unlikely to be addictive had increased risk of an earlier age of ever (AHR=1.3; 95%CI=1.1-1.5) and past 30-day (AHR=1.4; 95%CI=1.1-1.8) e-cigarette initiation compared to youth who perceive e-cigarettes to be somewhat/very likely to be addictive. Youth who perceive e-cigarettes as neither harmful nor addictive had increased risk of initiating past 30-day (AHR=1.7; 95%CI=1.2-2.5) e-cigarette use at earlier ages compared to youth who perceive e-cigarettes as both harmful and addictive. **Conclusion** Prevention efforts should include messaging on adverse health outcomes associated with e-cigarette use, as well as addiction potential to dissuade youth from initiating e-cigarettes.

PS3-49

STRESS, DEPENDENCE, AND COVID-19-RELATED CHANGES IN PAST 30-DAY MARIJUANA, ELECTRONIC CIGARETTE, AND CIGARETTE USE AMONG YOUTH AND YOUNG ADULTS

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Significance: Studies show substance use increases risk of contracting and worse symptoms of COVID-19. This study examines whether past 30-day youth and young adult users of marijuana, e-cigarettes, and cigarettes self-reported changes in their use of these substances due to the COVID-19 pandemic; and cross-sectional associations between perceived stress, nicotine or marijuana dependence, and COVID-19 related changes in use. **Methods:** Participants were 709 past 30-day self-reported substance users from the Texas Adolescent Tobacco and Marketing Surveillance study, TATAMS (mean age=19; 56% female; 38% Hispanic, 35% white). Multiple logistic regression models assessed associations between perceived stress and dependence and increased, decreased, or sustained past 30-day use of marijuana, e-cigarettes, and cigarettes due to COVID-19 (e.g., "Has your marijuana use changed due to the COVID-19 outbreak?"). Covariates included age, race/ethnicity, SES, dependence (exposure: stress), and stress (exposure: dependence). **Results:** Most participants reported sustained (41%, 43%, 49%) or increased (37%, 34%, 25%) use of marijuana, e-cigarettes, and cigarettes due to COVID-19, respectively. Participants who reported symptoms of dependence were significantly more likely than their non-dependent peers to report increasing their marijuana (AOR:1.66; 95%CI: 1.15-2.39) and e-cigarette (AOR: 2.57; 95%CI: 1.38-4.77) use. Those who reported higher perceived stress were significantly more likely to report increasing their marijuana use (AOR: 1.55; 95%CI: 1.00-2.42). **Conclusion:** Most youth and young adults did not decrease their substance use amid a global, respiratory disease pandemic. Health messaging and interventions that address the health effects of substance use, and factors like dependence and stress that may be barriers to decreasing use are vital during public health crises like COVID-19, as well as other potential respiratory infections like EVALI.

PS3-50

IMPROVING PROVIDER COUNSELING FOR YOUNG PEOPLE WHO VAPE: A MIXED METHODS APPROACH

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Significance: Vaping is an epidemic among young people, but there is little guidance for how medical providers should counsel youth and young adults about vaping. To address this gap, we examined how electronic medical record (EMR) systems prompt providers to collect vaping data and interviewed young adults about vaping communications with providers. **Methods:** We collected survey data from 10 rural primary care practices in North Carolina August - November, 2020. This survey asked about prompts and data fields regarding vaping in EMRs. We also interviewed 17 young adults, stratified by vaping status (cessation or prevention) from Western and Central NC. We conducted, audio recorded, and transcribed Zoom interviews. Participants reviewed resources including a copyrighted 2-page discussion aid. We developed a codebook and coded transcripts for thematic analysis. **Results:** From the survey data, we found that EMRs

lacked required vaping prompts; only 5 of 10 EMRs had a field to record responses. Of the 17 interviewees, 10 were female and 14 were White with a mean age of 19.6. Two central themes emerged: 1) youth were open to confidential, non-confrontational interactions with providers and highly supported the 2-page resource, questionnaires about vaping, and information in waiting rooms, and 2) youth wanted prevention and cessation resources to be age appropriate, include medical facts from a trusted source and disseminated via social media platforms used by youth. Additional themes included: a) youth perceived vaping prevalence as high while youth knowledge of the consequences and contents of vaping were low, and b) provider materials should specifically discuss vaping not just tobacco use. **Conclusions:** We found a gap in EMR functionalities, which may result in young people not receiving vaping counseling. Young adults report a willingness to communicate with providers and learn about vaping through trusted resources and dissemination of medical facts via social media. High perceptions of peer vaping with limited knowledge of health consequences suggest a need to update EMR prompts for vaping use.

PS3-51

EXAMINING THE INFLUENCE OF FLAVOR RESTRICTIONS ON E-CIGARETTE ABUSE LIABILITY USING HYPOTHETICAL PURCHASE TASKS

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Introduction: Thus far, federal e-cigarette flavor restrictions have been e-cigarette device specific and have allowed availability of menthol, while restricting similar flavors like mint. The aim of the current study is to examine how device-wide e-cigarette flavor restrictions impact e-cigarette abuse liability and if removal of mint, but not menthol, has a meaningful effect on abuse liability. E-cigarette purchase tasks (eCPT), questionnaires in which indices of demand are produced by estimating consumption across increasing prices, are used to assess this. **Methods:** Adult current e-cigarette users with no regular other tobacco use (n=155) completed anonymous online surveys. Surveys included four eCPTs, each representing a different potential e-cigarette flavor regulation; (1) where all e-cigarette flavors were available, (2) where only menthol, mint, tobacco flavored e-cigarettes were available, (3) where only menthol and tobacco flavored e-cigarettes were available, and (4) where only tobacco flavored e-cigarettes were available. Within subjects' differences by eCPT condition were determined for the five demand indices produced by the eCPT tasks; demand intensity (consumption when free), O_{max} (maximum spent), P_{max} (price O_{max} occurs), breakpoint (price consumption decreases to zero), and elasticity (sensitivity to change) using mixed effects models. **Results:** Across all five demand indices, ratings for the *menthol/mint/tobacco eCPT* and *menthol/tobacco eCPT* did not significantly differ from each other indicating no difference in abuse liability. The *tobacco only eCPT* had significantly lower values of intensity, O_{max}, P_{max} and breakpoint and increased elasticity (i.e. more sensitive to price) compared to the *menthol/mint/ tobacco eCPT* and the *menthol/tobacco eCPT*. For *all flavors available eCPT,* ratings of intensity, breakpoint were significantly higher and elasticity was significantly lower (i.e. less sensitive to price) compared to other eCPTs. **Conclusion:** Restricting mint, but not menthol flavor does not appear to significantly shift e-cigarette abuse liability. Availability of only tobacco flavor produces the greatest decrease in e-cigarette abuse liability.

PS3-52

DO CIGARETTE AND E-CIGARETTE USERS ALLOW TOBACCO USE IN THEIR CARS?

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INTRODUCTION: Smoking in cars exposes passengers to secondhand smoke and individuals in the car to third hand smoke. This study examines if (a) cigarette users and (b) e-cigarette users (i.e., vapers) living in a rural and agricultural region of California were more likely to allow smoking, vaping, or both in their car as compared to not allowing both smoking and vaping in their vehicle.**METHODS:** A convenience sample of 681 adults living in a 11-county rural and agricultural region were solicited at well attended events from May-November, 2019. Respondents were classified as (1) not allowing either cigarette or e-cigarette use, (2) only allowing smoking, (3) only allowing vaping, and (4) allowing both vaping and smoking in their car. Cigarette users were defined as individuals who only smoked combustible cigarettes. E-cigarette users were defined as individuals who reported that they only engaged in vaping. Fourteen

respondents reported that they used both tobacco products and were excluded from the analysis. A multinomial logistic regression was used to obtain the relative risk ratio. **RESULTS:** Cigarette users are more likely than non-tobacco users to allow people to smoke (RRR=89.65, 95% CI: 26.92, 298.59) or both vape and smoke (RRR=57.38, 95% CI: 20.30, 162.14, as opposed to not allowing either smoking or vaping) in their car. E-cigarette users are more likely than non-tobacco users to allow people to vape (RRR=10.14, 95% CI: 1.90, 11.03) or to use both products (RRR=6.36, 95% CI: 1.19, 34.01, as compared to not allowing either vaping or smoking) in their car. There was no relationship between using e-cigarettes and only allowing cigarette use**CONCLUSION:** Individuals who are riding in a car driven by a cigarette or e-cigarette user are at risk of exposure to cigarette smoke and e-cigarette vapor. Educating cigarette and e-cigarette users about the need to keep their car smoke-free is needed in rural and agricultural regions of California.

PS3-53

COMPARING BRAIN ACTIVATION BY ANTI-VAPING MESSAGE APPEALS AMONG YOUNG ADULT VAPERS

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Significance: Young adults (YA) are increasingly introduced to nicotine products through e-cigarettes. Anti-vaping public service announcements (PSAs) are meant to dissuade individuals from vaping by imparting knowledge about (cognitive appeals) or eliciting affective reactions towards (emotional appeals) negative consequences of vaping. **Methods:** We examined whole-brain functional MRI responses to PSAs with cognitive or emotional appeals compared to a scrambled image baseline in 38 YA (*M*=20.34, *SD*=1.51) vapers. Functionally defined regions of interest (ROIs) were identified based on clusters of significant response (*p*<.005, size>156mm[3]) during each PSA type using "or" logic. These included the right lingual gyrus (RLG), right anterior cingulate cortex (RACC), left fusiform gyrus (LFG), rostral right middle frontal gyrus (RRMFG), left hippocampus (LH), supplementary motor area (SMA), and left inferior premotor cortex (LIPMC). One-sample t-tests were used to determine if ROIs responded significantly to PSAs; contrasts of PSA type were then conducted with paired-sample t-tests. **Results:** All 7 ROIs responded significantly (*p*<.005) to both PSA types. RLG, LFG, LH, SMA, and LIPMC were more active and the RACC and RRMFG were less active than baseline. In both deactivated ROIs, emotional PSAs elicited greater relative deactivation (*t*(37)=-4.098, *p*<.001; *t*(37)=-3.995, *p*<.001). Emotional PSAs elicited a greater response in the RLG (*t*(37)=3.423, *p*=.002) and cognitive PSAs elicited a greater response in the SMA (*t*(37)=2.895, *p*=.006). There were no PSA-type effects in LFG, LH or LIPMC (p>.05). **Conclusion:** Both PSA types produced similar brain responses, with all regions responding significantly and in the same direction across type, yet response magnitude differed by message type in more than half. Compared to cognitive PSAs, emotional PSAs further suppressed frontal relative deactivation (RACC, RRMFG), resulted in attenuated frontal activation (SMA), and elicited more activation in primary visual cortices (RLG). The pattern of cognitive PSAs engaging frontal regions more than emotional PSAs is consistent with frontal lobe functions overall and may be a neuromarker of efficacy.

PS3-54

EXAMINING THE ASSOCIATION BETWEEN FLAVOR CATEGORIES OF ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS) AND SMOKING CESSATION AMONG U.S. WOMEN OF REPRODUCTIVE AGE, PREGNANT AND NOT-PREGNANT

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Significance: Accumulating evidence indicates that many women of reproductive age (WRA) who smoke combusted cigarettes are turning to electronic nicotine delivery systems (ENDS) in an effort to reduce or quit smoking. As flavors may be of special appeal to this population, determining the extent to which use of flavored ENDS predicts quitting smoking represents an opportunity for enhanced tobacco regulation. **Methods:** This study examined whether use of flavored ENDS predicted quitting current use of conventional cigarettes among WRA (n=501; 22 pregnant women, 479 not pregnant women) in Waves 3 (W3) and 4 (W4) of the Population Assessment for Tobacco and Health Study - a U.S. national longitudinal cohort study examining use of tobacco products in the non-institutionalized population. The WRA W3 sample included all women who reported dual use (i.e., users of combusted cigarettes and ENDS), includ-

ing women who did and did not endorse using ENDS to quit or cut down on smoking in W3. **Results:** WRA who reported regular use of flavored ENDS were more likely to report having quit current smoking by W4 compared to those who reported using only tobacco-flavored ENDS in W3 (Wald Chi-Square=12.61, *p*<.001). That relationship was observed among women who were pregnant in W4 (49.6% quit [95%CI=17.5-82.0%] vs. 0.0% [95%CI=0.0-0.2%] *p*=.001) and not-pregnant (12.3% quit [95%CI=7.7-19.0%] vs. 2.3% [95%CI=0.5-9.5%] *p*=.02). **Conclusion:** This study indicates that among WRA who report dual use of combusted cigarettes and ENDS, those who report using flavored ENDS are more likely to report quitting in the following year than those who report using only tobacco-flavored ENDS. Importantly, these results pertain both to WRA who do and do not report using ENDS to quit or cut down on smoking, and have potential to inform policies regulating the availability of flavored ENDS.

PS3-55

URINARY LEVELS OF ARSENIC, LEAD, AND CADMIUM IN AFRICAN-AMERICAN AND WHITE SMOKERS

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Background: African-American (AA) smokers are at higher risk for developing lung cancer than White (WH) smokers. In our previous study, we found that levels of urinary cadmium - a known lung carcinogen present in cigarette smoke - were significantly higher in AA than in WH smokers, even after adjustment for age, sex, and urinary total nicotine equivalents (TNE, a biomarker of smoking dose). However, urinary cadmium has a long half-life (6—38 years), and our analyses suggested a potential contribution of environmental exposures to its levels in our cohort of smokers. In this study, we analyzed urine of the same smokers for arsenic (also lung carcinogen) and lead (neurotoxicant and probable gastric carcinogen), which are also present in cigarette smoke but have much shorter half-lives than cadmium (4 days and 1—2 months, respectively). Methods: Urine of 87 AA and 82 WH smokers was analyzed by inductively coupled plasma mass spectrometry. Values were log-transformed using the natural log to approximate a normal distribution. Urinary levels of biomarkers were compared between AA and WH smokers and the potential effect of tobacco use history, socio-demographic characteristics, and employment status was investigated. Results: Urinary arsenic levels had a geometric mean (GM) of 5.85 ng/mL (95% Confidence Interval, CI: 4.93, 6.93 ng/mL); urinary lead had a GM of 0.60 ng/mL (95% CI: 0.53, 0.69 ng/mL). Both biomarkers significantly correlated with urinary cadmium measured in the same smokers: rho(N=167)=0.26, *p*=0.001 and rho(N=167)=0.48, *p*<0.001, respectively. Urinary arsenic and lead were positively associated with TNE after controlling for sex, age, race, and cigarettes per day (*p*=0.006 and *p*<0.001, respectively). However, in contrast to previous results for urinary cadmium, urinary arsenic and lead were not associated with either race or employment status. Conclusions: Urinary arsenic and lead, which reflect recent exposure, were associated with smoking dose, but did not differ by race. These results reinforce the significance of cadmium as a key contributor to the observed racial differences in lung cancer risk among smokers.

PS3-56

ASSOCIATION BETWEEN TOBACCO USE AND COVID-19 SEVERITY IN AMBULATORY PATIENTS

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Significance: Association between COVID-19 and tobacco use is not completely understood. Tobacco use has detrimental effects on health. Tobacco-related illnesses, such as serious pulmonary or heart conditions reduce lung capacity and impair the immune system and influence the ability to fight COVID-19. **Purpose**: To explore an association between COVID-19 severity and tobacco use and to identify potential risk factors in ambulatory care at the first presentation of COVID-19. **Methods**: De-identified data were extracted from Epic EHR across 13 hospitals at University of Maryland Medical System (UMMS) using the algorithm shared by NCI through the University of Wisconsin Center for Tobacco Research and Intervention. Data for 22,823 ambulatory patients tested COVID-19 positive between February 2020-April 2021 at first encounter were analyzed. COVID-19 severity was classified based on no symptoms present, symptoms but no shortness of breath or pneumonia, symptoms and/or shortness of breath and pneumonia. CDC/ATSDR Social Vulnerability Index (SVI) data were used to assess

social economic status in patients at the zip code level. **Results**: Among ambulatory patients, 48% were White, 32% Black, 14% Hispanic. Twenty percent were in the top 25th percentile based on SVI. Majority of patients (13,863, 85.5%) showed no symptoms, 1,713 (10.6%) showed signs, but did not have any shortness of breath, and 449 (2.8%) experienced signs and shortness of breath. In the bivariate analysis, COVID-19 severity was positively associated with cigarette use status (p=0.0003) and age (p<0.0001). **Outcomes to be reported:** Association between COVID-19 severity and tobacco use will be assessed by ordinal multivariable logistic regression modeling. Co-variates will include demographics, socio-economic, and clinical factors.

PS3-57

FRAMING OF GRAPHIC WARNING LABELS AND SMOKING CESSATION AMONG WOMEN OF REPRODUCTIVE AGE

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Significance: The 2001 Surgeon General's Report recommends reporting gender-specific cessation data to better understand potential differences in smoking cessation between genders. It is generally understood that women tend to have some poorer smoking cessation outcomes when compared to men, including lower long-term cessation rates. Little research on communication and cessation messaging has focused on gender-specific reporting. This study aimed to better understand the potential effects of warning label topics and framing on the quit process for women of reproductive age. **Methods**: Women of reproductive age currently using some form of tobacco product at least some days every week were recruited from Amazon Mechanical Turk (n= 149). Participants were shown 24 textual and image-based warning messages, half of which described the negative consequences of smoking (loss-frame) and the other half the benefits of not smoking (gain-frame). Participants' responses were rated for perceived effectiveness using a validated and reliable scale, including five subscales, including negative and positive affect, attention to the label, relevance to self, and intention to quit. Demographics were collected at the end of the survey. **Results:** Data were analyzed by assessing an overall effect of frame on subscales and by comparing loss-frame and gain-frame pairs of labels. Label topics were also ranked based on the mean participant responses for the intention to quit subscale. Paired two-sample t-tests show loss-framed messages elicited greater negative affect (p <.001) and more attention (p = .002), whereas gain-framed messages elicited greater positive affect (p < .001). Although loss-framed messages tended to perform better, gain-framed messages that were highly detailed, about normative beliefs, or encouraged utilizing a doctor performed the best overall. Warning label topics about children's health, smoking during pregnancy, and risks to a fetus during pregnancy tended to perform the worst overall. **Conclusions:** There is evidence to suggest that using a combination of loss-frame and gain-frame messages may be an effective tool for encouraging smoking cessation among women of reproductive age. Further research is needed to assess the best intervention strategy for communicating the risks at the intersection of smoking and pregnancy.

PS3-58

ASSESSING THE IMPACT OF MESSAGE THEME AND FORMAT ON COGNITIVE AND AFFECTIVE RESPONSES TO E-CIGARETTE HEALTH MESSAGES AMONG YOUNG ADULT SEXUAL MINORITY WOMEN

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Introduction: Young adult sexual minority women (i.e., self-identify as lesbian, bisexual, or other non-heterosexual identity; YSMW) disproportionately use e-cigarettes (ECs) compared to their heterosexual peers. This is concerning as EC use in young adulthood may increase uptake of combustible tobacco smoking, thus, widening existing tobacco disparities between heterosexual women and YSMW. Generally, sexual minorities report markedly low tobacco harm perceptions, which are prospectively associated with increased curiosity, susceptibility, and use of ECs. Thus, increasing EC harm perceptions should be a goal of population-level health communications for YSMW. We tested the effect of culturally targeted EC health messages with varying themes and image formats on YSMW's attitudes and intentions to use ECs. Methods: We recruited N=501 YSMW (18-30 years-old) via Prolific into an online experiment. Consented participants were

directed to a Qualtrics survey where they were randomized into a control or one of nine experimental conditions in a 3 (theme: harms, wellness, pride) by 3 (image format: individual, couple, cartoon) study design. We modeled associations between message condition and message effectiveness, discouragement from EC use, change in feelings toward EC use, perceived threat, and intentions to abstain from EC use. Results: Harm and wellness themes discouraged EC use more than pride-themed messages (p's < .001) . Participants who viewed harms messages self-reported feeling worse about vaping than those who viewed wellness themed messages (p = .02) and pride themed messages (p < .001). Current EC users reported greater intentions to abstain from ECs when they viewed harms-themed messages compared to the control (p < .001), pride (p = .001), and the wellness (p < .001) conditions. Images of couples were perceived as more effective than cartoon images. Current EC users reported greater readiness to avoid ECs and higher intentions to abstain from EC use after viewing images of individuals than the couple or cartoon conditions (p's <0.001). Conclusion: Message theme and image format were associated with YSMW's EC attitudes and behavioral intentions. Future studies should evaluate how to optimize harms messages; including how to re-frame wellness or pride messages to better affect YSMW's EC use.

PS3-59

CANNABIS VAPING AMONG YOUTH AND YOUNG ADULTS-A SCOPING REVIEW

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Significance: The last decade has seen a steep increase in e-cigarette use among young people, and young people are increasingly using cannabis products in these devices -- a trend that was brought into the limelight with the outbreak of EVALI. The aim of this study was to synthesize findings from a comprehensive scoping review of published scientific literature on cannabis vaping. **Methods:** Three peer-reviewed databases (PubMed, Embase, Web of Science) were systematically searched using a detailed MeSH term strategy for literature on cannabis vaping among adolescents and young adults (< 30 years old) published between January 2007 - June 2021. 1170 abstracts and titles were screened for inclusion, followed by 397 full-text reviews. Each was reviewed by two reviewers and any conflicts were resolved by a third reviewer. Studies were tagged as belonging to at least one of five mutually inclusive research areas (Epidemiology, Health Effects, Etiology, Marketing/Advertising, Intervention Strategies). **Results:** 186 articles that met the inclusion criteria were included in the final review. Most of the articles were published from 2019 onward, with 94 publications in 2020. The articles consisted of case-reports, case-series, qualitative studies, observational studies, and randomized trials. The majority of the studies examined epidemiological characteristics and use patterns (66%), followed by physical and mental health effects (50%) and etiology (26%) of cannabis vaping; 12 studies (7%) examined marketing and advertising while 9 studies (5%) examined vaping related policies and intervention strategies. Narrative summaries from each of these pools of literature will be reported. **Conclusion:** Studies indicate increasing use of vaporized cannabis in e-cigarettes among youth and young adults, posing a significant risk to health, especially vaping associated lung injury (EVALI). More studies are needed to examine the risk factors and the role of digital media and advertisement in cannabis vaping among youth. These studies can guide regulatory policies and targeted interventions for use among young people and the sale of cannabis and e-cigarette products.

PS3-60

CORRELATES OF YOUTH POLY-E-CIGARETTE DEVICE USE

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Significance: Electronic cigarettes (EC) remain the most common tobacco product used by youth in the United States. The US market remains saturated with numerous EC types, allowing youth EC users to engage in the use of multiple types of EC devices (i.e., 'poly-EC device use'). While polytobacco use among youth is well documented and associated with greater perceived social acceptability of tobacco use, younger age of tobacco initiation, household tobacco use, and greater nicotine dependence, the correlates associated with exclusive poly-EC device use (versus single device use) is lacking. **Methods:** A convenience sample of 861 exclusive EC users (81% female; 69% White) aged 14-21 (M=18.7 years) were surveyed to identify correlates of

poly-EC device use, including self-reported nicotine dependence, sociodemographic characteristics, and social perceptions of EC use. **Results:** 56% of the sample reported poly-EC device use. Poly-EC device use was associated with higher self-reported nicotine dependence (p<0.001). Participants who began EC use before the age of 18 were 35% more likely to be poly-EC device users than those who began use at an older age (95% CI: 1.00 - 1.81) and those who had all 5 of their closest friends use ECs were twice as likely to be poly-EC device users than those who had less than 5 friends use (Odds Ratio (OR): 2.07, 95% CI: 1.44 - 2.97). Users of cartridge based refillable EC were twice as likely to be poly-EC device users (OR: 2.17, 95% CI: 1.38 - 3.41). Users with higher or lower perceived SES were approximately 50% more likely to be poly-EC device users compared to users who perceived SES to be similar to others (OR: 1.56, 95% CI: 1.13 - 2.17; OR: 1.51, 95% CI: 1.04 - 2.19, respectively). **Conclusion:** Young poly-EC device users were more likely to begin using at a younger age, have close friends who were EC users, and report greater nicotine dependence. Future research should examine poly-EC device use in prospective surveillance monitoring to further evaluate the longitudinal implications on use and dependence.

PS3-61

YOUTH EXPOSURE TO VAPING RELATED ADS AND POSTS ON SOCIAL MEDIA PLATFORMS AND VAPING STATUS

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Social media use is associated with youth vaping and vaping susceptibility, yet it is unknown which social media platforms and exposure formats (posts / advertisements [ads]) contribute to these relationships. We investigated the association of exposure to vaping-related posts and ads, respectively, on 11 different social media platforms, with lifetime (LT) and past month (PM) vaping, and, among never users, susceptibility (SUS) to vaping. 1863 high school students from 2 CT schools (51.7% female; ages 13-19) completed an anonymous survey in Fall 2020 (vaping status: LT=27.4%, PM=12.7%, SUS never users=28.3%). We ran separate regression models for ads and posts for each of the 3 vaping variables/DVs (SUS, LT, PM) with social media platforms as IVs. Age and sex were included as covariates. Bonferroni correction was performed to account for multiple comparisons. With reference to ads on social media, exposure to ads on YouTube (vs. no exposure) was associated with increased odds of being SUS to vaping (AOR 1.59, 95% CI=1.17-2.15) but decreased odds of both LT (AOR 0.46, 95% CI =0.33-0.62) and PM vaping (AOR 0.48, 95% CI =0.32-0.72). No significant associations with ads on other social media platforms were observed. With respect to social media posts, exposure to Snapchat posts (vs. no exposure) was associated with increased odds of being SUS to vaping (AOR 1.55, 95% CI =1.14-2.12), LT vaping (AOR 1.86, 95% CI =1.39-2.48), and PM vaping (AOR 2.25, 95% CI =1.54-3.29). In contrast, exposure to YouTube posts was associated with decreased odds of LT vaping (AOR 0.57, 95% CI =0.43-0.76). No significant associations with posts on other social media platforms were observed. Our findings suggest advertisements and posts on certain social media platforms are uniquely related to youth vaping status. Further studies are required to examine the content of ads and posts on different social media platforms to better understand their differential effects on youth vaping behaviors. This would be critical to regulation of marketing and development of vaping prevention programs for youth.

PS3-62

INCREASED NICOTINE VAPING DURING THE COVID-19 PANDEMIC AMONG US YOUNG ADULTS: ASSOCIATIONS WITH NICOTINE DEPENDENCE, CURRENT VAPING, AND REASONS FOR USE

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Background: It is currently unknown whether and how many young adults (YAs) may have increased nicotine vaping during the pandemic, and there is no research on how this increased vaping predicts vaping-related outcomes. Longitudinal, national data are needed to answer these questions. Methods: Data came from the Monitoring the Future (MTF) Vaping Supplement collected from September to November 2020 (N=1244), which include a nationally-representative sample of US 12th-grade students

who participated in MTF in spring 2019. We oversampled those who reported vaping in 12th grade (modal age 18), and we surveyed participants one year after 12th grade (modal age 19). Approximately 35% (N=440) reported past-year nicotine vaping in 2020 and were included in the current analysis. Past-year vapers were asked, "How has the COVID-19 pandemic impacted how much you vape?" We examined how increased vaping (1="I vaped more", 0=other) was related to any nicotine dependence symptom (1=yes, 0=no), any and regular (>5 days) nicotine vaping in past 30 days, and 12 different reasons for vaping. We used weighted descriptive analyses and multivariable logistic regression. Results: At total of 16.8% young adults reported pandemic-related increased vaping. Those who reported increased vaping (vs. not) had higher odds of current nicotine dependence symptoms (AOR=2.28; 95% CI=1.02, 5.09), any nicotine vaping (AOR=10.75; 95% CI=2.94, 39.19), and regular nicotine vaping (AOR=5.03; 95% CI=2.31, 10.95) in 2020. Results were identical in sensitivity analyses that controlled for level of vaping in 2019. Increased vaping was positively and significantly associated with 3 reasons to vape: to cope, to get high, and boredom. Conclusion: Most YAs did not report pandemic-related vaping increases; however, about one in six reported more vaping in response to the pandemic. Increased vaping was associated with current nicotine dependence and use. It is possible that increased vaping was a form of coping with pandemic-related stressors, evidenced by reasons to vape including to cope, for boredom, and to get high. Interventions and future research should target those who increased vaping during the pandemic.

PS3-63

SMOKELESS TOBACCO USE AND DEPENDENCE AMONG AMERICAN INDIAN ADULTS

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Introduction: Public health burden of tobacco is disproportionately high among American Indians (AIs) because of inequalities in prevalence, tobacco-induced disease, and sociocultural factors. AIs have the highest prevalence of ST use compared to all other racial/ethnic groups in the US. In addition, they have relatively low tobacco cessation rates. Despite their high ST use prevalence, there is limited research focused on ST dependence in AIs. The aim of this study is to examine ST dependence among AI adult males and to identify sociodemographic factors and tobacco use characteristics associated with their ST dependence. **Methods:** Study was based on cross-sectional data collected from a community-based sample of 120 adult male AI exclusive ST users in Oklahoma. Sociodemographic characteristics, tobacco use behavior, and ST dependence were obtained through phone surveys. Tobacco Dependence Screener (TDS-ST) was used to measure ST dependence and classify ST users according to their dependence status. Descriptive statistics were calculated for all the study variables. Association of ST dependence with sociodemographic and tobacco use characteristics was evaluated using linear and logistic regression analyses. Odds ratio (OR) and 95% confidence intervals (CI) were calculated. **Results:** Mean ($\pm$SD) age of the study participants was 41.6$\pm$13.3 years. The majority of participants were obese (70.0%), had some college or a college education (56.7%), and rural area of residence (60.0%). Mean duration of ST use was 24.9$\pm$13.8 years. 96.7% were everyday ST users whereas, 10.0% reported traditional tobacco use. Mean TDS-ST score was 6.2$\pm$2.4 and 63.3% of the study participants had ST dependence. Tobacco use frequency, quantity, and age of onset of ST use were significantly associated with TDS-ST score (p=0.027, p=0.004, and p=0.0001, respectively). Those who had ST dependence were 5 times more likely to have ever made a quit attempt (OR: 5.2, 95% CI:2.1,12.9). **Conclusion**: AI adult ST users have high prevalence of ST dependence. Findings related to tobacco use characteristics associated with ST dependence can assist in formulating effective tobacco control interventions.

PS3-64

LONGITUDINAL ASSOCIATIONS BETWEEN EXCLUSIVE AND DUAL USE OF ELECTRONIC NICOTINE DELIVERY SYSTEMS AND CIGARETTES AND BRONCHITIS, PNEUMONIA OR CHRONIC COUGH AMONG YOUTH

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Significance: This study assessed the association of electronic nicotine delivery systems (ENDS) use exclusively or in combination with cigarettes, with incident diag-

nosis of bronchitis, pneumonia or chronic cough among youth using six waves of the Population Assessment of Tobacco and Health (PATH) study (2013-19). **Methods:** The sample consisted of youth aged 12-17 years at baseline who participated in at least one follow-up wave of PATH. A four-category exposure variable captured past 30-day product use for the wave preceding the outcome, and included exclusive ENDS, exclusive cigarettes, dual use and no current use of these products. The outcome variable was defined as incident diagnosis of bronchitis, pneumonia or chronic cough. Discrete-time survival analysis was used to estimate risk of the outcome from waves 2 to 5, adjusting for sociodemographic factors (age, sex, race/ethnicity, parental education and rural/urban residence) and risk factors (body mass index, household use of combustible products and secondhand smoke exposure) at baseline. **Results:** At baseline the sample (n=9,426) was majority male (51.5%), non-Hispanic White (54.4%), and resided in an urban area (79.7%). 2% of all participants used cigarettes exclusively, while 1.3% used ENDS exclusively and 0.9% used both products. Hazard rate estimates indicated that the conditional probability of diagnosis of the outcome was lower than 5% in each wave. In the adjusted model, exclusive cigarette use (aHR = 1.84, 95% CI 1.3-2.58) and dual use of cigarettes and ENDS (aHR = 2.55, 95% CI 1.53-4.24) were statistically significantly associated with higher risk of incident diagnosis of bronchitis, pneumonia, or chronic cough, while exclusive ENDS use shared a positive relationship with the outcome though it was not significant (aHR = 1.5, 95% CI 0.9-2.4). Non-Hispanic White participants were also significantly more likely to be diagnosed with the outcome than respondents of Black (aHR = 0.6, 95% CI 0.5-0.8), Hispanic (aHR = 0.6, 95% CI 0.51-0.81) and other race/ethnicities (aHR = 0.7, 95% CI 0.6-1.0). Lastly, the risk of diagnosing the outcome was significantly higher among obese respondents (aHR = 1.5, 95% CI 1.3-1.9) relative to those who were not. Remaining sociodemographic factors (age, sex, parental education, rural/urban residence) and risk factors (household combustible product use and secondhand smoke exposure) did not share a significant relationship with the outcome. **Conclusion:** Exclusive cigarette use and dual use of ENDS with cigarettes increased the risk of incident diagnosis of bronchitis, pneumonia and chronic cough among youth, whereas exclusive ENDS use did not.

PS3-65

LONGITUDINAL ASSOCIATIONS BETWEEN E-CIGARETTE USE AND ONSET OF MULTIPLE MODES OF CANNABIS USE AMONG U.S. ADOLESCENTS

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Significance: Previous studies investigating the association between e-cigarette use and cannabis use primarily focused on overall cannabis use, which may mask e-cigarettes' potential differential impacts on the initiation of different modes of cannabis use. This study examines the prospective associations between baseline e-cigarette use and onset of multiple modes of cannabis use during a 12-month follow-up period among cannabis-naïve US adolescents (12-17 years). **Methods:** Data were from the Population Assessment of Tobacco and Health (PATH) Study Wave 4 (December 2016 to January 2018) and Wave 4.5 (December 2017 to December 2018). The outcomes are past-12-month cannabis vaping, blunting, smoking cannabis with hookah, any cannabis use, and past-30-day cannabis use at Wave 4.5. Multivariate logistic regressions were used to estimate the weighted associations between the outcomes and baseline (Wave 4) past-30-day e-cigarette use, controlling for other tobacco use, socio-demographic factors, mental health status, and state recreational cannabis legalization status. **Results:** Baseline e-cigarette use and other tobacco use were significantly associated with onset of cannabis vaping, blunting, and smoking cannabis with hookah among US adolescents (aOR=5.74, 7.97, and 4.60 for e-cigarette use, respectively; and aOR=4.34, 3.75, and 4.30 for other tobacco use, respectively). Non-Hispanic Black was more likely to report past-12-month blunting (aOR=1.47, 95% CI=1.02-2.13) and smoking cannabis with hookah (aOR=2.74, 95% CI=1.03-7.25) compared with non-Hispanic White. In addition, living in states with laws permitting adult recreational cannabis use was significantly associated with past-12-month cannabis vaping (aOR=1.36, 95% CI=1.07-1.73) and past-30-day cannabis use (aOR=1.40, 95% CI=1.03-1.89). **Conclusions:** Using e-cigarettes and other tobacco products was associated with increased likelihoods of multiple modes of subsequent cannabis use among US adolescents. Interventions to prevent youth cannabis onset can be enhanced by targeting youth who use e-cigarettes and other tobacco products, racial/ethnic minorities and youth living in states with more lenient cannabis laws.

PS3-66

EXTRINSIC AND INTRINSIC CORRELATES OF CANNABIS USE AMONG LOW-INCOME EMERGING ADULTS DURING THE COVID-19 PANDEMIC

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Background: The COVID-19 pandemic and accompanying mitigation efforts have negatively impacted emerging adults' mental health, employment, and finances, at a time when they were just gaining autonomy. Reports indicate an increase in emerging adult cannabis use during the pandemic, even when socially isolated. Particularly among low-income emerging adults, it is unclear what factors are associated with this increase in cannabis use. This study examined the association of COVID-19-related extrinsic (financial difficulties) and intrinsic (job anxieties) factors with cannabis use in low-income emerging adults. **Methods**: Data were obtained via online surveys in January/February 2021, from a diverse sample of emerging adults participating in the Early Steps Multisite Study. Participants reported their frequency of cannabis use since March 2020, as well as pandemic-related job anxieties and financial stress. Those who indicated cannabis use at least once were categorized as users. We used bivariate and multivariable analyses to assess the association of COVID-19-related job anxieties and financial difficulties with cannabis use, adjusting for highest level of education, gender, and age. **Results**: Almost 40% of participants (N=320; 58.4% female, M_{age}=18.67 years, SD=0.57) reported cannabis use since March 2020. There was a significant association between experiencing COVID-19-related job anxiety (χ^2 (2) =16.09, p<0.01) and financial difficulties (χ^2 (2) =9.19, p=0.01) with cannabis use. Compared to adolescents who reported not experiencing job-related anxiety during the pandemic, those who did were about three times (aOR=2.92, 95%CI=1.66-5.13) more likely to report cannabis use; similarly, those who experienced pandemic-related financial difficulties were twice as likely (aOR=1.99, 95%CI=1.12-3.53) to report cannabis use. **Conclusions**: Pandemic-related job anxieties and financial difficulties are associated with increased cannabis use among low-income emerging adults; this may be related to limited employment opportunities, as low-wage essential workers, and/or to the abrupt pandemic-related disruption to all aspects of their life during a key transition to adulthood.

PS3-67

QUALITATIVE EXAMINATION OF MULTIPLE TOBACCO PRODUCT USE AMONG LOW-INCOME AFRICAN AMERICAN ADULTS DURING THE COVID-19 PANDEMIC

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Significance: Low-income and African American populations experience severe tobacco-related health disparities. Concurrent use of multiple tobacco products is also disproportionately common in these populations. Research is needed to understand both risk and protective factors for use of multiple tobacco products in the current sociopolitical climate, which has been characterized by high stress and unemployment related to COVID-19 as well as protests and heightened awareness of systemic racism. This qualitative study explored perceptions and experiences of low-income African American adult tobacco users in this context. Methods: Twenty African American adult cigarette smokers (who also used at least one other combustible tobacco product) from metro Atlanta, GA completed individual, in-depth virtual interviews. Interviews covered perceptions of various tobacco products; experiences with the COVID-19 pandemic; thoughts about recent protests and social justice issues; and any changes in tobacco use related to these issues. Results: Participants had a median age of 38.5 years and were mostly male (59.1%) with annual household incomes of less than $30,000 (72.7%). In addition to cigarettes, most (86.4%) used little cigars/cigarillos (LCCs); almost half also used traditional cigars (45.5%) and/or hookah (45.5%). Overall, participants expressed low risk perceptions of little cigars and cigarillos (LCCs) LCCs compared to cigarettes, especially when used with marijuana. They indicated greater desire to reduce or stop smoking cigarettes (perceived as "harsher") than other products like LCCs, cigars and hookah. Most (60%) reported an increase in their tobacco use since the COVID-19 pandemic, which was attributed to higher stress related to the pandemic and sociopolitical climate. Specific stressors included financial insecurity, job loss, isolation, changes in living situation, uncertainty of post-pandemic life, and anger and sadness related to racism and social injustice. A lack of knowledge regarding tobacco use and susceptibility to coronavirus was also observed. The presentation will include illustrative participant quotes. Conclusion: Multi-level interventions are needed to address

structural determinants of health, systemic racism, social norms related to tobacco use, perceptions of various tobacco products, and strategies for coping with stress among low-income African American tobacco product users.

PS3-68

PREVALENCE OF 'TOBACCO-FREE' ORAL NICOTINE PRODUCTS AND CORRELATES OF USE AMONG YOUTH AND YOUNG ADULTS IN THE US: FINDINGS FROM THE ITC YOUTH TOBACCO AND VAPING SURVEY

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Significance: Recently, many tobacco companies have converged on the theme of harm reduction by moving away from combustible products with nicotine vaping products (NVPs), smokeless tobacco (SLT), and novel 'tobacco-free' oral nicotine products (ONPs). Since the advent of ONPs in 2016, sales have increased, but little is known about the use of ONPs. The purpose of this study is to examine trends in prevalence and correlates of ONP use among US youth and young adults. **Methods:** Cross-sectional US data were analyzed from Waves (W) 3 (Aug 2019; N=3,981), 3.5 (Feb 2020; N=5,132), and 4 (Aug 2020; N=6,936) of the ITC Youth Tobacco and Vaping Survey. Online surveys were conducted among youth 16-19 years in W3 and 3.5, and youth and young adults 16-29 years at W4 who were recruited from US Nielsen consumer panels. Descriptive statistics and logistics regressions were used to describe changes in prevalence over time and predict correlates at all waves, including demographics and tobacco product use, of ever and past 30-day ONP use. Models were adjusted for response wave, age, sex, race/ethnicity, perceived family socioeconomic status, and past 30-day use of SLT, cigarettes, and NVPs. **Results:** From Aug 2019 to Aug 2020, ONP ever use significantly increased (3.5-5.3%, p=0.0014), as did past 30-day use (1.5-2.5%, p=0.0107) while the use of SLT, cigarettes, and NVPs trended downward. Those who were 21-29 years were significantly more likely to ever use and currently use ONPs when compared to those who were 16-20 years. Further, females were less likely to ever use ONPs. Those who currently used cigarettes, NVPs, and SLT, in particular, were more likely to ever use and currently use NVPs. The demographic characteristics of ONP users were similar to those of SLT users **Conclusions:** Although ONPs are among the least prevalent products used among US youth and young adults, their prevalence of use may be trending upward. ONP users are more likely to be a user of other nicotine products, but the availability of flavors and easy to conceal design of ONPs may be appealing to those who may not use nicotine products. Researchers should continue to observe behaviors associated with ONP use to inform the need for future regulatory efforts.

PS3-69

DELAY DISCOUNTING MEDIATES THE RELATIONSHIP BETWEEN CIGARETTE PERCEPTION AND NUMBER OF CIGARETTES SMOKED PER DAY IN EXCLUSIVE CIGARETTE SMOKERS

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Concerns about the effect of smokers' misperceptions associated with cigarette descriptors on tobacco use have been raised in the literature. Moreover, tobacco use has been associated with delay discounting (DD). Understanding how smokers' perceptions about their cigarettes and DD impact their smoking behavior is warranted. This study examines the relationship between smokers' perceptions about their usual cigarette, DD, and the number of cigarettes smoked per day. A crowdsourced sample (N=996) of smokers of high filter ventilation (>20% ventilation; N=546) and low filter ventilation (<10% ventilation; N=450) cigarettes identified their usual cigarette to be "light" or "full flavor", reported the average number of cigarettes they smoke per day, and completed an adjusting amount DD task. Linear regressions tested for associations among these three measures and a mediation analysis tested the role of DD in mediating the relationship between cigarette perception and number of cigarettes smoked per day. In smokers of high-ventilation cigarettes, 292 (53.48%) individuals perceived their usual cigarette as light and 254 (46.52%) individuals perceived them as full flavor. In smokers of low-ventilation cigarettes, 184 (40.89%) individuals perceived their usual cigarette as light and 266 (59.11%) individuals perceived them as full flavor. Participants who thought they smoked light cigarettes on average smoked 2.5 cigarettes more per day

compared to participants who thought they smoked full flavor cigarettes (p=0.006). This relationship was mediated by an individual's DD rate (indirect effect: p=0.004) with higher discounters reporting higher numbers of cigarettes smoked per day. No significant differences were observed in the number of cigarettes per day between high-ventilation cigarette smokers and low-ventilation cigarette smokers (p=0.066). Smokers' perceptions about their usual cigarette, but not their actual ventilation status, predicted the number of cigarettes smoked per day via a direct effect and an indirect effect through an individual's DD rate. These findings may inform tobacco cessation programs and health communication strategies for tobacco control.

FUNDING: Federal

PS3-70

QUALITATIVE EVALUATION OF THE CIGARILLO PURCHASE TASK: RECOMMENDATIONS FOR FUTURE USE

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Significance: The cigarillo purchase task is a novel procedure modeled after the cigarette purchase task and used to assess the value of cigarillos among users of the product. Great utility exists in using this task: it is simple, straightforward, and takes little time to complete. However, little research has used the cigarillo purchase task and no validation studies have been published. The aim of the current study was to evaluate understanding of and thoughts about a nine-price cigarillo purchase task using in depth semi-structured interviews and to use the findings to recommend parameters for use of the cigarillo purchase task. Methods: A convenience sample of young adults ages 21-28 (n=29) were recruited online between May-August 2020 to participate in semi-structured interviews about cigarillo and e-cigarette perceptions and use. The analysis presented here included responses from participants who were current users of cigarillos (n=7) or currently used both cigarillos and e-cigarettes (n=8). Audio-recorded interviews were conducted remotely. Verbatim transcripts were coded by two researchers and a thematic analysis was used to examine responses to a purchase task. Results: Themes that emerged from the qualitative interviews were related to: purchasing price, budget, normal cigarillo usage, cigarillo pack size, and time frame of use. Five participants mentioned that they would increase their use when products were free, while one commented that smoking more in a day wouldn't be enjoyable. Others were inclined to wait until the 24 hour period was over before buying cigarillos at expensive prices. Comments were also made that budget is important and using a calculator during the task is helpful. Finally, some commented that selling in individual units wasn't realistic and made it more difficult to purchase according to their normal usage and budget. Conclusions: Results suggest modifications to the task used here, including depiction of cigarillo pack size and use of a budget calculator. These enhancements are likely to support usability and replicability of results when using this novel purchase task tool.

FUNDING: Federal

PS3-71

TOBACCO USE DISPARITIES AMONG SEXUAL AND GENDER MINORITY GROUPS AMONG YOUNG ADULTS AND ADULTS FROM WAVE 5 OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY

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Significance: Sexual and gender minority individuals have rates of tobacco use that differ from their majority counter parts. This study investigates tobacco use disparities for young adults (18 to 24, n = 11053) and older adults (25+, n = 20960) by sexual and gender identify groups separately using PATH wave 5 data. Methods: Analyses examined prevalence of ever and past 30-day use of 5 different tobacco products (cigarettes, e-cigarettes, cigar products, hookah, and smokeless tobacco) across sexual minority group (SMG) males and females as well as transgender (TG) and cisgender individuals, separately by age group. Results: TG young adults showed no difference in tobacco use of any product from their cisgender counterparts. A higher percentage of SMG females reported ever use (77.6%) and past 30-day use (45.1%) of any tobacco products, compared to heterosexual females (ever: 61.5%; past 30-days: 30.7%, $p's$ <.0001). For SMG males, their only difference in tobacco use compared to heterosexual males was in ever hookah use (38.9% vs 29.3%, p = 0.0035). TG older Adults were more likely to have used at least one tobacco product in the past 30 days than cisgender

adults (62.2% vs 47.5%, $p = 0.0236$). SMG females were also more likely than their straight female participants to have ever used (90.9% vs 83.4%) or have past 30-day use (54.9% vs 41.9%) of any tobacco product ($p <.0004$ and $p <.0001$). SMG males did not significantly differentiate from heterosexual males in terms of ever use or past 30-day use of any tobacco product. Conclusion: Similar to previous findings, sexual and gender minority groups use more tobacco products, as well as use at a higher rate, than their non-minority peers. Results disseminated from this study show tobacco use disparities are based on age, gender, and sexual or gender identity. Understanding these groups relationships with tobacco use could be helpful in tailoring public health messages designed to reduce tobacco use in these groups, developing specific tobacco cessation treatments, or a starting point for future research.

FUNDING: Federal; Academic Institution

PS3-72

WHAT IS THE BEST WAY TO MEASURE PEER CROWD IDENTIFICATION FOR TOBACCO PREVENTION CAMPAIGNS COMPARING OPEN-ENDED, SINGLE BEST AND SLIDING SCALE METHODS

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SIGNIFICANCE: Because identification with specific peer crowds (also known as social types or subcultures, e.g., alternative) increases a young person's risk of tobacco use, peer crowds have been used to target tobacco prevention media campaigns (e.g., FDA's Fresh Empire). The ability to implement such campaigns relies on a valid way to assess peer crowd identification; however, little research has empirically examined the utility of these measures. The objective of this study was to identify utility of these measures for peer crowd identification and predicting tobacco use. METHODS: Data collected in Wave 1 (Spring 2019) of the PACE Vermont study, an online cohort of adolescents (n=480) and young adults (n=1,037) ages 12-25, assessed peer crowd identification with three measures: 1) open-ended (OE), 2) sliding scale (SS), and 3) single best crowd (SB). The SS and SB measures used 11 pre-identified crowds from the literature. We examined the distribution of crowd identification across measures and concordance in participants' responses across measures. Cross-sectional analyses examined correlations between peer crowd identification, cigarette, and electronic vapor product (EVP) use. RESULTS: The distribution of crowds was similar across the 3 measures. However, the OE measure identified ten emergent crowds (e.g., athlete, hippie) not identified in the SS and SB items. Concordance was low between the OE and SB crowd measures (<50%), but in all cases, the crowd selected as the SB also held the highest average score for that crowd on the SS. All three measures were correlated with higher past 30-day use for two of the pre-specified crowds (cigarettes: Alternative, Burnouts; EVP: Burnouts, Social). The SB and SS measures were correlated with higher past 30-day cigarette use for County and Social crowds. The OE item alone was correlated with higher past 30-day EVP use in the Country crowd. CONCLUSIONS: The OE measure can identify crowds within a population not previously captured but may not uniquely predict substance use. The single-best measure is easiest to implement and analyze, but likely misses salient crowds for prevention efforts. An SS item with an open-ended response option may be the optimal way to identify priority crowds for tobacco prevention campaigns.

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PS3-73

TOBACCO QUIT INTENTIONS AND AWARENESS OF COVID 19 PANDEMIC AMONG SMOKELESS TOBACCO USERS IN INDIA

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Introduction: Tobacco consumption is major public health concerns in India. Smokeless tobacco (ST) addiction was likely to worsen the progression and prognosis of COVID-19. The use of ST increased transmission of infection by public spitting, hand-to-mouth contact, and sharing of tobacco. Hence, this study was conducted to assess the knowledge of COVID 19 & quitting intentions among ST users. **Methods: C**ommunity

based cross-sectional study was conducted in two districts of Delhi. Simple random sampling was done from shops. As per the GATS survey factsheet 2016-17 of India there are 21.4% (p) of SLT users in India, at 95% confidence level(z =1.96), and margin of allowable error of 5.85%(e) sample size of 209 subjects were interviewed. Continuous variables were summarized with mean (SD) and median (IQR) based on the distribution of data. The categorical variables were summarized using frequencies. McNemar Chi square test was used to compare the quitting intention during and before COVID 19. **Results:** Majority of the ST users were from age group of 31- 40 years, studied up to 12 class or less, unskilled workers and belonging to lower socio-economic class. The knowledge about symptoms like fever, dry cough, running nose, loss of taste increased with increasing education (p=0.001), professional skilled work (p=0.005) and higher socioeconomic status (p= 0.001). Higher socioeconomic classes of ST users were aware of transmission of virus via handshakes (p=0.002), via droplets (p=0.05) and via fomites (p= 0.008). During COVID-19 pandemic only 83 (39.7%) SLT users had quitting intention. Quitting intention was significantly reduced among all age groups irrespective of literacy level or socioeconomic class of ST users during pandemic as compared to before pandemic. (p=0.000) **Conclusion:** Majority of the ST users were aware of symptoms, modes of transmission and preventive measures of COVID 19 which were higher among educated and higher socio-economic background. Reduction in quitting intention was found among ST users due to COVID 19 pandemic.

PS3-74

EFFECTS OF PG/VG RATIO, NICOTINE CONCENTRATION, PARTICLE SIZE DISTRIBUTION, AND FREEBASE/PROTONATED NICOTINE FRACTION ON THEORETICAL "THROAT HIT" FROM ELECTRONIC CIGARETTE AEROSOLS

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"Throat hit" is a harsh sensation of short duration felt by a smoker when a bolus of aerosol containing nicotine is inhaled. The harsh sensation is thought to derive from absorption of nicotine in the region of the glossopharyngeal nerve at the back of the throat. Tobacco products that have very high freebase nicotine concentrations such as cigars are difficult to inhale due to excessive throat hit, while products with relatively lower concentrations are experienced as smooth and easy to inhale. Throat hit appears to play a role in the psychological reward of tobacco smoke, with some degree of hit considered desirable by long-term users of tobacco products. It may also affect the puff topography of a given tobacco product, with greater throat hit resulting in shorter and fewer puffs due to building irritation during use. Nicotine gas phase concentration is a function of the nicotine concentration in the aerosol particles as well as its form (salt versus freebase). In recent years, electronic cigarette (ECIG) manufacturers have shifted liquid compositions towards salt-based nicotine, allowing higher liquid concentrations to be employed. In this study, we examined the effects of nicotine concentration, form, propylene glycol/vegetable glycerin ratio, and particle size on predicted gas phase nicotine absorption at the back of the throat. To do so we developed a mathematical model of a multicomponent monodisperse aerosol flowing through the upper airway of the respiratory tract. The model accounts for the simultaneous heat transfer and vapor mass absorption in the upper airways, in addition to the evaporation and condensation processes occurring between aerosol particles and surrounding vapors. Simulation results show that nicotine absorption flux, defined as the mass of nicotine absorbed in the throat per unit time, increases with higher fractions of free base nicotine in the aerosol. Moreover, for a given nicotine form, liquids with higher total nicotine concentrations displayed higher absorption fluxes that did not vary significantly with liquid PG/VG ratio. This indicates a tradeoff between nicotine concentration and form with respect to harshness, with significant implications for delivery. In addition, for a given mass of inhaled nicotine, smaller particle diameters exhibited greater absorption flux, but the effect was small relative to nicotine form and concentration. These findings can inform interpretation of clinical data and design of future studies and suggest opportunities for public health regulations centered around the concept of upper airway nicotine absorption.

PS3-75

USE AND PERCEPTIONS OF CIGARETTES AND E-CIGARETTES AMONG GUATEMALAN ADOLESCENTS BEFORE AND DURING COVID

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Significance: Guatemala is one of a few countries where the sale of e-cigarettes (ecigs) is unregulated, and before COVID-19, e-cigarettes use was much more popular than smoking among adolescents. This study aimed to evaluate the changes in use and perceptions of cigarettes and ecigs among Guatemalan adolescents from 2019 to 2020, during the height of the COVID-19 pandemic. **Methods**: High school students in Guatemala City were surveyed May-September 2019 and August-December 2020. Students reported use of and susceptibility to use cigarettes and ecigs, with responses combined to categorize participants into 4-level use status variables for each product: non-susceptible never smokers/vapers (reference group); susceptible never smokers/vapers; tried but not current smokers/vapers; and current smokers/vapers. Students were asked about the harm, addictiveness, and social acceptability of ecigs and smoking, assessed separately. By subtracting the response for ecigs from that for cigarettes, we derived measures of relative harm, relative addictiveness, and relative social acceptability. Separate logistic models that adjusted for school clustering regressed the prevalence of smoking and ecig use on survey year. Separate linear models regressed each of the perceived relative harm, addictiveness, and social acceptability measures on survey year, while including as covariates sociodemographics, cigarette and ecig use, friend and parent use, and sensation seeking. **Results**: From 2019 (n=2700) to 2020 (n=1836), the prevalence of current smokers (8% to 3%, p=<0.001) and ecig use (27% to 14%, p=<0.001) decreased. Also, students interviewed in 2020 vs 2019 thought that ecigs were more harmful than cigarettes (b=-.13, p<.01) and more addictive than cigarettes (b=-.06, p<.05). The relative harm (52% to 48%, p=0.003), addictiveness (28% to 22%, p<0.001), and social acceptability (7% to 5%, p=0.015) of cigarettes compared to ecigs decreased from 2019 to 2020. Compared to non-susceptible students, susceptibility to and use of ecigs was positively associated with perceiving that cigarettes are more harmful, more addictive, and less socially acceptable than ecigs. Smokers perceived ecigs as relatively more addictive and less socially acceptable than cigarettes. **Conclusion**: The COVID-19 pandemic appears to have reduced smoking and ecig use among Guatemalan adolescents. As students return to school, interventions may be needed to ensure that tobacco use does not increase.

PS3-76

LATENT TRANSITION ANALYSIS OF TOBACCO USE FREQUENCIES FOR MULTIPLE PRODUCTS IN US ADULTS

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Background: Given the evolving market of various tobacco and nicotine products, research is needed to understand population-based transitions in tobacco use frequencies across many products. Methods: We used Waves 1-4 PATH Study data for adult ever established tobacco users at baseline (n=12,358), accounting for survey design and weights. We conducted latent transition analysis of current use frequencies for nine tobacco products: cigarettes, traditional cigars, cigarillos, filtered cigars, pipes, e-products, traditional smokeless tobacco (loose snus, moist snuff, dip, spit, and chewing tobacco), snus pouches, and hookah. We identified latent states of use and one-wave transitions. Multinomial logistic regression identified demographic factors associated with transitions. Results: We identified seven latent states: non-current=42%; daily cigarette=29.7%; non-daily cigarette=9.8%; daily cigarette and polytobacco (DCPT=7.4%), daily smokeless tobacco (SLT)=4.9%; non-daily cigar=3.2%; and daily e-product and non-daily cigarette (DENC=2.4%). Non-current use was most persistent (98.8% remained non-current), followed by daily SLT (96.2%) and daily cigarette (93%) use. Among daily cigarette use, 2.2% transitioned to non-daily cigarettes, 1.7% to DENC, and 2.2% to non-current use. Among DENC, 87.4% did not transition, 7.3% transitioned to daily cigarette, and 3.8% to non-current use. Non-daily cigarette use was less persistent (83.0% did not transition); 4.6% transitioned to daily cigarette and 10.9% to non-current use. DCPT was least persistent (75.7% did not transition); 15.6% transitioned to daily cigarette, and 0.3% to non-current use. Young adults were more likely than older adults to transition from daily cigarette or DCPT to DENC and less likely to transition to non-daily cigarette or non-current use. Lower socioeconomic status groups were less likely to transition from daily cigarette or DCPT to non-daily cigarette use or DENC and

more likely to relapse. Non-Hispanic Blacks were more likely than whites to transition from daily cigarette to DCPT and less likely to transition to DENC. Conclusions: Latent states consisted of primary cigarette, cigar, ENDS and SLT use, secondary cigarette use, and polytobacco use. We identified important transitions, which were associated with demographics and may influence disparities.

FUNDING: Federal

PS3-77

ASSOCIATIONS OF SENSATION-SEEKING AND CANNABIS INTOXICATION TO DAILY "CHASING" OF CANNABIS WITH TOBACCO

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Significance: Cannabis and tobacco co-use has increased among young adults, however factors associated with different types and patterns of co-use are still not well understood. Using tobacco shortly after cannabis (i.e., chasing) has been hypothesized to prolong and/or intensify the cannabis high. Personality characteristics that are associated with cannabis and tobacco use, like sensation-seeking, may influence types of co-use. This study assessed the association of baseline sensation-seeking characteristics with episode-level cannabis chasing and the association between cannabis chasing with episode-level cannabis intoxication ratings. **Method:** Ninety-seven young adult co-users (Mage = 21.3 years, 57.7% male, 49.5% White) completed the 4-item Brief Sensation-Seeking Scale at baseline and thrice daily Interactive Voice Response (IVR) surveys of cannabis and tobacco use and co-use for 28 consecutive days, corresponding to four epochs (Morning, Afternoon, Evening and Late Night). IVR surveys asked about order of tobacco and cannabis use and perceived cannabis intoxication in each episode of use. Chasing was defined as reporting tobacco use after cannabis use in episodes when co-use was reported. Sequential multiple imputation was used to account for missing data. Models were fit using imputed data files, regressing the total number of chasing episodes on sensation-seeking and episode-level cannabis intoxication on chasing. **Results:** Baseline sensation seeking did not predict chasing, $b = 0.57$, $p = 0.40$ and chasing did not predict increased episode-level intoxication, $b = -0.15$, $p = .49$. In exploratory analysis, cigarette smoking in an episode was associated with increased odds of reporting chasing in that episode (OR = 3.01, $p < .01$). **Conclusion:** Young adults who are high and low in sensation-seeking are equally likely to engage in chasing and, counter to theory, chasing did not increase self-reported cannabis intoxication ratings obtained during real-time daily monitoring. Findings reveal cigarettes are largely the product used in chasing and finding may inform messaging to reduce tobacco use and prevent initiation of tobacco use among young adults who use cannabis.

FUNDING: Federal

PS3-78

CO-OCCURING CANCER RISK BEHAVIORS AMONG SEXUAL AND GENDER MINORITY CIGARETTE SMOKERS

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Significance: Sexual and gender minority (SGM) populations use tobacco at higher rates than their heterosexual peers. The degree to which cancer risk behaviors occur more generally among SGM populations is not well understood. The purpose of this study was to identify prevalent cancer risk behaviors among SGM smokers and determine factors predictive of higher risk. Methods: This was a secondary analysis of the Pennsylvania LGBTQ Health Needs Assessment. The survey was fielded between March and May of 2020 through a non-probability community-based sampling of LGBTQ adolescents and adults in Pennsylvania. Standard measures of current cigarette use were used. Other standard measures of cancer risk behaviors including (1) alcohol use, (2) fruit/vegetable consumption, (3) physical inactivity, (4) overweight status, and (5) use of tanning beds were applied and dichotomized into an index ranging from 0-5. This index was regressed on predictor variables (demographic, substance use, mental health) using OLS regression. Results: The analytic sample (N=5,308) was primarily non-Hispanic white (85.4%), cisgender (70.8%), and identified as gay/lesbian (53.5%). Approximately 14.5% were current smokers. The prevalence of heavy alcohol use (51.4% vs. 31.7%), inadequate fruit/vegetable consumption (92.1% vs. 85.1%), physical inactivity (83.6%

vs. 79.4%), and tanning (9.7% vs. 4.8%) were greater among smokers compared to non-smokers. On average, respondents reported 3 out of 5 risk behaviors. Non-binary gender (vs. cis-man) (beta = -.12, p<.01), current marijuana use (beta = .08, p=.03), and use of flavored tobacco (beta = .11, p=.01) were independently associated with the number of cancer risk behaviors among current cigarette smokers. Mental health variables were uncorrelated with the cancer risk index. Conclusion: Cancer risk behaviors co-occurred among SGM cigarette smokers. The use of multiple health behavior change interventions are needed and should address other substance use behaviors (e.g., marijuana and flavored tobacco).

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PS3-79

TOBACCO WHACK-A-MOLE - ASSESSING CIGAR AND OTHER COMBUSTIBLE TOBACCO PRODUCT USE AMONG A NATIONALLY-REPRESENTATIVE SAMPLE OF YOUNG ADULTS

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Significance. Little filtered cigars and cigarillos (LCCs) are often consumed infrequently, co-administered with marijuana, and concurrently used with other tobacco products. Relying on estimates of past 30-day prevalence, which often captures single-product use and guides regulatory policy actions, may under-estimate the dynamic and complex pattern of intermittent LCC use and co-use with other tobacco products. Using broader recency (i.e., time since last use) categories and assessing product use modality (e.g., "blunt" with marijuana) may more accurately capture the variability in young adults' LCC use patterns and inform tobacco regulatory policy decisions. **Methods**. We estimated the weighted prevalence of distinct LCC user groups across product modality and recency (i.e., within the past 1 - 6 months) using data from a nationally representative sample of 1063 young adults (mean age=26, range 18 to 34) who were a part of the C'RILLOS Project. Additionally, we estimated the joint occurrence of LCC and other combustible tobacco product use (CTP, i.e., cigarettes, large cigars) across recency categories. **Results.** Overall, 15 mutually exclusive groups of LCC users were observed. Additionally, 16 ever use patterns of LCC, and other CTP were observed. Of those, the polytobacco use pattern of LCCs used with its tobacco, LCCs as "blunts", and cigarettes (21%) was the most common. Additionally, the data revealed "on-off" patterns of LCC and other CTP use. Among our sample of past 30-day LCC users (n=195), 17.4% reported LCC-only use. Over half (50.3%) reported dual use of LCCs with cigarettes or large cigars during the past 30-days. Further, over a third (32.4%) of past 30-day LCC users reported smoking cigarettes or large cigars within the past 3-6 months before the survey. **Conclusions.** Our sample of young adults had unique profiles of LCC use behaviors and dynamic cycles of product use, discontinuation, and re-uptake. Smoking behavior assessment can impact tobacco policy decisions. Product standards enacted on a single product may have downstream effects on the assessment and use of another product (i.e., Tobacco Whack-a-mole). Surveillance measures that accurately capture the dynamic nature of multiple tobacco product use behaviors in young adults are needed to inform policy efforts.

FUNDING: Federal

PS3-80

THE EFFECT OF RACE ON THE ASSOCIATION BETWEEN ADVERSE CHILDHOOD EXPERIENCE (ACES) AND SMOKING CESSATION OUTCOMES

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Significance: Adverse childhood experiences (ACEs) are linked with poor smoking cessation outcomes. However, little is known about the interrelations among race, ACEs, and smoking cessation. **Methods:** Participants (N=275) were adults who enrolled in the same standard tobacco cessation treatment, the Tobacco Treatment Research Program. At baseline, participants self-reported their sociodemographic characteristics, tobacco use history, the Heaviness of Smoking Index (HSI), and the ACEs questionnaire which assesses 8 domains of abuse and dysfunction experienced before 18 years of age [0-8]. Self-reported, carbon-monoxide verified 7-day smoking abstinence was assessed at 4,

12, and 26 weeks after a scheduled cessation attempt. Generalized mixed effect model was employed to evaluate the impact of race and ACEs on smoking cessation over time. **Results:** Participants were primarily female (58.5%), high school educated or less (50.9%), non-Hispanic White race (57.8%; 29.8% Black), and had a mean age of 51.5 years (SD=12.2). Participants' mean ACEs score was 3.0 (SD=2.1), and 38.9% reported a score of ≥4; neither differed by race. Results showed a significant main effect of ACEs on cessation (p=0.05) such that higher ACEs was associated with a lower likelihood of achieving abstinence. Race was also significantly associated with cessation (p=0.04), such that Whites had a higher probability of achieving abstinence than non-Whites. Results showed a significant ACEs by race interaction (*p*=0.04), such that non-Whites with higher ACEs had an increased probability of abstinence, whereas higher ACEs among Whites was associated with a greater probability of non-abstinence. Notably, Whites had significantly higher HSI scores and were more likely to endorse substance abuse in the household compared with non-Whites. **Conclusions:** The positive relation between non-White race and smoking cessation may be related to racial differences in dependence and the types of ACEs endorsed. Further research is needed to characterize culturally unique factors, such as lower exposure to household substance abuse, which may attenuate the adverse impact of ACEs on smoking cessation.

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PS3-81

CROSS-SECTIONAL ASSOCIATIONS OF ANXIETY SYMPTOMS WITH MENTHOL CIGARETTES AND E-LIQUIDS AMONG YOUNG ADULT E-CIGARETTE USERS

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Significance: Menthol tobacco use is associated with anxiety symptoms among young adults (YAs), but it is not clear whether this association is consistent across products. It is possible that YAs use nicotine to self-medicate anxiety symptoms and that menthol enhances the desired effects of nicotine. To better understand this relationship, we evaluated the association of anxiety symptoms with use of menthol e-cigarettes (e-liquids) and cigarettes, the two most commonly used tobacco products among YAs. **Methods:** U.S. YA past 30-day e-cigarette users (18-25 years old; 47% female; 62% non-Hispanic white) were recruited via Amazon MTurk to provide anonymous survey data between May-July 2019 (n=2339). Logistic regression evaluated the associations of menthol e-liquid (vs. non-menthol) and menthol cigarettes (vs. non-menthol) with anxiety symptoms (GAD-7), adjusting for gender, sexual orientation, race/ethnicity, subjective financial situation, other tobacco product use, nicotine dependence, cannabis use, alcohol use, and frequency of e-cigarette use. **Results:** Overall, 35% (n=813) reported any anxiety symptoms. Nearly half (43%; n=1013) used menthol e-liquids; among cigarette smokers (N=1435, 61% of the sample), 67% (n=955) used menthol cigarettes. Menthol cigarette use (vs. non-menthol) was associated with anxiety symptoms (aOR=1.32 [95% CI: 1.03-1.70]); menthol e-liquid use was not associated with anxiety symptoms (aOR=0.89 [95% CI: 0.74-1.08]). **Conclusions:** Use of menthol cigarettes, but not menthol e-liquids, was associated with anxiety symptoms. It is possible that factors other than self-medication may explain the significant association with menthol cigarettes, such as sensory properties unique to combustion or exposure to menthol cigarette advertising.

FUNDING: Federal; State

PS3-82

DID YOUTH AND YOUNG ADULT E-CIGARETTE USERS SWITCH TO MENTHOL FLAVOR AFTER FEDERAL RESTRICTIONS ON FLAVORED CLOSED-SYSTEM E-CIGARETTES? RESULTS FROM A LONGITUDINAL STUDY

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In February 2020, FDA implemented guidance to restrict flavors in closed system e-cigarettes to menthol and tobacco only, banning other characterizing flavors such as fruit, mint, or candy. This study followed flavor selections in a longitudinal cohort of youth and young adult e-cigarette users to identify flavor-switching behaviors following the implementation of FDA guidance. A sample of 203 respondents aged 15-24 who were current users of mint-, fruit-, candy- or other non-menthol flavored ("characterizing-flavored") e-cigarettes at baseline (February-May 2019 or September-December 2019) completed a follow-up survey after the implementation of FDA guidance on flavored e-cigarettes (September 2020-March 2021). Latent class analysis was used to detect the probability

of within-subject change from non-menthol characterizing-flavored e-cigarettes into one of 4 classes: (1) continued non-menthol characterizing-flavored e-cigarette use; (2) continued non-menthol characterizing-flavored e-cigarette use with the addition of menthol e-cigarettes; (3) switch to menthol e-cigarettes only (no other characterizing flavors); (4) cessation of e-cigarette use. Bootstrap likelihood ratio tests were used to determine the number of classes in the model (entropy for 4 classes = 0.903). Of the 203 non-menthol characterizing flavored e-cigarette users at baseline, 190 continued to use non-characterizing flavors at follow-up, but not menthol. Only 6% of respondents made any changes to their flavor use by follow-up: 7 switched to menthol flavor only; 3 continued non-menthol characterizing flavor use with the addition of menthol; and 3 had stopped using e-cigarettes. Results suggest that the 2020 FDA restriction on flavors in closed-system e-cigarettes is not effective in preventing e-cigarette use among youth and young adults. Flavor bans should be extended to all e-cigarette device types to prevent the sale of products with youth appeal.

FUNDING: Unfunded

PS3-83

PROSPECTIVE ASSOCIATION BETWEEN EXCLUSIVE USE OF E-CIGARETTES OR NICOTINE REPLACEMENT THERAPY BY PAST-YEAR EX-SMOKERS WITH SMOKING STATUS AND RELAPSE AT ONE YEAR: FINDINGS FROM THE SMOKING TOOLKIT STUDY

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Significance: Long-term e-cigarettes (EC) use by ex-smokers is increasing. This could reduce smoking relapse risk, by satisfying ex-smokers' need to obtain nicotine from other sources, or it may promote relapse by maintaining nicotine dependence and through its behavioral similarity to smoking. This study aimed to assess associations between exclusive EC use by past-year ex-smokers with smoking status/relapse at 1-year follow-up compared with (i) a behavioral control group, past-year ex-smokers with exclusive nicotine replacement therapy (NRT) use, and (ii) past-year ex-smokers with no product (NP) use. **Methods:** Data came from representative baseline surveys of adults in England, collected monthly from 04/2015 to 06/2020, with follow-up 1 year later. Eligible participants were past-year ex-smokers with exclusive EC (N=83), NRT (28) or NP (122) use at baseline, with follow-up data. Main outcomes were smoking (current/ex-smoker) and (intermittent) relapse (relapsers/continuous abstainer) status at 1 year follow-up. Multiple logistic regressions compared groups on outcomes, adjusted for baseline socio-demographic, smoking and quit-attempt related characteristics. **Results:** Of past-year ex-smokers, with median abstinence of 3-6 months at baseline, 42.2% (95%CI 32.1-52.9) with exclusive EC use, 39.3% (95%CI 23.6-57.6) with exclusive NRT and 32.0% (95%CI 24.3-40.7) with NP use were smokers at 1 year follow-up. Further, 51.8% (95%CI 41.2-62.2) of baseline ex-smokers with exclusive EC use, 60.7% (95%CI 42.4-76.4) with exclusive NRT use and 44.3% (95%CI 35.8-53.1) with NP use had a relapse since baseline. There were no significant differences between groups for either outcome in adjusted analysis, although data were insensitive (Bayes factors 0.58-1.39). Being a smoker or relapser at 1-year follow up was independently associated with greater urges to smoke (aORs 1.72/1.54, p<0.001) and shorter quit attempt length (aORs 0.77/0.64, p<0.05). **Conclusion:** In England, exclusive use of EC by ex-smokers was not independently associated with a greater risk of smoking or relapse one year later compared with NRT or NP use. However, data were insensitive to rule out associations with relapse reported in the literature.

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PS3-84

POPULATION-LEVEL ASSOCIATIONS BETWEEN E-CIGARETTE DESIGN FEATURES AND CIGARETTE INITIATION BEHAVIORS AMONG YOUTH IN THE UNITED STATES: LONGITUDINAL FINDINGS FROM THE PATH STUDY 2013-2019

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Significance: The population-level impact of e-cigarettes depends in large part on their effects on combustible tobacco cigarette smoking. We evaluated whether e-cigarette design features are related to cigarette smoking initiation among youth e-cigarette users in the US between 2013-2019. **Methods**: Data were from youth (ages 12-17) noncurrent

cigarette smokers who used e-cigarettes in the past 30 days and participated in the PATH Study (n=983 observations). Outcomes were initiation of past 30-day cigarette smoking (i.e., transition from noncurrent smoking/never smoking to past 30-day smoking) and initiation of frequent cigarette smoking (i.e., transition from noncurrent smoking to smoking on 20+ days in the past 30 days). E-cigarette design feature predictors were flavor (tobacco; menthol/mint; nontobacco, nonmenthol/mint; combination of tobacco, menthol/mint, other flavors), device type (disposable, cartridge, tank), and year of assessment (categorical variable, used as a proxy for nicotine concentration/formulation). We used generalized estimating equations to evaluate associations between e-cigarette design features and cigarette initiation using multiple pairs of assessments, adjusted for demographic characteristics, and weighted to be nationally representative. **Results**: Among youth noncurrent smokers who used e-cigarettes in the US, use of only non-tobacco, non-menthol/mint flavor e-cigarettes (compared to use of only tobacco flavor e-cigarettes) was associated with lower rates of initiating past 30-day cigarette smoking (16% vs 44% initiation among all noncurrent smokers; AOR=0.21, 95%CI: 0.06-0.71; 12% vs 31% initiation among the subset of never smokers; AOR=0.31, 95%CI: 0.03-2.89), and with lower rates of initiating frequent cigarette smoking (2% vs 4% among all noncurrent smokers; AOR=0.30, 95%CI: 0.05-1.64). **Conclusion**: Findings suggest that future research should examine if use of non-tobacco, non-menthol/mint flavor e-cigarettes among youth e-cigarette users may be protective against initiating cigarette smoking, alongside consideration of population data showing that non-tobacco flavoring in e-cigarettes is strongly associated with initiation of e-cigarette use itself. **Funding**: This research was supported by the National Institute On Drug Abuse of the National Institutes of Health under Award Number R21DA051446. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

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PS3-85

SOCIODEMOGRAPHIC AND SMOKING CHARACTERISTICS ASSOCIATED WITH BELIEF THAT ORGANIC TOBACCO PRODUCTS ARE LESS HARMFUL THAN CONVENTIONAL TOBACCO PRODUCTS AMONG US ADULTS AND SMOKERS - RESULTS FROM WAVE 4 OF THE PATH STUDY

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SIGNIFICANCE: Previous research has established that "organic" descriptors on cigarette packaging and advertising convey misleading reduced harm messages to consumers. This study describes the prevalence and sociodemographic/psychosocial correlates of the misbelief that organic tobacco products are less harmful than conventional tobacco products among US adults, US cigarette smokers, and Natural American Spirit (NAS) cigarette smokers, a brand that uses the "organic" descriptor. **METHODS:** Data were drawn from Wave 4 (2017/18) of the Population Assessment of Tobacco and Health (PATH) Study (n= 33,822 adults ages 18+). We used cross-sectional weights to generate point estimates and logistic regressions to model the odds of belief that organic tobacco are "less harmful" vs. "about the same" or "more harmful". **RESULTS:** Overall, 11.3% (95% CI: 10.7, 11.8) of all adults, 19.7% (95% CI 18.6, 20.9) of all smokers, and 37.3% (95% CI: 33.1, 41.6) of NAS smokers believe that organic tobacco products are less harmful than regular tobacco products. Men were more likely than women (aOR 1.10, 95% CI: 1.04,1.17) and former (aOR 1.45, 95% CI: 1.33,1.58) and current smokers (aOR 2.07, 95% CI: 1.90,2.25) were more likely than non-smokers to hold this belief. After controlling for sociodemographics, smokers who believe their own brand might be less harmful (aOR 2.84, 95% CI: 2.45, 3.31), believe some types of cigarettes are less harmful (aOR 4.40, 95% CI: 3.92, 4.93), or who smoke NAS (aOR 2.5, 95% CI: 2.06, 3.22) had higher odds of believing that organic tobacco products are less harmful. Among NAS smokers, women had two times higher odds of holding this belief than men (95% CI: 1.27, 3.14) and those who believe NAS might be less harmful than other brands had 11 times higher odds (95% CI: 7.39, 18.47) of this belief. **CONCLUSIONS:** A significant proportion of US adults, US smokers, and especially NAS smokers believe that organic tobacco products are less harmful. This misunderstanding is associated with similar false beliefs (i.e., that one's own brand is less harmful than other brands), and consistent with the conclusion that the "organic" descriptor is misleading.

FUNDING: Federal

PS3-86

SOCIAL MEDIA INFLUENCERS PROMOTING VAPES - ADOLESCENT EXPOSURE AND ASSOCIATIONS WITH DEGREE OF USE

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In this presentation, we explore the extent to which adolescents are exposed to influencers promoting electronic nicotine devices (ENDS) on social media despite bans implemented on several platforms, as research shows that marketing exposure to ENDS may predict future initiation. We also sought to determine whether the frequency of this exposure is associated with higher degrees of ENDS use and susceptibility to ENDS initiation. Our study population included 1,100 adolescents, aged 13-17 across the United States, who participated in an online survey we created to explore vape-related attitudes and behaviors, including social media use. We found that 49% of respondents reported seeing vape promotions at least a few times in the past month, and 25% reported weekly exposure. Further, of the 183 respondents who reported only regularly checking Facebook and Instagram, which have established bans in place, 23% still reported weekly exposure in the past month. These percentages reveal the pervasiveness of a marketing strategy which exploits restriction loopholes and highlights the persisting need for clear, robust policies and regulations against such influencer posts. To assess whether exposure to influencers promoting ENDS varied incrementally with increased degrees of ENDS use, we ran pairwise t-tests between four profiles of varying degrees of reported ENDS usage: Never-users, who reported no likelihood of initiation; Susceptible-users, who reported any likelihood of future initiation; Light-users, who reported vaping nine or fewer days in the past month; and Regular-users, who reported vaping ten or more days in the past month. We found that susceptible-users, light-users, and regular-users were all significantly more likely to be exposed to weekly promotion of ENDS by influencers than never-users, all with (p< 0.001). While limited to association rather than causality, it is probable that adolescents who are more curious about vaping or have already initiated ENDS use may be more likely to seek out influencers promoting ENDS. It is also probable that ENDS manufacturers target more susceptible youth to expand their market.

FUNDING: Federal

PS3-87

A PILOT RANDOMIZED CONTROLLED TRIAL OF AN AUTOMATED AND COUNSELOR-DELIVERED TEXT MESSAGING PROGRAM FOR VAPING CESSATION

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Introduction: There is a paucity of evidence-based interventions for vaping cessation. Automated text messaging programs are effective for smoking cessation, and initial evidence indicates for vaping cessation. **Methods:** This pilot 3-arm randomized controlled trial tested the feasibility and acceptability of Quit the Vape (QTV), a text messaging program for vaping cessation informed by social cognitive theory. One intervention arm consisted of daily automated text messages (QTV); the other included both automated and counselor texts (QTV-C), which were sent out twice/week by a trained counselor in addition to the automated ones; the control group received 1 text. We randomized 46 participants from a young adult cohort to QTV (n=15), QTV-C (n=15), or a control text (n=16). Primary outcomes of were measured at 1-month. **Results:** The average age of participants was 27.5 years. The majority were male (52.2%), white (65.2%), and past 30-day cigarette smokers (55.3%). Average number of days of e-cigarette use was 26.3 days per month (SD=6.8). QTV-C participants interacted with the program an average of 9.3 times (SD=13.4) while QTV participants interacted 4.9 times (SD=5.9) (differences were not significant (n.s.). Opt-out rates were low for all programs (QTV: n=3; QTV-C: n=1; control: n=1). A higher proportion of QTV participants (53.9%) found the messages triggering than QTV-C (13.3%) or control (25%) (n.s.). Overall program satisfaction was higher for QTV-C (53.3%) and QTV (57.1%) than for control (14.3%) (p<.05). A higher proportion of QTV-C participants made a quit attempt (66.7%) compared with QTV (42.9%) and control (50.0%) and a greater number reported 7-day vaping point prevalence abstinence (26.7%) than QTV (7.1%) or control (7.1%) (n.s.). **Conclusions:** Both programs were feasible, and participants reported significantly higher satisfaction with the intervention programs than control. QTV-C trended towards higher

engagement and more favorable quitting outcomes than QTV, but differences were not significant. A larger trial is needed to assess the effectiveness of various types of text messaging for vaping cessation.

PS3-88

CHARACTERIZING TWITTER CONVERSATION ABOUT E-CIGARETTE USE PREVENTION CAMPAIGNS

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Although smoking rates in the US have decreased, the declines in cigarette sales are offset by sharp increases in the consumption of other tobacco products including vaping products. The prevalence of e-cigarette use among youth and young adults (YYA) now exceeds that of combustible cigarettes. One of the reasons behind the rapid increase in YYA e-cigarette use is the extensive and effective marketing of these products. These products are increasingly aggressively marketed on social media, which are disproportionately popular among this hard-to-reach at-risk age group. We assessed the amount, content, sources, and engagement of Twitter content related to recent prevention campaigns discouraging e-cigarette use. We analyze Twitter conversations between January 2014 to October 2020 about 14 state campaigns and one national campaign—"The Real Cost" launched by the Food and Drug Administration. Textual analysis was employed to understand the support of and opposition to those campaigns and explore the major themes of the tweets. Profile analysis is employed to identify the sources of information. Lastly, we aim to understand the diffusion of various types of messages among different sources. In total, we collected 145,969 tweets about the state campaigns and 472,996 tweets about the national campaign. Those messages had a potential reach of over 2 billion Twitter users. Results indicate that awareness of large campaigns like The Real Cost was prominent on Twitter. We find that most campaign messages feature health risk references and policy advocacy but mixed with an influx of e-cigarette product promotion, and advocacy for e-cigarette, and misinformation about e-cigarette use. Results also demonstrate that e-cigarette advocates are committed to disruptions of e-cigarette use prevention public health campaigns and use sophisticated methods to further their goals. The study findings provide insights for public health agencies to develop concepts and technologies to create effective social media campaigns preventing e-cigarette use among young adults.

PS3-89

POPULATION-LEVEL ASSOCIATIONS BETWEEN E-CIGARETTE DESIGN FEATURES AND CIGARETTE CESSATION BEHAVIORS AMONG ADULTS IN THE UNITED STATES: LONGITUDINAL FINDINGS FROM THE PATH STUDY 2013-2019

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Significance: The population-level impact of e-cigarettes depends in large part on their effects on combustible tobacco cigarette smoking. We evaluated whether e-cigarette design features are related to cigarette cessation behaviors among adult cigarette smokers who used e-cigarettes in the US between 2013-2019. **Methods**: Data were from adult (ages 18+) past 30-day cigarette smokers (at baseline) who used e-cigarettes in the past 30 days (at baseline or follow-up) and participated in the PATH Study (n=7646 observations). Outcomes were discontinuing past 30-day cigarette smoking, making a quit attempt, and quitting among attempters. E-cigarette design feature predictors were flavor, device type, nicotine concentration and formulation (salt-based/free-based/no nicotine). We used generalized estimating equations to evaluate associations between e-cigarette design features and cigarette cessation using multiple pairs of assessments weighted to be nationally representative. **Results**: Daily use of e-cigarettes versus non-daily use (at baseline or follow-up) was consistently positively associated with cigarette cessation among adult smokers in the US. Findings for flavor and device type were generally not significant. Relationships between nicotine concentration/formulation and cigarette cessation varied depending on baseline/follow-up assessment; when assessed at baseline, 22% (95%CI: 18-26%) of those using zero nicotine e-cigarettes discontinued smoking compared to 9% (95%CI: 4-20%) of those using salt-based nicotine e-cigarettes; when assessed at follow-up, 13% (95%CI: 11-16%) of those using zero nicotine e-cigarettes discontinued smoking compared to 36% (95%CI: 29-44%) of those using salt-based nicotine e-cigarettes. Year of the study period was positively

related to cessation behaviors; rates of discontinuing smoking increased from 12% (95%CI: 10-14%) in 2013/14 to 22% (95%CI: 20-25%) in 2018/19. **Conclusion**: Findings underscore that daily use of e-cigarettes (compared to nondaily use) is associated with greater cigarette cessation rates at the population-level in the US. Further, associations between some e-cigarette features and cigarette cessation may depend on whether features are assessed at baseline or follow-up, calling for assessment of inter-wave vaping in population studies. **Funding**: This research was supported by the National Institute On Drug Abuse of the National Institutes of Health under Award Number R21DA051446. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

PS3-90

ADOLESCENTS' PERCEPTIONS OF NICOTINE VAPING-RELATED SOCIAL MEDIA CONTENT AND ITS EFFECTS: A QUALITATIVE INVESTIGATION

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Background: Nicotine vaping content on social media is common. We interviewed adolescents about their perceptions of nicotine vaping-related social media content and its effects. **Methods:** Participants (analytic sample N=30, age 13-18, in California, 40% male) were recruited from social media for online semi-structured interviews. Initial codes were derived from the interview questions. Two authors discussed emerging themes in the transcripts and revised the coding guide in an iterative process until saturation was reached. The first author coded the transcripts; the second author independently coded a randomly selected 30%. Theme intercoder agreements ranged from 98.3%-99.7%. **Results:** Few (8/30) reported ever vaping, most (22/30) reported exposure to vaping in-person (e.g., in school restrooms), and most (22/30) reported exposure to vaping on social media. Exposure to pro-vaping content was common (27/30), especially transient content (e.g., "stories;" 13/27). Participants identified three main purposes of social media vaping posts: showing off (21/30), documenting normal daily activity (11/30), and selling products (7/30). Perceived effects of vaping-related content on social media included normalization of vaping and other substance use (24/30) and increased access to vaping products (i.e., through direct sales or by providing information about obtaining vaping products; 3/30). Many participants (20/30) spoke of social media content affecting others, not themselves. Adolescents' reactions to vaping-related posts were multiple and included indifference (22/30), disapproval (21/30), and curiosity (8/30). In addition to pro-vaping content, most participants (20/30) had seen ads on social media warning against the consequences of vaping and other substance use. One in 3 (10/30) recalled seeing social media ads for vaping products. **Conclusions:** Among a sample of adolescents in California, most of whom had never vaped, exposure to vaping-related social media content was common. Non-vaping adolescents may become curious about vaping after frequent exposure to social media content. Pro-vaping content should be restricted on social media platforms to protect adolescents.

PS3-91

EXAMINING THE EFFECTS OF INTERNALIZING AND EXTERNALIZING SYMPTOMS, AND GENDER, ON SUBSEQUENT TOBACCO PRODUCT USE

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Adolescents have demonstrated alarming rates of tobacco product use, including elevated rates of e-cigarette use. Past studies have examined the association between internalizing and externalizing symptoms and tobacco initiation and past 30-day use among adolescents. However, examining sustained tobacco use patterns may provide insight into the relationship between internalizing and externalizing symptoms and more problematic tobacco use patterns. The current study examined whether these variables predict both tobacco initiation and sustained use over time across multiple tobacco products in adolescents. 6170 tobacco-naïve youth participants were drawn from the Population Assessment of Tobacco and Health Study, which assessed tobacco use in young adults. Past-month internalizing symptoms were associated with increased odds of initiating combustible cigarettes (OR = 1.27, 95% C.I. = 1.05-1.54), e-cigarettes (1.13, 95% C.I. = 1.04-1.22), and poly-tobacco product use (1.13, 95% C.I. = 1.04-1.22). Past-month externalizing symptoms predicted increased odds of initiating e-cigarettes (OR = 1.20, 95% C.I. = 1.13-1.28) and poly-tobacco products (OR = 1.33, 95% C.I. = 1.24-1.42). We observed significant interactions between gender and internalizing

symptom scores, such that internalizing symptoms were associated with increased odds of initiating e-cigarettes (OR = 1.26, 95% C.I. = 1.07-1.49) and poly-tobacco products (OR = 1.29, 95% C.I. = 1.08-1.54) for females only. Internalizing symptoms were associated with increased odds of sustained combustible cigarette use (OR = 1.46, 95% C.I. = 1.11-1.92) and poly-tobacco use (OR = 1.26, 95% C.I. = 1.06-1.50). A significant interaction was found between externalizing symptoms and gender, such that females who reported greater externalizing symptoms were more likely to sustain other tobacco product (e.g., cigar, hookah, pipe, smokeless tobacco, bidis, and kreteks) use across multiple years (OR = 1.75, 95% C.I. = 1.13-2.72). Our findings indicate that internalizing and externalizing symptoms differentially predict tobacco initiation and sustained use across multiple tobacco products in adolescent boys and girls.

PS3-92

EXAMINING THE EFFICACY OF CONTENT REGULATION MODELS ON TIKTOK

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Introduction and Aims: User-generated vaping-related content on the social media platform, TikTok, may influence adolescent's perceptions towards vaping and e-cigarette use. We aimed to examine how effective TikTok's content regulation model is at identifying and removing content that promotes vaping.**Method / Approach:** Data were collected from TikTok accounts using hashtag-based keywords on vaping related videos (n = 802) in November, 2020. Researchers used the URLs to access these videos again, in August, 2021, to determine whether the content was still publicly available. **Results:** Of the 802 videos in the original sample, 562 (70.07%) were still publicly available. These videos had a mean view count of 2,061,940 (SD = ±2,877,891), a mean 'likes' count of 297,504 (SD = ±549,551) and a mean of 2,052 (SD = ±6262) comments. This reflects a growth in viewer engagement of 1.49% for gross views and 1.05% for gross likes. Whilst 240 (29.93%) videos were not publicly available, 33 (13.75%) of these had been privatised by the content creator and not removed by TikTok's content regulation algorithms. **Discussions and Conclusions:** From our sample of vaping related videos, more than half were still publicly accessible which indicates that TikTok's current content regulation model is flawed and ineffective. With previous research demonstrating that adolescent and young adult exposure to vaping related content may have consequences on adolescent attitudes and subsequent use, it is imperative that better content regulations are implemented. **Disclosure of Interest Statement:** Authors have no conflict of interest to declare.

PS3-93

E-CIGARETTE PERCEPTIONS IN THE GENERAL POPULATION : A SYSTEMATIC REVIEW

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Background: As e-cigarette (EC) use rises in the USA and EU among smokers and non-smokers, policy issues are emerging. Several studies have shown how perceptions influence behavior: there have been systematic reviews on EC, but none on perceptions with recent data on the general population, despite significant growth in the literature since 2016. **Objectives:** A systematic review of studies on EC perceptions in the general population in the EU and USA. **Methods:** In line with PRISMA 2020, a search was carried out in PubMed and PsycArticle between January 1, 2006, and May 11, 2021, and references in previous reviews were checked. Index terms such as "EC", "vape", "perception" and "beliefs" were used to locate articles in English in peer-reviewed journals. Two reviewers worked independently to screen articles on the following criteria: documenting perceptions; general population; not industry-funded. They then extracted data from all the studies. CASP Cohort and NIH cross-sectional study tools were used to assess study quality. **Results:** The search yielded 5386 records, 51 were screened for full text and 17 met eligibility criteria. The studies were conducted in the EU and US, cross-sectional, ranged from 527 to 32320 participants, and mostly compared perceptions of smokers and non-smokers. CASP and NIH found study quality to be heterogeneous. The results show four aspects of EC perceptions: harmfulness, addiction, health effects, and expected general benefits. On harmfulness and addiction potential, perceptions vary in time and by socio-demographic and smoking status. Perceptions of health effects and general benefits were assessed through different methods, limiting our results. **Conclusion:** This systematic review is the first to focus on perceptions of EC in the general population. It contributes to reflection on the different trajectories of vaping

users and provides insights into perceptions of EC among smokers and non-smokers. Finally, it identifies avenues of work for a larger study in France with a new analysis grid on the general population's perception of EC.

PS3-94

IDENTIFYING A TYPOLOGY OF TOBACCO FLAVOUR PREFERENCES AMONG ADULT SMOKERS IN SINGAPORE

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Significance: While many consumers of tobacco products have different flavour preferences, little is known about their prevalence and patterns of tobacco flavour preferences in a multi-ethnic Asian population. The primary aim of the study is to identify a typology of tobacco flavour preferences among adult smokers in Singapore using latent class analysis (LCA). **Methods:** Data were from the 2019 Singapore Smokers Survey (N =2,015, ages 19 - 69 inclusive). Latent class analysis was performed to differentiate subgroups of smokers using eight dichotomous items (yes/no) on tobacco flavour preferences (full or strong, mild, menthol, cooling sensation, capsule, fruity, sweet, clove). Further, multinomial logistic regression analysis was used to assess correlates of the tobacco flavour preference class membership. Socio-demographic characteristics (gender, age, ethnicity, education, housing type, and marital status), health status and smoking status (daily versus occasional smoking) were entered into the regression model to examine as correlates of the class membership. **Results:** Results indicated four classes (subgroups) of tobacco flavour preferences among adult smokers in Singapore: 1) multiple flavour preference, 2) mild flavour preference, 3) full and strong flavour preference, and 4) menthol flavour preference. Menthol Flavour class was the biggest subgroup of smokers (50%), followed by Full and Strong Flavour class (23%) and Mild Flavour class (21%). Multiple Flavour class (6%) was the smallest subgroup that prefers a range of flavours including menthol, cooling sensation, fruity and sweet flavour. The multinomial logistic regression analysis found that gender, age, ethnicity and smoking status were unique predictors of the tobacco flavour preference class membership. **Conclusion:** This study provides novel evidence for heterogeneous subgroups of adult smokers who prefer different tobacco flavour preferences. The findings offer important implications for future policies to enact robust regulations regarding flavoured tobacco products particularly in multi-ethnic Asian settings.

PS3-95

NEWS MEDIA COVERAGE OF COVID-19 LOCKDOWN BAN IN SOUTH AFRICA

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Significance: The South African government imposed a strict COVID-19, which included a temporary ban on the sale of tobacco/nicotine products for 20 weeks (27 March to August 17, 2020). The initial reason for placing the ban was due to the classification of tobacco/nicotine products as non-essential items. Early findings of a link between tobacco smoking and COVID-19 severity led to extension of the ban in order to protect the country's fragile health system. This study investigates news media coverage of arguments and activities in relation to the lockdown tobacco ban. **Methods:** We collected and reviewed 187 news media articles in Google published between 26 March to 15 August 2020 using standard snowball searches. We conducted a thematic analysis using NVivo version 12.**Results**: Eight major themes were identified in the data: controversy surrounding the classification of tobacco products, anti-tobacco sales ban arguments and activities, pro-tobacco sales ban arguments and activities, tobacco companies' tactics during the ban, tobacco/nicotine products marketing during ban, coverage of litigation brought against the ban, legal problems during the ban and issues considered in placing/lifting the ban. Anti-sales ban arguments include the adverse effect of nicotine withdrawal symptoms on smokers, loss of jobs and the expansion of the illicit cigarette markets. Pro-sales ban arguments include the importance of protecting the health system from collapse as a result of rising COVID-19 hospitalization, benefits of cessation, and the need for non-smokers to be protected from exposure to secondhand smoke. **Conclusion:** There was more reporting on the negative effects of the ban and the agitation to lift the ban than its benefits. The media was used as a tool to mobilize citizens against the ban. The benefits of the ban, including smoking cessation did not receive enough support in the media. Health interventions should strategically include the use of the media to educate and get citizens' support.

PS3-96

TERMS TOBACCO USERS EMPLOY TO DESCRIBE E-CIGARETTE AEROSOL

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Background. The scientific term for the material inhaled from a vaping device is aerosol, but it is unclear whether the public uses this term. To inform tobacco control communication efforts, we sought to understand what tobacco users call e-cigarette aerosols. **Methods.** Participants were a national convenience sample of 1,562 US adults who used e-cigarettes, cigarettes, or both (dual users). Conducted in spring 2021, the online survey asked participants to describe what "*people inhale and exhale when they vape*" And to evaluate FDA's required nicotine addiction warning for e-cigarettes. The survey then randomly assigned participants to see warning statements containing the term aerosol or vapor (e.g., "E-cigarette aerosol/vapor contains nicotine, which can lead to seizures"). **Results.** In open-ended responses, the most common terms were vapor (28%) and smoke (20%), but rarely aerosol (0.2%). In close-ended responses, the most common terms were again vapor (57%) and smoke (22%), but infrequently aerosol (2%). In closed-ended responses, use of the term vapor was more common among people who were older, white, gay or bisexual, college-educated, or non-smokers (all $p<.05$). People who chose term vapor over smoke found the FDA warning to be less on three measures (discouragement, negative affect, and social interaction; all $p<.05$). In our experiment, warnings using the terms aerosol and vapor were equally effective (all $p>.05$). **Conclusions.** Educational efforts and warnings using the term vapor may resonate more with tobacco users. FDA may consider using familiar terminology and language understood and used by consumers to enable extensive effects of vaping-specific warning statements.

PS3-97

THE USE OF TOBACCO INDUSTRY VAPING PRODUCTS IN THE UK AND PRODUCT CHARACTERISTICS: A CROSS-SECTIONAL SURVEY

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Significance: Tobacco industry (TI) companies have entered the global e-cigarette ('vaping') market in recent years. However, their motives and ambitions for doing so have been questioned. Little is known about differences between TI and independent products and in their usage. This study in the UK explored 1) how popular TI vaping products are and who uses them, and 2) how do vapers' use of TI products differ from their use of independent products? **Methods:** Secondary analysis of data from a longitudinal web-based survey of smokers, ex-smokers and vapers (n=3883) in the UK in 2019. The main study sample consisted of daily and non-daily vapers, who were current or ex-cigarette smokers, and had stated the brand of their preferred e-cigarette device (n=1202). 1) Proportions using TI and independent brands were calculated and regression analysis assessed associations with socio-demographic and smoking/vaping characteristics between vapers of TI and independent products. 2) Chi-square tests were used to analyse differences between TI and independent products. **Results:** Among those stating a preferred e-cigarette device, 12 were from the TI and 49 from the independent industry. Overall, 53.4% used TI products. A university education (67.6%; Adjusted OR=1.54; 95% CI, 1.140-2.088), non-daily vaping (68.2%; AOR=1.39; CI, 1.029-1.880), and cigarette dependence (moderate, strong and very strong urges to smoke) were associated with using TI vaping brands. TI products used were less likely to be refillable ('open') than independent brands (60.9% vs. 18.3%, chi-square=228.98, p<0.001), more likely to use nicotine salts (16.7% vs. 8.6%, chi-square=25.04, p<0.001) and tobacco flavours (23.8% vs. 17.9%, chi-square=12.65, p<0001). **Conclusion:** TI vaping products were popular in the UK. Associations with product and user characteristics suggest that TI products may be less conducive to smoking cessation, although the findings were not always consistent. Restricting vaping product types to closed devices could favour TI products.

PS3-98

THE ROLE OF DEPRESSIVE SYMPTOMS IN ENDS DEPENDENCE AMONG TEXAS YOUNG ADULTS

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Significance: Depressive symptoms elevate risk for use of electronic nicotine delivery systems (ENDS) among young adults. But, it is not known if depressive symptoms contribute to symptoms of ENDS dependence among young adult ENDS users. Similarly, the role of depressive symptoms in ENDS dependence following the surge in vape pod (e.g., JUUL) sales in late 2017 is not known. The purpose of the present study was to assess if depressive symptoms were associated with ENDS dependence symptoms across a one-year period from 2018 to 2019 among young adults. Vape pod use was included as a covariate to determine if depressive symptoms contributed to ENDS dependence, over and above type of ENDS device used. Method: Participants were from a multi-wave, online study, Project M-PACT, that recruited students from 24 Texas colleges in fall 2014/spring 2015. Data were from the spring 2018 and spring 2019 waves. Only participants who reported past 30-day use of any ENDS product in 2018 or 2019 were included (n=741). In spring 2018, the 741 participants were 22-30 years old (m=24.0; sd=1.79); 53.6% female; 38.5% non-Hispanic, white, 29.8% Hispanic, 31.8% other race/ethnicity. ENDS dependence was assessed at both waves with one item measuring use of an ENDS product within 30 minutes of waking, and depressive symptoms were assessed at both waves with the CES-D-10. A mixed effects regression analysis was used to test if depressive symptoms predicted ENDS dependence, over and above device type (vape pod vs. all others). Other covariates included cigarette dependence and socio-demographics. Results: The prevalence of using ENDS within 30 minutes of waking increased across the one-year period from 14.4% to 21.3%% (z=2.48, p=.013). Depressive symptoms (z=2.21, p=.027) and vape pod use (z=2.53, p = .011) were significantly and positively associated with depressive symptoms, even after accounting for the other covariates. Conclusions: Depressive symptoms elevate risk for ENDS dependence, irrespective of the type of device used. Findings underscore the need for ENDS prevention and cessation interventions during young adulthood, the developmental period when regular tobacco use is established.

PS3-99

EXPLORING THE LATENT FACTOR STRUCTURE OF A CIGARETTE PURCHASE TASK AMONG PREGNANT WOMEN WHO SMOKE

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Introduction: The cigarette purchase task (CPT) is a valid behavioral-economic measure of demand that has smokers estimate hypothetical cigarette consumption under a range of escalating prices. The task involves no experimenter exposure of participants to smoking. CPT demand is measured in terms of five indices: Intensity (cigarettes consumed at 0), O_{max} (the highest expenditure a participant will incur), P_{max} (the financial price associated with peak expenditure), Breakpoint (a price at which one would quit smoking rather than incur the cost), and Elasticity (the change of consumption as a function of increasing price). Out of concerns for collinearity, several prior studies have investigated a more parsimonious CPT latent-factor structure for these 5 derived indices reporting a two-factor solution. The present study examined whether that two-latent-factor solution extends to pregnant women who smoke, a unique and highly vulnerable population of smokers due to the additional stigma and adverse effects associated with smoking during pregnancy. To our knowledge, this study is the first to examine this question with pregnant women. **Methods:** 665 women completed the CPT as part of recruitment for a remote contingency management intervention to promote smoking cessation among pregnant women. A principal component analysis with a standard regression coefficient > 0.40 on any particular factor was used to determine the loading pattern for the current analysis. **Results:** Factor analysis confirmed a two-factor solution to the CPT accounting for 87% of the variance in the CPT indices with demand Intensity and O_{max} loading onto one factor (i.e., Amplitude or volumetric consumption independent of price) and O_{max}, P_{max}, Breakpoint, and Elasticity loading onto the second factor (i.e., Persistence or consumption as a function of price). **Discussion**: These results are consistent with prior CPT studies reporting a two-factor solution in other populations and extend them to pregnant women. These results further support the potential utility of using the CPT to examine individual differences in smoking among pregnant women in an efficient and ethical manner.

PS3-100

E-CIGARETTE USE AMONG ADOLESCENT NEVER TOBACCO USERS AND SUBSEQUENT COMBUSTIBLE TOBACCO SMOKING

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Significance: Previous studies have found strong longitudinal associations between youth ever e-cigarette use and subsequent cigarette smoking, but few distinguished the difference between past and current vaping. Less is known about the association between youth vaping and subsequent cigar or hookah use. **Methods:** We analyzed two recent waves of the Population Assessment of Tobacco and Health (PATH) Study (wave 4, 2016-2017; and wave 4.5, 2017-2018). Our sample included youth who had never used any tobacco product (except for e-cigarettes) by wave 4 (N = 9,432), observing how their vaping behaviors in wave 4 are associated with subsequent combustible tobacco smoking in wave 4.5. We conducted multivariable logistic regressions to calculate the association between vaping and cigarette, cigar, or hookah use a year later, controlling for sociodemographic, environmental, and behavioral risk factors. We examined both current vaping (vaped in the past 30 days) and past vaping (ever vaped but no current vaping). Our outcome variables in wave 4.5 included initiation (past 12-month use) and current use (past 30-day use). **Results:** Controlling for potential risk factors, adolescents who are past vapers exhibit non-significant increases a year later in the odds of initiating cigarette (aOR = 1.43, 95% CI, 0.89-2.32) and hookah use (aOR = 2.29, 95% CI, 0.96-5.48) and non-significant change in initiating cigar use (aOR = 0.97, 95% CI, 0.40-2.32). Youth who are current vapers report statistically higher odds in subsequent cigarette (aOR = 1.98, 95% CI, 1.01-3.92) and cigar initiation (aOR = 3.28, 95% CI, 1.47-7.32) but not initiation of hookah (aOR = 0.85, 95% CI, 0.17-4.17). Neither past nor current vaping is significantly associated with subsequent current use of cigarettes, cigars or hookah. **Conclusion:** Compared with never tobacco users, including never e-cigarette users, past vapers who have never used any other tobacco products at baseline exhibited non-significant changes in subsequent initiation or current smoking of cigarettes, cigars, and hookah. Current vapers at baseline showed significantly increased odds in initiating cigarettes and cigars, but not in initiating hookah or current use of any combustible tobacco products.

PS3-101

ACCEPTABILITY AND EFFICACY OF A TOBACCO TREATMENT TRAINING PROGRAM FOR ONCOLOGY CARE PROVIDERS

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Introduction: Although persistent smoking after a cancer diagnosis is linked to adverse effects on mortality, treatment effectiveness, and quality of life, up to two-thirds of cancer patients continue to smoke after diagnosis. Despite significant progress having been made in disseminating clinical guidelines for tobacco cessation, most oncology settings still have not yet established tobacco use assessment and treatment (TUAT) as standard care. Oncology care providers have identified lack of staff training and inadequate knowledge of smoking cessation medications as barriers for TUAT implementation, supporting the need for oncology-specific provider training tailored to the needs of tobacco-dependent cancer patients in order to accelerate TUAT in cancer care settings. Methods: We developed and implemented a tobacco treatment training program for multidisciplinary oncology care providers (Tobacco Treatment Training-Oncology; TTT-O), consisting of a two-day didactic and experiential workshop followed by six monthly collaboratory videoconference calls supporting providers in their efforts to implement NCCN guidelines in their oncology settings. Process and outcome evaluation data was collected from ten cohorts of TTT-O participants who completed the workshop, course evaluations, baseline, and follow-up assessments. Results: Participants (n=219) included NPs and other APPs (33.1%), oncology RNs (19.9%), social workers (12.3%), and other clinicians including physicians, psycho-oncologists, and respiratory therapists working in cancer settings. Trainees rated didactic presentations and interactive simulated patient roleplays as highly favorable and reported significant pre- post-training gains in self-efficacy in their ability to assess and treat tobacco dependence. Participants also demonstrated significant (p < .001) improvements in implementation of TUAT in their cancer settings, including provision of staff training and implementation of reach and effectiveness of tobacco use treatment services. Conclusions: The TTT-O program increased participants' tobacco treatment skills, self-efficacy, and delivery of TUAT with successful integration of didactic knowledge combined with innovative simulated patient roleplay exercises for TUAT skill development. This training model can be adopted in diverse cancer care settings to improve tobacco treatment delivery.

PS3-102

DEGRADATION OF FLAVORING CHEMICAL COMPOUNDS IN FLAVORED NICOTINE SOLUTIONS USED IN E-CIGARETTES

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Significance: Flavored liquids used in e-cigarettes contain various flavoring chemicals along with nicotine and solvents (PG and VG). Little is known about their stability in these solutions. With proposed legislation to ban flavored e-cigarette products nationally, the stability of these flavoring chemicals becomes increasingly concerning as users may begin to purchase and store flavored products. This study aimed to determine the effects of time and storage conditions on the stability of twenty popular flavoring chemicals used in e-cigarettes. **Methods:** Reference solutions independently containing 1mg/mL of each flavoring chemical and 40mg/mL nicotine were prepared in 50:50 PG/VG. Commercial Blu pods with flavors "Cherry," "Blueberry," and "Melon Time" were purchased online. All products were placed in ambient light, dark, and 4°C dark conditions. Aliquots were taken initially at preparation and at intervals of 1, 3, 6, and 12 months. Samples were analyzed using an Agilent 7890B/7250 GC/Q-TOF and flavoring chemicals of concern were quantified. **Results:** In both the reference and commercial liquids, decreased concentrations of several flavoring chemicals were observed over 12 months, most notably in solutions exposed to ambient light. For example, recoveries of benzaldehyde, vanillin, triacetin and maltol were 5%, 3%, 2% and 1%, respectively compared to initial concentration in the reference solutions. In Blu liquids, a 6-, 5-, 2- and 1.7-fold loss, respectively for these flavoring chemicals were observed at 12 months. Preliminary evidence shows an increasing presence of potential reactionary byproducts where chemical structures indicate probable oxidation of these chemicals over time. **Conclusions:** Benzaldehyde, vanillin, triacetin, and maltol degraded substantially in e-cigarette solutions over one year. Understanding the chemical reactionary byproducts is important to determine the potential health effects associated with degraded liquids. Implementation of expiration dates or regulation of packaging to reduce exposure to light and heat may be necessary for user protection.

PS3-103

THE ROLE OF SOCIAL CONNECTIONS IN DRIVING INTENTION TO USE DIFFERENT TOBACCO PRODUCTS

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Background: Tobacco use has been on the rise among American adolescents, mainly due to vaping. As a result, adolescence is a pivotal time during which tobacco prevention is critical. Social network studies indicate that negative influence from friends is a potent predictor of future tobacco use among adolescents. However, little is known about the role of positive influence and support from friends. We aim to examine how positive social influence (PSI) measured through social network data and loneliness are associated with intentions to use different types of tobacco products, including vaping products, cigarettes, cigars, hookah, and dip. Methods: We conducted a cross-sectional survey with 83 adolescents from after-school organizations (Boys and Girls Clubs in Northeast and Central Florida) in the summer of 2021. In this survey, loneliness was measured with the UCLA loneliness scale. To measure PSI, adolescents were asked to nominate 6 of their best friends from their after-school organization, and they reported which tobacco products they would try if offered by each of their best friends. Tobacco products included e-cigarette/vape, cigarettes, cigars/little cigars/cigarillos, hookah, chewing tobacco/dip. Also, on a 5-point Likert scale, participants were asked to report how likely they are to avoid any type of tobacco product if advised by their 6 best friends. Intention to use each tobacco product was measured as a continuous form of the susceptibility to use scale. Pearson correlations and path analysis were conducted for data analysis. Results: Pearson correlations indicated that PSI is related to lower intention to use social products (vaping products, hookah, and dip). Through path analysis, PSI predicted lower intention to use vaping products only (Beta=-0.23, p<0.05), while loneliness was found to be related to higher intention to use combustible products only (cigarettes, Beta=0.24, p<0.05, cigars, Beta=0.27, p<0.05 and hookah, Beta=0.34, p<0.01). Conclusion: Loneliness may play a role in adolescents' intention to use combustible products, while PSI played a particular role in predicting lower intention to vape, supporting the social ritual of vaping.

PS3-104

LOW INTENSITY DAILY SMOKING AND MORTALITY RISK AMONG WOMEN IN THE MEXICAN TEACHERS COHORT (MTC) STUDY

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Significance: Current epidemiologic studies have shown that smoking even a few cigarettes per day (CPD) leads to substantially elevated disease and mortality risks. In Mexico, the average daily smoker smokes less than 10 CPD (mean: women=6, men=8). Yet, it is important to evaluate the mortality risk associated with this low intensity pattern. **Methods:** We examined this association among 109,756 female participants of the Mexican Teachers Cohort (MTC) Study, who completed a baseline questionnaire in 2006-2008 and were followed for mortality through 2019. Baseline smoking status was defined by self-report and participants were classified as current, former and never smokers. Current smokers were categorized according to the number of cigarettes they smoked per day (1-2CPD and >=3CPD). Deaths were identified through employer and pension-fund management databases and next-of-kin reports and cross-linked to two mortality registries. Hazard ratios (HRs) and 95% confidence intervals (95%CI) were estimated using Cox proportional hazards regression models, with follow-up time as the underlying time metric and adjusted for marriage, teaching at rural school, speaking indigenous language, socioeconomic status, health care provider, physical activity, hours watching television per week, and alcohol consumption. **Results:** In the MTC study, 75.7% (n=83,053) were never smokers, 10.1% (n=11,082) were former smokers, and 14.2% (n=15,620) were current smokers (CPD median=3, interquartile range=1-5). Relative to never smokers, current smokers had higher risk of all-cause mortality (1-2CPD HR=1.36, 95%CI=1.11-1.68; >=3CPD HR=1.42, 95%CI=1.19, 1.69) and cancer mortality (1-2CPD HR=1.45, 95%CI=1.05-2.01; >=3CPD HR=1.47. 95%CI=1.10-1.96). Yet, compared to never smokers, risk of cardiovascular disease mortality was higher among the women who smoked >=3CPD (HR=1.58, 95%CI=1.10-2.28; 1-2CPD HR=0.97, 95%CI=0.56-1.66). **Conclusion:** Smoking as low as 1-2 CPD was associated with higher mortality risk among Mexican women. It is important to raise awareness about the risks of low intensity smoking and to promote cessation in Mexico and in other countries where such pattern is common.

PS3-105

EFFECT OF THE RECENT PEAK IN THE COVID-19 PANDEMIC ON CIGARETTE SMOKING USAGE AMONG VETERANS

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Significance: The prevalence of tobacco use increases in times of stress, however, during the initial stage of the COVID-19 pandemic, tobacco use rates stayed the same in most populations. Previous work has focused on the initial months of the pandemic while this study sought to evaluate whether there was a change in tobacco use during a peak period of the pandemic, either overall or for specific subgroups. **Methods:** We used data from 61,852 visits to the VA San Diego Healthcare System from November 2019 to February 2021, divided into pre-, early, and peak pandemic periods. Binary logistic regression was used to test whether the odds of being a daily or non-daily user varied over time. **Results:** Women had a greater reduction than men in the odds of daily use during the pandemic's peak. The prevalence of non-daily use declined between the early and peak periods for younger Veterans. Individuals with Substance Use Disorder and Serious Mental Illness diagnoses were more likely to report tobacco use, but psychiatric diagnoses did not predict change in use over time. **Conclusion:** These findings demonstrate factors that potentially contribute to changes in tobacco use during a public health crisis and may help guide future cessation and relapse prevention efforts.

PS3-106

SMOKING CESSATION AMONG PSYCHIATRIC AND SUBSTANCE USE PATIENTS WITH COMORBID OPIOID USE DISORDERS A REVIEW

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BACKGROUND. The rate of cigarette smoking is high among individuals with psychiatric illness and substance use compared to the general population. Individuals living with a psychiatric illness also experience high rates of opioid use disorders, with about 90 percent of opioid-dependent patients smoking cigarettes, a rate almost **six** times that of the general population. Cigarette smoking among psychiatric and substance use patients with comorbid opioid use disorders is a public health concern. This review examines smoking cessation interventions among psychiatric and substance use patients with opioid use disorders. **METHODS.** We used narrative overview guidelines to search PubMed and PsycINFO for intervention studies published between 1960 and 2020. Studies used in this review study must have comprised participants with a psychiatric or substance use diagnosis with comorbid opioid use disorders. Search term examples included: smoking cessation among psychiatric patients, opioid use among psychiatric patients, smoking cessation and opioid use, smoking cessation in substance use settings, and mental health. **RESULTS.** Based on the inclusion and exclusion criteria, ten studies were used. Participants in the studies were 50-60 percent male and smoked at least 10 cigarettes per day. Individuals with severe mental illness or substance use were generally excluded in cessation programs. Treatment periods were generally 8 weeks long and included behavioral and pharmacological interventions. One study reported an 8.6 percent cessation among participants. Opioid-maintained clinics have populations such as methadone-maintained patients and are prime locations for smoking cessation interventions among this population with comorbid psychiatric and substance use diagnoses. **CONCLUSION.** Despite high smoking rates among patients with intersecting diagnoses of psychiatry or substance use and opioid use disorders, interventions are rare to help them quit. This population with comorbid diagnoses is generally excluded from smoking cessation interventions. A need therefore exists for evidence-based smoking cessation interventions tailored to this unique vulnerable population.

PS3-107

CHARACTERIZING USER-REPORTED APPEAL AND SENSORY ATTRIBUTES OF 10 DIFFERENT FLAVORED E-CIGARETTE SOLUTIONS IN A HUMAN LABORATORY EXPERIMENT

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Significance: Characterizing the flavor of various e-cigarette solutions is challenged by the hundreds of different e-cigarette products available on the market and the thousands of unique chemical flavoring constituents used. Controlled administration of flavored e-cigarette products under double-blind conditions can be used to isolate the effects of flavorings on the appeal and sensory qualities of different e-cigarette solutions. Methods: Nicotine/tobacco product users (N=119) self-administered standardized puffs of 10 different e-cigarette flavors, including 2 fruit, 2 dessert, 2 menthol, 2 mint, and 2 tobacco flavored solutions. After puffing each solution, participants rated appeal and 5 sensory attributes (sweetness, bitterness, smoothness, harshness, coolness) (0-100 scale). Multi-level models calculated the difference in appeal and sensory attributes of each flavor relative to the mean ratings of the 9 other flavors. The constituent composition of the study e-cigarette solutions was empirically determined using gas chromatography and mass spectrometry. Results: Constituent analyses revealed that certain constituents were used in different flavors from distinct flavor categories (e.g. vanillin was found in solutions with fruit, dessert, and tobacco characterizing names). Strawberry was the most appealing flavor (B=7.07), followed by, in order of relative appeal, Vanilla (B=6.29), Peppermint (B=5.57), Menthol (B=2.24), Green Apple (B=1.71), Spearmint (B=-1.07), Koolada (B=-2.03), Subtle Tobacco (B=-4.59), Full Flavored Tobacco (B=-6.16), and Dark Chocolate (B=-9.00). Vanilla yielded the highest sweetness ratings (B=14.44). Full Flavored Tobacco (B=-8.34) and Subtle Tobacco (B=5.69) ranked highest in bitterness and harshness, respectively. Peppermint scored highest in smoothness (B=6.98) and coolness (B=29.25). Conclusions: The 10 flavored e-cigarette solutions tested produced a diversity of different appeal and sensory profiles. In general, higher ratings of appeal aligned with higher-than-average ratings of sweetness, smoothness, and coolness, while lower ratings of appeal were associated with higher ratings of bitterness and

harshness. The characterization of e-cigarette flavors based on appeal and sensory qualities can complement other descriptors (i.e., flavor names, flavoring constituents) and may be a useful paradigm to inform future flavored e-cigarette product regulation.

PS3-108

THE IMPACT OF COVID-19 ON HOSPITAL-BASED TOBACCO CESSATION SERVICES IN MUMBAI, INDIA

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Background: LifeFirst, a tobacco dependence treatment programme is implemented in healthcare settings like hospitals and primary care facilities providing cessation service to the lower socioeconomic section of the society in Mumbai, India. The COVID-19 pandemic resulted in challenges in implementation of the service due to the lockdown and other restrictions affecting the tobacco users along with changing hospital priorities. We aim to compare the characteristics of patients registering for cessation and their cessation-related behaviour before and during the COVID-19 pandemic. **Methods**: Before the pandemic, LifeFirst protocol included a detailed, in-person first counselling session, with six follow-ups conducted telephonically over six months. As an adaptation to the pandemic, counselling services were converted to completely-telephonic instead of in-person first-session by the counsellors (after receiving referrals from the same health-care settings, screening and consent process). Enrolment and follow-up data of patients registered one year before the pandemic (April 2019 to March 2020) was compared to one year of modified implementation during the pandemic (April 2020 to March 2021). **Observations**: 1. Enrolment of tobacco users for tobacco cessation counselling in the same healthcare facilities has reduced from 689 to 297 in COVID period. 2. Daily expenditure on tobacco products has increased by 30%. 3. Patients' adherence to LifeFirst counselling follow-up improved. Proportion of cases lost to follow-up reduced to 5% from 13%. 4. 7-day point prevalence abstinence (PPA) at six months increased from 63% to 78%. **Conclusion**: COVID-19 has resulted in decreased proportion of smokers among all enrolled tobacco users. Patients who enrol for cessation have higher adherence and abstinence rates. While these findings may be due to awareness of association of tobacco use, particularly smoking, with COVID-19; utilisation of and access to cessation services has reduced during the pandemic. Awareness about this association should be further strengthened and restrictions on tobacco use should be implemented. Awareness about referral to cessation services among providers is essential.

PS3-109

LONGITUDINAL TRAJECTORIES OF NICOTINE PRODUCT USE IN ADOLESCENTS IN THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY

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Significance: Adolescent polytobacco use (PTU) is a significant public health concern. Much remains unknown about the patterns of multiple tobacco product use in youth and about the role of socioecological factors in the progression in use of multiple tobacco products. The PATH data is a nationally representative survey that provides the unique opportunity to identify patterns of PTU and correlated risk factors. **Methods:** Data were drawn from the 10,086 youth (ages 12-17) with longitudinal weights available at Waves 2 - 4. Outcome variables were days of use of four tobacco products: cigarettes, e-cigarettes, cigars and smokeless tobacco. Predictors collected at Wave 1 included sociodemographic factors, impulsivity measures, internalizing and externalizing symptoms, rules about tobacco use at home, tobacco accessibility and exposure to advertising. Multitrajectory latent class growth analysis was used to identify distinct subgroups with similar patterns of use over time. Multinomial logistic regression models were used to investigate predictors of class membership. Weights were used to account for the complex survey design. **Results:** We identified six trajectory classes: "Non-user all products" (78.2%), "Experimenter all products" (9.8%), "Increasing e-cigarette use" (4.0%), "Increasing combustible product use" (3.3%), "Decreasing combustible products and e-cigarette use" (3.2%) and "Consistent smokeless tobacco use" (1.6%). The older age cohort (15-17 years old), males, non-Hispanic whites, adolescents with externalizing problems, exposure to tobacco advertising, relaxed rules about tobacco use at home and other person tobacco use at home were more likely to be classified in the use classes. Very difficult access to tobacco was associated with lower odds of membership in the "Increasing combustible product use" class. **Conclusion:** The results highlight the

heterogeneity of longitudinal pathways of multiple tobacco product use in adolescents in the US. Understanding changes in use patterns and associated risk factors provides targets for regulatory policies as well as prevention programs directed at Youth.

PS3-110

TOBACCO INDUSTRY DENORMALIZATION BELIEFS IN RELATION TO USE OF HEATED TOBACCO PRODUCTS IN HONG KONG ADULTS

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Significance: Cigarette smokers are known to have weaker tobacco industry denormalization (TID) beliefs. However, the association of heated tobacco products (HTP) use with TID beliefs is unclear. **Methods:** A total of 8090 participants (weighted age of 47.6 (SD 17.4) years, 52.8% male) from a household survey (n=7090) and a smoking hotspot survey (n=1000) reported their cigarette and HTP use status. TID beliefs were measured by four random items with each having a 50% chance of being used. The items included: (1) the tobacco industry (TI) tries to hide and downplay the dangers of smoking; 2) the TI tries to get youth to smoke; 3) the TI lies; and 4) the TI takes people's lives for money. Overall perception towards the TI was assessed using a 0-10 Likert scale, with higher scores indicating stronger negative perceptions. The association of ever HTP use with the above beliefs and perception were examined using logistic regression in cigarette smokers and non-smokers. **Results:** The weighted proportions of agreement for the TID items ranged from 39.8% (TI takes people's lives for money) to 75.8% (TI hides and downplays the dangers of smoking). The mean score of the overall perception towards the TI was 7.4 (SD 2.2). In non-smokers, having one more TID belief and a higher score of overall negative perception towards the TI were reversely associated with ever HTP use (adjusted odds ratio: 0.62, 95% confidence interval: 0.51-0.75; and 0.75, 0.69-0.81). By contrast, in current smokers, a higher score of negative perception towards the TI was associated with 21% higher odds of ever HTP use (1.21, 1.15-1.27). **Conclusion:** Hong Kong adults in general had a negative perception towards the TI. TID beliefs were reversely associated with ever HTP use in non-smokers, but stronger negative perception towards the TI was associated with ever HTP use in current smokers. Whether TID beliefs would predict HTP use in cigarette smokers should be examined using prospective studies.

PS3-111

CHALLENGES OF RECRUITING RURAL ADOLESCENTS TO PARTICIPATE IN E-CIGARETTE RESEARCH

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Significance: Adolescents have been leading adopters of e-cigarettes, and the potential harms of their e-cigarette use are significant. Patterns of e-cigarette use by rural adolescents are still unclear, and rural areas have fewer resources for tobacco control. **Methods**: Our research aims to engage rural adolescents in qualitative research to map the context(s) of e-cigarette use with the intent to identify contexts amenable to intervention. Over the past two years, we have found enrolling rural adolescents in Iowa to be challenging. Our recruitment strategies evolved from working with school systems to contacting youth-serving organizations, and then expanding to a larger audience using the mass email system at the University of Iowa. **Results**: This presentation uses Bronfenbrenner's Ecological Systems Theory to frame the various challenges we faced at the micro, meso, exo, macro and chrono systems in order to inform future research with rural adolescents, an important but hard-to-reach population. In the exosystem, and unique to the timing of our work, the COVID-19 pandemic affected all aspects of our research including recruitment and data collection strategies. The environmental disaster of the August 2020 inland hurricane (i.e., Derecho) further reduced community capacity to engage in research, particularly in rural areas. At the meso level, school principals we contacted in 2020 were overwhelmed with the pandemic response and prioritizing student wellbeing and learning; we received little response. We then reached out to youth-serving organizations in 2021 also with little success; given our rural focus, some of these organizations were deep in the planning for state agriculture fairs, leaving little bandwidth for other topics. We consider the IRB to also be part of the meso system: our IRB required active parental consent for this research, which impeded our ability

to 'speak' directly to youth. The micro system consists of the adolescents themselves. **Conclusion**: Innovative tools are needed to reach rural adolescents, however for them to work, ethical review boards must shift their paradigm to accommodate out-of-the-box methods for minors, particularly when exploring stigmatized behaviors like e-cigarette use. This presentation will describe our challenges in more depth, providing insight for teams endeavoring to do this work.

PS3-112

EVALUATING & DEVELOPING TOBACCO HARM REDUCTION STRATEGIES AMONG SMOKERS IN KATHMANDU, NEPAL

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Background: Tobacco harm reduction refers to strategies designed to reduce the health risks associated with tobacco smoking but which may involve the continued use of nicotine. The ultimate aim of the action, research is to establish tobacco harm reduction clinics in densely populated cities of Nepal. Methods: Action research includes key in-depth interviews focus group discussions, transient walks, and stakeholder analysis was done to evaluating & developing tobacco harm reduction strategies among smokers in Nepal. The participants involved in this study are slum dwellers, students, public health experts, and stakeholders of Kathmandu, Nepal. Results: Most of the participants are positive about the use of ANDS products. They stated that it is not possible to stop the use of tobacco products without safer alternatives. Therefore, it is wiser to offer an alternative product that would reduce harm. They mentioned that ANDS products must be easily and sufficiently available in the market at an affordable price. Stakeholder analysis shows that the National health education information and communication center, local governments and advocacy organizations should have managed closely for the establishment of tobacco harm reduction clinics. Conclusions: The findings show it is urgent to think about tobacco harm reduction. Smokers are searching for safer alternatives. Most of the participants mentioned e-cigarette should be made sufficiently available in the market at an affordable price. For instance, the establishment of tobacco harm reduction clinics will benefit more to solve the problems for smokers. Keywords: ANDS products; Electronic cigarettes; Nepal; Tobacco harm reduction

PS3-113

SELF-REPORTED ELECTRONIC CIGARETTE DEVICE AND LIQUID CHARACTERISTICS- INACCURACIES AND INCONSISTENCIES

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Background: Electronic cigarette (ECIG) technology, and the language used to describe it, continues to evolve. Reliance on users' self-reports of their device/liquid characteristics requires that those reports be accurate and consistent with terminology used by researchers. This study compared the classification of device/liquid characteristics between users' self-reports and product pictures. **Methods:** Participants (N=134) reported daily use of a nicotine-containing ECIG for at least 3 months. They answered questions (yes/no/don't know) about their individual ECIG characteristics (e.g. disposable, refillable). They also chose the term that best described their device (cigalike, pen, mod, pod) and the picture that best resembled their device (cigalike, pen, box mod, USB-shaped pod, teardrop-shaped pod, none of the pictures). Respondents provided a picture of their device/liquid, which was used by independent raters to classify products according to these same features. Agreement was examined with Cohen's kappa (k). **Results:** Agreement was excellent for individual features of refillable (k=.94) and disposable (k=.83); good for adjustable power (k=.68); and poor for nicotine salt (k=.18). Incorrect responses were provided by 12.6% and 19.3% of participants for adjustable power and nicotine salt, respectively. Also, 31.1% provided a "don't know" response for nicotine salt. Agreement was moderate for questions that probed "picture that resembles device" (k=.44) and "term used to describe device" (k=.51). Nearly 15% of participants said that none of the pictures resembled their device; raters classified the devices as pens (5.2%), box mods (15.8%), and USB-shaped pods (74.7%). For participants who chose the term "pen" (24.3%) or "mod" (20.6%) to describe their device, raters classified their devices as a "pod" (73.1% and 22.7%, respectively) using the same terms. **Conclusions:** Findings highlight ECIG users' lack of knowledge about certain product characteristics,

and discrepancies between how products are described and viewed by users versus researchers. Surveillance efforts may be improved by supplementing users' self-reports with pictures of their device/liquid.

PS3-114

CHARACTERIZING YOUNG ADULT ELECTRONIC NICOTINE DELIVERY SYSTEM USERS

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Significance. Despite the increasing popularity of Electronic Nicotine Delivery Systems (ENDS), research is lacking on patterns of young adult current (i.e., past 30-day) ENDS use. The aim of this study was to examine classes of young adult current ENDS users and determine common characteristics of these classes among a cohort of young adults in Texas. *Methods.* Participants were 463 young adults aged 19-31 years, who were drawn from wave 4 (April-May 2016) of the Marketing and Promotions across Colleges in Texas project (Project M-PACT), which collected data every 6 months beginning November 2014 to February 2015 from a larger cohort of college students across Texas. Latent Class Analysis with six indicator variables, which are, 1) self-identifying as a social ENDS user, 2) frequency of ENDS use, 3) ENDS nicotine dependence symptoms, 4) binge alcohol use, 5) marijuana use, and 6) current cigarette use, was used to discern classes of young adult current ENDS users. Other tobacco use and socio-demographics were examined as covariates contributing to the membership within various ENDS user classes. *Results.* Findings identified three distinct classes of users, including non-nicotine dependent social ENDS users, high-risk poly-tobacco and substance users, and nicotine dependent ENDS users. *Conclusion.* Results underscore the heterogeneity among young adult current ENDS users and the need for development of distinct tobacco control messaging and intervention strategies tailored to different sub-groups of young adult ENDS users.

PS3-115

RACIAL/ETHNIC DISPARITIES IN MENTHOL CIGARETTE SMOKING, UNITED STATES, 2004-2019

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Significance: Menthol use promotes youth and young adult smoking initiation and hinders successful cessation. Black persons have disproportionately high menthol cigarette use, but studies suggest rising use among other race/ethnic groups until 2014. Contemporary data on racial/ethnic differences in menthol cigarette smoking are unknown. **Methods**: Annual nationally representative cross-sectional data from the National Survey on Drug Use and Health from 2004 to 2019 were pooled to estimate 4-year (2004-2007; 2008-2011; 2012-2015; 2016-2019) menthol cigarette smoking prevalence by age-group (adolescents, 12-17 years; young adults YAs, 18-25 years; adults, 25-34, 35-49, 50+ years) and race/ethnicity (persons who identify as White; Black; American Indian/Alaska Native, AI/AN; Native Hawaiian/Pacific Islander, NH/PI; Asian; Hispanic; or more than one race). Adjusted logistic regression models were used to assess differences and polynomial temporal trends in menthol cigarette smoking by age-group and race/ethnicity. **Results**: Menthol smoking prevalence declined (linear and quadratic p<0.001) particularly from 2012-2015 in adolescents (2004-2007:4.5%, 2008-2011:4.2%; 2012-2015:2.7%; 2016-2019:1.4%) and YAs (13.5%, 15.3%, 14.5%, 10%), with similar trends across race/ethnic groups except for AI/AN YAs (13.9%, 18.8%, 20.8%, 15.1%). Among adults, menthol smoking increased among AI/AN persons aged 35-49 years (4.8% to 13%); White (7% to 11.1%) and Hispanic (8.3% to 10.4%) persons aged 25-34 years; but declined quadratically among Black persons aged 25-34 (24%, 28%, 28%, 22%) and 35-49 (26%, 22%, 21.7%, 20.4%) years. While Black persons had higher prevalence relative to most other groups in 2004-2007, by 2016-2019 there was no prevalence difference between AI/AN and Black persons in 18-24 years (14.8% and 12% respectively) and 25-34 years (21.8% and 20.3%). Among persons who smoke, the largest absolute and relative increase of menthol smoking over the study period was among AI/AN (25% to 35%), NH/PI (47% to 69%), and Hispanic persons (32% to 47%), while remaining the highest and stable in Black persons (81% to 85%). **Conclusion**: Despite declines in most age-groups, menthol smoking in Black persons continues to be 2-to-5 times higher than other race/ethnic groups overall. However, there is a shifting

burden in use to AI/AN YAs and middle-aged adults. These disparities reinforce the importance of the Food and Drug Administration's planned policy to ban all-flavored tobacco products, including menthol cigarettes.

PS3-116

PATTERNS OF EXCLUSIVE AND DUAL ENDS USE AMONG US ADULTS

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While most individuals mature out of the peak use of substances (including Electronic Nicotine Delivery Systems (ENDS)) after young adulthood, some remain at risk or progress to problematic use in adulthood (e.g., Chassin et al., 2004; Sher et al., 2011). As problematic substance use contributes to numerous public health burdens (e.g., Miller, 2008; Whiteford et al., 2013), understanding the use patterns over the life course is a critical public health issue. The ENDS use has notably increased in recent years, however, our understanding of the ENDS use among middle-aged adults is limited. We investigate the prevalence of ENDS use with cigarette smoking by age. Data were from the Public-Use Files from the Population Assessment and Tobacco and Health (PATH) Study downloaded from the National Addiction and HIV Data Archive Program (NAHDAP) (https://www.icpsr.umich.edu/web/NAHDAP/series/606). Analyses included Wave 4 of the PATH Study data from 8,132 individuals who reported using ENDS and/or cigarettes but no other tobacco products. Exclusive ENDS users included currently established (regularly using any ENDS in the past and some days/every day) or experimental users (not using ENDS regularly in the past, but using some days/every day) (9.0%). Exclusive cigarette smokers included currently established (smoking 100+ cigarettes lifetime and smoking some days/every day) and experimental smokers (smoking <100 cigarettes lifetime, but smoking some days/every day) who did not use ENDS (80.0%). Dual users included respondents who reported current established/experimental ENDS use and current established/experimental cigarette use (11.0%). Survey-weighted multinomial logistic regression models show that middle-aged adults (aged 35-54) were less likely than young adults (aged 18-34) to be exclusive ENDS users (Relative Risk Ratio [RRR]=0.43, p<.001) and were more likely than older adults (aged 55+) to be dual users (RRR=1.96, p<.001), both compared to exclusive cigarette smoking. Our findings show that the risk of dual use (ENDS use with conventional cigarette smoking) among middle-aged adults may appear similar to that of young adults, which warrants further attention to the group.

PS3-117

THE ASSOCIATION OF SOCIAL AND FINANCIAL SUPPORT WITH SMOKING CESSATION IN A SAMPLE OF SURVIVORS OF INTERPERSONAL VIOLENCE

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Significance: Tobacco use, particularly smoking cigarettes, is a leading cause of morbidity and mortality worldwide. Existing literature has shown that there is a correlation between interpersonal violence (IPV) victimization and cigarette smoking. IPV is a leading public health concern that affects a broad range of women in diverse socioeconomic and ethnic groups. It has been estimated that 4% to 23% of all women in the United States have been victims of IPV. Few studies address the social determinants of health associated with smoking cessation among women who have suffered from IPV. The primary objective of this secondary data analysis is to understand if social and financial support are associated with willingness to quit smoking. The secondary objective is to understand if, in the presence of social support, depression and anxiety are associated with willingness to quit smoking. *Methods:* The sample comprises of 232 individuals with a recent self-reported incident of IPV and at least mild depression (phq-9 score >=5). Chi square tests were performed with race, ethnicity, sexual orientation, education and income level to investigate whether any of these variables are associated with willingness to quit smoking (Y/N). T-tests were performed to investigate whether social support, financial support, anxiety or depression were associated with willingness to quit. Finally, logistic regression was performed on willingness to quit smoking with social support, anxiety, depression and relevant covariates. *Results:* Out of 232 patients with reported IPV, 98 individuals (42%) identified as smokers. Of these, 35 (36%) expressed willingness to quit smoking, indicating no association between anxiety and depression and a willingness to quit smoking in this sample. There was not a statistically significant association between those who were willing to quit smoking (vs. those who were not) on self-reported social support. *Conclusion:* This study provides some insights into barriers to tobacco cessation in survivors of IPV. The rates for willingness to quit smoking are much lower than the national average, which may indicate an opportunity to increase outreach to and information for this group. Ongoing research on nicotine addiction in survivors of interpersonal violence is needed.

PS3-118

NORTH AMERICAN QUITLINE CONSORTIUM VAPING CESSATION RESOURCES AUDIT

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Significance: Vaping (e-cigarette use) among youth has reached epidemic proportions despite steady declines in traditional smoking. Research increasingly indicates that many of the appealing vaping product flavorings are toxic, but dissemination of these harms remains limited. More resources for vaping cessation are needed to combat this epidemic of nicotine addiction among youth. Currently, there are additional concerns that e-cigarette users may be at greater risk for succumbing to Covid-19, which is an acute respiratory disease that attacks the lungs. **Methods:** Previous studies have focused on examining all NAQC (North American Quitline Consortium) member "quitsites" to identify and characterize information pertaining to vaping cessation across all 50 U.S. states, all 13 Canadian provinces, 3 U.S. territories and Washington D.C. The quitlines were also thoroughly examined to determine whether or not quit sites provide information about COVID-19 concerns in relation to vaping. The present study further analyzed the NACQ quitsites to identify updates to information and resources related to vaping cessation. **Results:** Although many quitsites presented information on the harms of vaping (76%), not enough include messaging to indicate that flavors are harmful (27%) or recommended speaking to a health care provider (41%). Further updates to these results will be presented in the poster. **Conclusion:** Ongoing research is needed to track this trend, however, there is an increase in the number of quitsites that include information on the harms of vaping (and specifically vaping flavors) and resources for vaping cessation was observed. Next steps may include creating tailored guides for individual quitlines for updates of their quitsites. Supported by National Cancer Institute (NCI) and the (FDA) # U54CA228110.

PS3-119

THE RETURN TO NORMALCY- CONCERNS ABOUT RETURNING TO WORK ASSOCIATED WITH COVID-19

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Background: The pandemic resulted in challenges to Tobacco Centers of Regulatory Science (TCORS) trainees and early/junior/new (EJN) investigators, including lab shutdowns, movement to remote research and learning, and needs to juggle remote and changing work situations with personal and logistical concerns. Similarly, return to on-site work may raise concerns. This analysis focuses on the latter, as institutions began resuming on-site research and training. **Methods:** Data were collected using a REDCap survey that was distributed to 202 TCORS trainees and EJN investigators through the Center for Coordination of Analytics, Science, Enhancement, and Logistics (CASEL) from April 5 - May 10, 2021. Qualitative and bivariate analyses were conducted to assess concerns about returning to work and the COVID-19 vaccine. **Results:** The 54 respondents (26.7% response rate) included 14 graduate students, 19 postdocs, and 21 EJN investigators. About one third of graduate students (35.7%) and postdocs (36.8%) reported concerns about returning to work. Most graduate students had returned (61.5%) while most postdocs had not (61.1%). Over half of EJN investigators expressed concerns about returning to work (57.9%), and most had not returned (68.4%). Significantly more trainees and EJN investigators doing lab and data research returned to work. Common themes for concerns about returning to work included increased risk of exposure from resuming taking public transportation and returning to an enclosed environment, and losing productivity. Concerns did not significantly differ by change in work environment (e.g., moving from remote to in-person), by institutional reopening, type of research, vaccine access or gender identity. 20.4% reported concerns about the vaccine with the most common themes related to short and long-term vaccine effectiveness. **Conclusion:** COVID-related restrictions have redefined work environments.

A meaningful percentage of trainees and EJN investigators expressed concerns about returning to on-site work, particularly regarding personal safety and productivity loss. Recognizing and addressing concerns are important for supporting career development of this cohort of trainees and investigators.

PS3-120

POSITIVE AFFECT AND MULTIPLE TOBACCO PRODUCT USE AMONG YOUTH: A 3-YEAR LONGITUDINAL STUDY

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Objectives: Multiple tobacco product (MTP) use is common among adolescent tobacco users. Low positive affect is a risk factor for e-cigarette use and combustible tobacco smoking. We examine the longitudinal relationship between positive affect and MTP use among a diverse cohort of adolescents in Texas. **Methods:** We analyzed six waves of biannual data (Fall 2014-Spring 2017) from the Texas Adolescent Tobacco and Marketing Surveillance (TATAMS) system. Participants were n=3,868 6th, 8th, and 10th grade students in urban Texas, at enrollment. Multinomial logistic regression models examined longitudinal associations between positive affect score (range: 1-5; low-high) and categories of MTP use (non-users, single products users, dual-users (2 products), and poly users (3 or more products) of five tobacco products: cigarettes, e-cigarettes, hookah, cigars, and smokeless tobacco. Data were aggregated across six waves such that 3,868 participants provided 17,348 total observations. Models controlled for sex, race/ethnicity, past 30-day alcohol use, cohort, survey wave, and peer tobacco use. All variables were assessed and analyzed at each wave (i.e., time-varying), except sex and race/ethnicity, and cohort which were time-invariant. **Results:** The sample was 4.6% single product users, 1.7% dual users, and 0.7% poly users. Each unit decrease in positive affect was associated with increased risk for single (RRR: 1.29; 95%CI: 1.16-1.44), dual (RRR: 1.35; 95%CI: 1.11-1.64), and poly (RRR: 1.98; 95%CI: 1.54-2.54) tobacco use, relative to non-use. Similarly, each unit decrease in positive affect was also associated with increased risk for poly tobacco use (RRR: 1.53; 95%CI: 1.19-1.97) and (RRR: 1.47; 95%CI: 1.11-1.95), relative to single and dual use, respectively. **Conclusion:** We observed a gradient relationship between low positive affect and greater number of tobacco products used. Findings reinforce the association between poor mental health and tobacco use during adolescence. Tobacco prevention efforts should incorporate methods of addressing low positive affect, for example, activities that increase positive emotions like physical activity.

PS3-121

A SUBSTANTIAL PROPORTION OF YOUNGER ADULTS ENDORSE EVER USE OF FLAVORED DISPOSABLE POD DEVICES

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Significance: Pod devices are the most recent "fourth generation" of electronic vaping products (EVPs). In 2018, the United States Food and Drug Administration (FDA) passed regulations prohibiting flavors in pod devices other than tobacco, mint, or menthol. However, these regulations applied only to rechargeable pod devices. In 2019, disposable pod devices, sold in a wide variety of flavors, appeared on the market in the U.S. in an apparent response to this FDA rechargeable pod device flavor ban. To date, there are no published survey studies that have queried specifically about use of disposable pod devices. **Method:** The current study utilized a cross-sectional design with a sample of 634 younger adults (18-35) residing in the U.S. (Mean age 29.6; 48.6% female; 77.9% Non-Hispanic White). Data was collected in May of 2021 using Amazon's Mechanical Turk. Participants were queried about disposable pod device knowledge/awareness, ever use, 30-day use, specific brands/models used, flavor most used, and reasons for use. Never users were asked about susceptibility to future use. **Results:** A substantial 48.1% of participants endorsed knowledge/awareness of disposable pod devices, 27% of the sample reported ever use, and 44.6% of ever users endorsed past 30-day use. For ever users, the three devices used most commonly were Puff Plus (38.5%), Puff Bar (35.5%), and Puff Nano (20.1%). The most commonly endorsed reason for disposable pod use was availability of flavors (40%), and the two most frequently used flavor categories were fruit (30.3%) and sweet flavors (15.4%). Among never users, 55.1% were categorized as susceptible to future use. **Conclusion:** It appears that the FDA regulation banning flavors in rechargeable pod devices was quickly followed by the introduction of disposable pod devices to the market. Nearly half of young adults in the current sample were aware of disposable pod devices, 27% of participants were lifetime users, the most cited reason for use was availability of flavors, and over half of never users were susceptible to future use. These results suggest that the FDA consider taking immediate action to ban flavored disposable pod devices from the market.

PS3-122

MONITORING THE TREND OF THE U.S. SMOKING CESSATION RATE AND ITS IMPLICATION FOR FUTURE SMOKING PREVALENCE

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Objectives: To calculate the adult smoking cessation rate for the 2014-2019 period using NHIS and NSDUH prevalence data and compare it to the previously estimated cessation rate for 2008-2013 and the projected value for 2014-2019 derived from extending the 1990-2013 estimated trend. **Methods:** We repeated the analysis presented in the 2017 article by Mendez et al., extending the analysis period to 2019. As in the previous work, we employed data from the National Health Interview Survey (NHIS) and the National Survey on Drug Use and Health (NSDUH) to estimate the adult cessation rate in six-year intervals. We used weighted non-linear least squares to perform the estimation. We then employed a meta-regression model to test whether the cessation rate has increased beyond expectations. **Results:** The annual cessation rate has increased 29% (from 4.2% in 2008-2013 to 5.4% in 2014-2019) according to the NHIS data, and 33% (from 4.2% in 2008-2013 to 5.6% in 2014-2019) according to the NSDUH data over the last six years. The increase in cessation was significant according to the meta-regression results (significant positive slope, p-value = 4.63×10^{-7}). Our results also show that the increase in cessation between 2008-2013 and 2014-2019 is responsible for 60% of the extra fall in prevalence. The remaining 40% can be attributed to the decrease in the initiation rate between those periods. **Conclusions:** The smoking cessation rate in the U.S. continued to increase during 2014 - 2019. Our NHIS and NSDUH results are practically identical, making it very unlikely that our findings are a product of chance. The larger share of prevalence drop (60%) during 2014-2019 can be attributable to the increased cessation, which is encouraging since the positive health effects of cessation happen much sooner than those derived from a decrease in initiation. Going forward, that upward trend of the smoking cessation rate suggests that the CDC Healthy People goal of 5% adult smoking prevalence in 2030, while still ambitious, is attainable.

PS3-123

THE IMPORTANCE OF PEER IMITATION ON SMOKING CESSATION OVER TIME - A DYMANICAL SYSTEMS APPROACH

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A recent Institute of Medicine Report calls for explicit modeling of smoking initiation, cessation, and addiction processes. We introduce a model of smoking initiation that explicitly teases out the percentage of initiation due to social pressures, which we call "peer-imitation," and the percentage due to other factors, such as media ads, family smoking, and psychological factors, which we call "self-initiation." We propose a dynamic non-linear behavioral contagion model of smoking initiation and employ data from the National Survey on Drug Use and Health (NSDUH) to estimate the relative contributions of imitation and self-initiation to the overall smoking initiation process. Although the percentage of total smoking due to peer imitation has been trending downward over time, it remains higher than the percent due to self-initiation. This suggests that targeting peer-pressure spread would be more effective than targeting self-initiation spread in anti-smoking campaigns. We discuss possible implications for interventions and the spread of e-cigarettes.

PS3-124

USER CHARACTERISTICS, E-CIGARETTE AND COMBUSTIBLE CIGARETTE USE, AND NICOTINE INTAKE AMONG POD-MOD USERS IN THE SAN FRANCISCO BAY AREA

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Aim: To describe demographic characteristics, e-cigarette use patterns, tobacco cigarette use, and nicotine intake among users of pod-mods. **Method:** One hundred (n = 100) pod-mod users (64% male, 71% in the 18-34 age group, 45% white) participated in an observational study in the San Francisco Bay Area in 2019-2020. Before the COVID pandemic, questionnaires were administered, and urine samples were collected at a research facility. During the pandemic, participants completed the questionnaires at home and samples were picked up by research personnel. Total nicotine equivalents (TNE) and total NNAL were measured by LC-MS/MS. Descriptive statistics were computed for the full sample, across pod-mod types, flavor types, nicotine concentration of e-liquid and other variables. **Results:** Of the 100 participants enrolled, 59 used JUUL, 13 used Puff Bar, and 28 used other brands of pod-mods. Participants' most-often-used flavors were fruit (40%), tobacco (30%) and menthol/mint flavors (30%). Participants used e-cigarettes an average of 25.5 (SD = 6.3) days a month, 10.2 (SD = 14.2) times a day, used <1 pod/cartridge per day (77%) and 1-2 pods/cartridges per week (40%). Number of times e-cigarette used per day and the number of days vaped in the last 30 days were correlated with TNE (Spearman correlation coefficient 0.42, p<0.001 and 0.55, p<0.001 respectively). In multivariate analysis, e-cigarette brand (JUUL vs Non-JUUL), number of pods/cartridges per day (<1 vs 1+), days vaped in the last 30 days and total NNAL levels were all significantly associated with TNE levels. Self-reported CPD was not found to be predictive of TNE. Average TNE levels for nonsmoking pod-mod users (i.e., NNAL ≤ 10 pg/mg creatinine as a cutpoint) were significantly lower than that of pod-mod users who smoke (dual users) (NNAL >10 pg/mg creatinine) (TNE of 38.1 (95% CI 31.8-44.5) nmol/mg creatinine vs 45.7 (95% CI 40.7-50.8) nmol/mg creatinine). **Conclusions:** Predictors of daily nicotine intake among pod-mod users include number of times e-cigarettes are used during the day, number of pods vaped, and days vaped in the past 30 days. These measures can be included in instruments to better understand pod-mod use and nicotine intake in the general population.

PS3-125

THE ASSOCIATION BETWEEN NICOTINE DEPENDENCE AND THE DESIRE TO QUIT, MOTIVATION TO CHANGE, QUIT ATTEMPTS, AND BARRIERS TO TOBACCO TREATMENT AMONG SAUDI SMOKERS

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Background: Saudi Arabia has a higher smoking prevalence (19.2%) in comparison to the global prevalence of smoking (17.0%). Despite the advancement in tobacco control and smoking treatment services in the country, tobacco smoking remains challenging especially among hardcore smokers. Our purpose, therefore, was to assess how nicotine dependence among Saudi smokers is associated with the desire to quit, motivation to change, quit attempts, and barriers to tobacco treatment.**Method**: In a cross-sectional study, 518 current tobacco smokers answered questions related to nicotine dependence (Fagerstrom Test For Nicotine Dependence), desire to quit in the future, motivation to change (The Motivation to Change Scale), and barriers to tobacco treatment. Linear regression was tested to assess how nicotine dependence among smokers associates with desire to quit, motivation to change, quit attempts, and barriers to tobacco treatment. **Results**: Nicotine dependence was significantly associated with lower motivation to change (β = - 0.197, t = - 3.308, p ≤ 0.005) and fewer barriers to tobacco treatment (β = - 0.501, t = 9.384, p ≤ 0.005). Desire to quit tobacco smoking (β = - 0.002, t = - 0.034, p = 0.973) and quit tobacco smoking in the past (β = - 0.023, t = - 0.427, p = 0.670) were not significantly associated with nicotine dependence among Saudi smokers. Gender, age, educational attainment, income, and occupational status were controlled as covariates in the model.**Conclusion**: We revealed that nicotine dependence among Saudi smokers affects the degree to which smokers are motivated to change and perceive the barriers of tobacco treatments. Tobacco treatment services in Saudi Arabia have been disseminated every smoker; however, *hardcore smokers* remain unlikely to change even if they perceive lower barriers to tobacco treatment services. Tailored tobacco treatment and behavioral intervention might be a key to increase the motivation to change among hardcore smokers.

PS3-126

IQOS KNOWLEDGE/AWARENESS, PERCEIVED HARM, PERCEIVED ADDICTIVENESS, USE, AND SUSCEPTIBILITY IN YOUNGER ADULTS IN THE UNITED STATES

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Significance: Heated tobacco products (HTPs) are battery operated and heat tobacco rather than combusting it to create an aerosol vapor. IQOS was approved by the U.S. Food and Drug Administration (FDA) for sale in the United States in 2019 and is currently available for sale in four states: Georgia, Virginia, North Carolina, and South Carolina. However, the national launch of IQOS has been hampered by COVID as well as a patent-infringement lawsuit. The published survey research in the U.S. assessing use and susceptibility to future IQOS use is hampered by design limitations such as survey questions about HTPs in general rather than IQOS specifically and samples gathered from single states in the U.S. **Method:** The current observational, cross-sectional study used Amazon's Mechanical Turk for data collection, which occurred in May of 2021. The sample consisted of 127 United States younger adults aged 18 to 35 (Mean age 29.7; 48% female; 81.9% Non-Hispanic White). Participants were provided a picture and text description of IQOS, then were surveyed about IQOS knowledge/awareness, perceived harm, perceived addictiveness, and use. Never users were assessed for susceptibility to future use. **Results:** A total of 29.1% of participants reported IQOS knowledge/awareness. A substantial 24.6% of the sample endorsed IQOS lifetime use, with 67.7% of ever users reporting past 30-day use. The majority of participants (65.6%) believed IQOS was about as harmful as cigarettes, while an even greater proportion (71.8%) believed that IQOS was about as addictive as cigarettes. Finally, among IQOS never users, 49.5% were classified as susceptible to future use. **Conclusion:** The proportion of participants endorsing ever use of IQOS was unexpectedly high at roughly 25% of the entire sample, which is substantially higher than ever use estimates reported in the extant published data on IQOS use in the U.S. Further, given the high rates of IQOS susceptibility among never users, ongoing monitoring of IQOS is warranted, as well as public health IQOS prevention efforts focusing on younger adults, both smokers and non-smokers, especially before the product is nationally released.

PS3-127

EXPOSURE TO E-CIGARETTE CONTENT ON SOCIAL MEDIA AMONG 6TH GRADE STUDENTS IN TEXAS

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Background: Social media is an inexpensive and largely unregulated marketing platform. E-cigarette companies (e.g., JUUL; Puff Bar) utilize social media to market their products to young people. This study examines exposure to e-cigarette content on social media platforms among Texan 6th grade students. **Methods:** We analyzed baseline data from n=983 6th grade students enrolled in the CATCH My Breath E-Cigarette Prevention program. Data were collected in Spring 2021. Multileveled, multivariate logistic regression models examined the assocation between self-reported exposure to e-cigarette content on social media and e-cigarette susceptibility, social norms, outcome expectations, and perceived acceptability. Exposure to e-cigarette content on social media include seeing peers and/or influencers/celebrities post, share, or comment about e-cigarettes on social media sites (e.g. Facebook; Instagram; Twitter, etc.). Analyses controlled for sex, race/ethnicity, class settings (online, in person, both), academic performance, and living with an e-cigarette user. School was included as a random-effect to account for nesting within schools. **Results:** Overall, 53.1% of 6th grade students reported exposure to e-cigarette content on social media. Lifetime exposure was significantly associated with e-cigarette susceptibility among never users (aOR: 1.78) as well as greater odds of perceived use among peers (1) in their middle school used e-cigarettes (aOR: 2.11), (2) their age used e-cigarettes (aOR: 2.95), and (3) in high school used e-cigarettes (aOR: 2.07). Exposure was significantly associated with increased positive outcome expectations of e-cigarette use (β = 0.178); and (5) increased perceived acceptability about e-cigarette use (β = 0.12). **Conclusions:** Texas 6th grade students reported exposure to e-cigarette content on social media. This exposure was linked to psychosocial determinants of e-cigarette use among 6th graders. This is the first study to report

prevalence and these significant associations among such a young age-group. Findings indicate the need to introduce e-cigarette prevention and counter-messing efforts early, that combat the normalization of e-cigarette content on social media.

PS3-128

ASSOCIATION OF CLASS SETTINGS AND E-CIGARETTE USE BEHAVIOR AMONG 6TH GRADE STUDENTS IN TEXAS DURING COVID-19 PANDEMIC

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Background: In response to the novel coronavirus SARS-CoV2 (COVID-19) pandemic, school districts incorporated remote learning as a mitigating strategy. We examined the association between how lessons where taught/ delivered to students in class settings (i.e. remote versus on-campus/hybrid learning) and e-cigarette use/susceptibility among 6th grade students in Texas. **Methods:** We analyzed baseline data of n=985 students enrolled in the CATCH My Breath E-Cigarette Prevention Program, an NIH funded study. Data was collected in Spring 2021. Participants were recruited from 3 school districts located in the Dallas/Fort Worth and El Paso, Texas. A multinomial logistic regression model examined the association between class settings (i.e. on-campus versus remote learning) and categories of e-cigarette use behavior. Categories were: (1) non- susceptible never e-cigarette users (referent); (2) susceptible never users; and (3) ever e-cigarette users. Covariates included sex, race/ethnicity, academic achievement, perceived school connectedness, and self-reported exposure to positive e-cigarette content on social media, **Results:** Overall, 32.7% of the sample were susceptible never users and 3.6% were ever e-cigarette users. For class modality, 55.0% were on-campus learners and 45.0% were virtual. Multinomial logistic regression revealed that on-campus learners were more likely to be susceptible to e-cigarettes (RRR: 1.54; 95% CI: 1.14 - 2.07) and ever e-cigarette users (RRR: 2.15; 95% CI: 1.01 - 4.59), relative to those who were remote learning **Conclusions:** This study found that 6th grade students who received classes on-campus during the Spring 2021 semester were more susceptible to e-cigarettes use and more likely to be ever e-cigarette users. These findings have significant implications for public health. As school districts prepare to return to on-campus learning in Fall 2021, a more stringent approach is needed to prevent e-cigarette access and use on school campus.

PS3-129

STUDENT-SCHOOL CONNECTEDNESS AND E-CIGARETTE SUSCEPTIBILITY AND USE AMONG A DIVERSE SAMPLE OF 6TH GRADE STUDENTS IN TEXAS

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Background: The emotional connectedness a young person experiences with their school, including feelings of attachment and support with peers and teachers and feeling a part of one's school, is protective against multiple health risk behaviors. While student-school connectedness has been consistently associated with reduced risk of adolescent smoking, research is lacking on its role in the prevention of e-cigarette use. This study examined the association between student-school connectedness and e-cigarette susceptibility/use among an ethnically and socio-economically diverse sample of 6th grade students in Texas. **Methods:** We conducted a cross-sectional analysis of baseline data from the CATCH My Breath study, an NIH-funded study aimed at reducing e-cigarette use among public middle school students. The sample was n=985 6th graders from 21 public schools in Texas. Student-school connectedness (4- item scale; content described in first sentence) was based on National Longitudinal Study of Adolescent Health measures. E-cigarette use was categorized as: (1) non-susceptible never users (referent); (2) susceptible never users; and (3) ever e-cigarette users. Multinomial logistic regression analyses were conducted, adjusting for sex, race/ethnicity, class modality, academic performance, secondhand e-cigarette exposure, and language spoken at home. **Results:** This diverse sample was 57.6% Hispanic, 21.2% non-Hispanic White, and 9.3% African American; approximately 48% were bilingual. Overall, 63.8% were non-susceptible never users, 32.7% were susceptible never users, and 3.6% were ever users. As student-school connectedness increased, students were significantly less likely to be susceptible to e-cigarette use (RRR: 0.33; 95% CI: 0.25 - 0.43) or to be ever e-cigarette users (RRR: 0.34; 95% CI: 0.18 - 0.62), relative to non-susceptible

never users. **Conclusion:** Student-school connectedness was found to be protective against e-cigarette susceptibility and ever use among a diverse sample of Texas 6th grade students. These findings provide important foundation for further research on the role of student-school connectedness in reducing e-cigarette use among young adolescents.

PS3-130

SUGAR PROFILES IN FLAVORED AND UNFLAVORED WATERPIPE AND POTENTIAL MECHANISMS OF SUGAR DEGRADATION DURING WATERPIPE TOBACCO SMOKING

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Significance: In the 30 years since its introduction, sweetened waterpipe (WP) tobacco ("ma'assel") is now smoked by >0.5M middle and high school children and 1.2M young adults in the U.S. The mass ratio of sweet additives to nicotine in WP tobacco is significantly higher than any other combustible tobacco product, making WP the perfect "starter product" for nicotine initiation. Sweet additives comprise the bulk of WP tobacco and can degrade to form carcinogens and respiratory toxicants that are subsequently inhaled by the smoker. To define the effects of WP tobacco's primary chemical additives with respect to toxicant exposure, WP tobacco that differs only in concentrations of sugars and humectants was examined. **Methods**: The concentrations of sugars and semivolatile furans in a flavored and unflavored WP tobacco that was fortified with two ecologically valid levels of sugars and humectants (high and medium) were determined using HPLC. Results were compared with extant data on molasses, honey, and high fructose corn syrups. Semivolatile furan mainstream smoke yields for the tobaccos were determined using machine smoking and a human-derived puffing regimen. **Results**: The mass of semivolatile furans in mainstream smoke exceeded the mass in the tobacco by 3-14 times, depending on the sugar content of the tobacco. Extant data indicate sugars in WP tobacco result from added high fructose corn syrups. **Conclusions**: These data provide supporting evidence that the added sugars in WP tobacco thermally degrade during smoking to form high concentrations carcinogens and respiratory toxicants. **Statement of Relevance to CTP Regulatory Authorities**: A human study will determine how specific WP tobacco additives affect users puffing behavior, liking, harm perceptions, and estimate the quantities of toxicants they inhale. These data are needed to inform the development of evidenced-based product standards, or limits to additives in WP tobacco, designed to reduce smoking-related death and disease.

PS3-131

A QUALITATIVE ASSESSMENT OF KNOWLEDGE, ATTITUDES, AND BELIEFS ABOUT FLAVORS AND FLAVORED ELECTRONIC NICOTINE PRODUCTS AMONG USERS

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Background: Flavors in electronic nicotine delivery systems (ENDS) contribute to uptake and continuation of ENDS use among youth and adults. Local, state, and federal governments have increased restrictions of flavored ENDS to reduce youth use. In May 2020, New York enacted a statewide ban on the sale of all flavored ENDS with the exception of tobacco flavor and unflavored products. This study examined ENDS users' perceptions and behaviors around flavors. **Methods**: Focus groups and structured interviews were conducted in Western NY among ENDS users before and after implementation of the flavored ENDS restriction. 100 ENDS users (aged 18+, everyday use over past 7 days) were primarily recruited through Facebook (focus groups N=80; structured interviews N=20). Baseline questionnaires assessed demographic and tobacco use characteristics. Semi-structured discussions focused on flavored ENDS use, motivations for use, harm perceptions, marketing, packaging, and effects of the flavor ban on use patterns. All responses were recorded, transcribed, and then theme-coded for analysis. **Results**: The majority of participants were former cigarette smokers or current dual users (cigarettes and ENDS) who reported flavored ENDS use to quit/reduce cigarette smoking. Flavors were reported as appealing, while flavor-switching and sampling multiple flavors were frequently mentioned behaviors. Users reported preferring either refillable tank systems or prefilled systems, with greater trust in local vape shops versus international tobacco companies. Some users mentioned vaping to address symptoms of mental health diagnoses, including ADHD. Prior to the restriction, most users preferred flavored ENDS and

a majority were opposed to restrictions on availability. Despite restrictions on online and retail sales in NY, many users reported continued use of flavored ENDS.**Conclusions**: The qualitative results suggest that flavored ENDS are appealing to users, many users frequently use and switch between multiple flavors, users use ENDS to reduce smoking, and some vape as self-medication. The findings also suggest that users continued to procure these products after restrictions went into effect.

FUNDING: Federal

PS3-132

QUALITATIVE ANALYSIS OF IQOS POPULARITY IN THE U.S.

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Significance: IQOS, a type of Heated Tobacco Product (HTP), is widely sold on international markets, and, starting in 2019, it is the only HTP brand allowed to sell in the United States of America (U.S.). IQOS is only sold in a few states, and exceedingly little is known about the public's perception of this product in the U.S. **Methods:** This study employed qualitative content analysis of reviews about IQOS stores and social media posts made to the Phillip Morris IQOS official Facebook page to examine how the product is currently being considered by U.S. consumers. **Results:** Findings reveal that geography and availability, certain perceptions about the barriers and benefits of purchase and use, the technology and aesthetics of the product and where they are sold, and store employees were significant in molding people's perceptions of the IQOS device. **Conclusions:** While the Food and Drug Administration's regulation of IQOS marketing appears to have been largely successful as relatively little information was being exchanged amongst the platforms investigated, the dearth of information available and geographic limitations may fuel interest through notions of exclusivity.

FUNDING: Unfunded

PS3-133

INTERSECTIONALITY OF TOBACCO USE WITH ALCOHOL, POVERTY, AND AGE IN LAO PDR

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Significance. Globally, tobacco and alcohol abuse are the most highly prevalent addictive behaviors and rank in the top ten addictive substances. In the Western Pacific Region, there is emerging data that cigarette smoking and alcohol use is a "polydrug" behavior among young men, and their initiation is occurring at about the same age. Such trends raise the possibility of targeting risk factors in prevention programs at the community and individual levels. We considered the association between alcohol and tobacco in the first nationally representative tobacco survey of Lao People's Democratic Republic. Methods. Lao PDR's National Adult Tobacco Survey (NATSL) was the first nationally representative prevalence survey of adult tobacco use in Lao PDR. It was completed in 2013 by the Lao Statistics Bureau, Ministry of Health (CIEH Office), and Loma Linda University under funding from Fogarty International Center of the US NIH. NATSL investigators conducted a stratified, multi-stage cluster sampling that selected 9,706 subjects from 2,822 households located in all 17 provinces and used the 2010 census as the sampling frame. The tobacco items were adapted from the Global Adult Tobacco Survey format and administered to all adults ages 15 years and older. Results. Alcohol was measured in number of drinks over a 7-day interval as beer, wine, liquor, and palm liquor that was made at home for some rural subjects. Alcohol abuse (more than 14 drinks per week) was evident in 8.9% (95% CI 8.4% to 9.5%) of adults, and primarily due to beer consumption at this level (6.1% [95% CI 5.6% to 6.5%]). We found alcohol abuse (more than 14 drinks per week) was strongly associated with current daily cigarette smoking (OR = 2.26 [95% CI 1.89 to 2.713]) among all adults, and a significant 4% increase in odds of being a smoker per drink consumed each week (OR= 1.04 [95% CI 1.03 to 1.05]). Conclusion. Smoking and alcohol use are strongly associated in a national sample of adults in Lao PDR, and the finding raises the possibility of targeting both risk factors in culturally tailored interventions.

FUNDING: Federal

PS3-134

SYNTHETIC NICOTINE HAS ARRIVED - HISTORY, PATENTS AND MARKETING

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The introduction of a new product line of the popular disposable electronic cigarette brand Puffbar, advertised as containing synthetic nicotine, has drawn attention to the increasing use of synthetic nicotine in marketed products and its uncertain regulatory status. A search of the Truth Tobacco Industry Documents revealed that the industry considered using synthetic nicotine already in the 1960s, efforts that were abandoned due to high costs and insufficient purity. Recent patents revealed renewed efforts to develop more efficient strategies for the synthesis of nicotine. Nicotine exists as two stereoisomers, *S*-nicotine and *R*-nicotine. While *S*nicotine is the prevalent (>99%) form of nicotine in tobacco, a market-leading form of synthetic nicotine contains both stereo-isomers at equal amounts, raising concerns about inaccurate labeling and the poorly understood health effects of *R*-nicotine. Other manufacturers, including a leading vendor of pharmaceutical grade nicotine, developed stereospecific strategies to synthesize pure *S*nicotine, now added to Ecigarette products marketed in the US and UK. While *S*-nicotine and *R*-nicotine can be differentiated by enantioselective HPLC, differentiation of synthetic (fossil-derived) from tobacco-derived *S*-nicotine will require development of methods to measure carbon isotope (^{14}C or ^{13}C) content. Vendors claim that the FDA has no authority to regulate synthetic nicotine as a tobacco product, allowing them to circumvent the premarket tobacco product application (PMTA) process. Synthetic nicotine is not only marketed in electronic cigarettes, but also in the novel nicotine pouch category. These products are currently marketed through non-traditional sales channels, including Amazon.com . Manufacturers claim that the FDA has no authority to regulate synthetic nicotine as a tobacco product, allowing them to avoid the premarket tobacco product application (PMTA) process. However, legal analysis suggests that FDA may have the authority to regulate synthetic nicotine as a drug. Alternatively, Congress needs to include nicotine from any source within the legal definition of tobacco products.

FUNDING: Federal

PS3-135

A MULTIWAVE CROSS SECTIONAL SURVEY OF SECONDHAND SMOKE EXPOSURE IN HONG KONG WORKPLACES, TREND AND ASSOCIATIONS WITH FACTORS AND RESPIRATORY SYMPTOMS

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Background Smoking has declined in Hong Kong, but little is known about the trend of second-hand smoke (SHS) exposure at workplaces. We examined the trend and associations of such exposure with factors and respiratory symptoms. **Study design** This study is a secondary data analysis of a multi-wave cross-sectional survey. **Methods** The data were collected from eight waves (2013 to 2019) of Tobacco Control Policy-related Survey (TCPS) with a representative sample of 35,753 people aged 15 and above with over-sampling of current and former smokers. Two-stage landline random digit dialing was used. Respondents reported exposure to SHS within 3 meters at workplace in the past 7 days and frequent respiratory symptoms (e.g. cough, sore throat for at least 3 months) in the past 12 months. 15,832 working respondents were eligible for the present study, including 5,320 who were randomly selected to report their respiratory symptoms. The trend of exposure, related factors, and association with respiratory symptoms were examined using passion regression and adjusted risk ratios (ARRs). **Results** Exposure to SHS at workplace declined 14.3% from 48.1% in 2013 to 33.8% in 2019 in Hong Kong. More current smokers (52.9%) were exposed than former smokers (37.8%) and never smokers (20.2%). Younger age, being male, lower education level, and workplace environment (mainly outdoor and both indoor and outdoor) were significantly associated with exposure in never, former and current smokers. In former smokers, manual jobs were significantly associated with exposure. SHS exposure at workplace was marginally significantly associated with respiratory symptoms in never smokers (ARR 1.39, 95% confidence interval 1.00-1.94, P=0.051) and the association was significant among former smokers (1.51, 1.11-2.04, P<0.01) and all respondents (1.37, 1.14-1.66, P<0.01). **Conclusion** SHS exposure at workplace was declining but remained high in Hong Kong. Such exposure was significantly associated with outdoor and manual jobs and was independently associated with frequent respiratory symptoms in non-smokers. Funding: Hong Kong Council on Smoking and Health.

FUNDING: Nonprofit grant funding entity

PS3-136

STORM HEROES A GAME-BASED TOBACCO PREVENTION INTERVENTION THAT PROMOTES PEER TO PEER INTERACTION AMONG ADOLESCENTS

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Background: Adolescent tobacco use remains a public health concern. While several computer-based tobacco prevention programs for adolescents have shown some level of success, they do not yet promote peer-to-peer interaction in order to counteract the potential effect of negative influence or peer pressure. Considering the role of social interaction in driving adolescents' tobacco use, we have developed a model that seeks to examine a game-based social intervention alongside a computer-based tobacco prevention program known as A Smoking Prevention Interactive Experience (ASPIRE). We aim to examine the short-term user experience of our game-based tobacco use prevention intervention called STORM HEROES. Methods: The intervention implements game play in order to enhance learning processes via the promotion of social interaction through an entertaining and interactive environment. We conducted a randomized comparative study with 47 adolescents from 4 after-school organizations in Florida who engaged in either the intervention (social game-play with ASPIRE) or ASPIRE alone. A series of one-way analyses of variance comparing the two groups were conducted for data analysis. Results: As expected, there were no group differences with respect to recall of intervention content, paying attention to the program, or being motivated to have a conversation with others about the program. However, adolescents who received STORM HEROES were more likely to express higher positive attitude toward the program compared to those who received ASPIRE alone (F=5.11, P<0.05). Also, adolescents who received STORM HEROES were more likely to express enjoyment of the storyline (F=6.19, p<0.05), express creative freedom (F=7.16, p<0.05), and engage in social interactions with their peers during the program (F=5.13, p<0.05).Discussion: Our results indicate that STORM HEROES can improve peer-to-peer interaction with conversations against tobacco use. Our next logical step is to evaluate this program's effectiveness in preventing tobacco use with a larger number of adolescents.

PS3-137

RELATIONSHIP BETWEEN SMOKING AID USE AND PERCEIVED BARRIERS TO USE BY GENDER MINORITY AND SEXUAL MINORITY STATUS

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SIGNIFICANCE: Gender and sexual minority people (e.g., trans men and women; gender diverse individuals; and lesbian, gay, bisexual, queer [LGBQ] people) smoke more cigarettes than heterosexual and cisgender people in the US. This study's aim was to describe the relationship between smoking cessation aid use and perceived barriers to use by gender and/or sexual minority status, focusing on use of varenicline. **METHODS:** Data are from an online survey of 1,111 adult daily smokers in the US, using quotas to gather an adequate sample of smokers by sexual/gender minority status. **RESULTS:** Overall, the sample consisted of 71.8% cisgender heterosexual, (CH) 11.9% trans heterosexual (TH), 10.7% cisgender LGB (CLGB), and 5.6% trans LGB (TLGB) daily smokers. CH and LGB smokers' sociodemographic and smoking characteristics were comparable; trans participants were more likely to be men (77.4% vs. 43.6%) and to be of higher SES (e.g., report a "comfortable" income [80.4% vs. 32.3%], have at least a bachelor's degree [71.1% vs. 35.1%], and have health insurance [95.4% vs. 82.9%]) than cisgender participants (p's <0.001). Current depression increased with the number of stigmatized identities, from CH (43.4%), to CLGB (52.1%), TH (65.2%), and TLGB (69.4%) people. While lifetime and past 12-month quit method use were similar for CH and CLGB participants, trans participants were 2.7 times more likely to use varenicline during their last attempt (p<0.001). However, among varenicline never users , trans people were ~2 times more likely than cisgender people to cite structural barriers to access (e.g. expense or not being able to get a prescription). TLGB people were the most likely to report structural barriers to access compared to CH people (aOR 3.0; p=.002). **CONCLUSIONS:** Despite trans participants' greater material wealth, structural barriers to using varenicline persist for trans smokers and highlight a mechanism to reduce disparities in smoking prevalence by gender identity.

PS3-138

AMOUNT AND THEMES OF SMOKELESS TOBACCO-RELATED MESSAGES ON INSTAGRAM

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Significance: Social media promotion of non-cigarette tobacco products is on the rise, yet digital marketing remains to be an understudied domain in tobacco control. Vendor and influencer messages promoting tobacco products on social media are currently under-regulated, target youth and often contain misinformation. The objective of the present study was to assess the amount and characterize the content of smokeless-related commercial and organic messages on Instagram. **Methods**: Keyword rules were used to collect smokeless-related Instagram posts from the CrowdTangle platform from 01/08/2016 to 04/30/2020. Posts were coded for commercial content and promotional strategies (e.g., youth and new user targeting) using a combination of machine learning methods, keyword algorithms, and human coding. Post metadata were analyzed to assess post engagement. Additional exploratory analyses using topic modeling were performed to discover major discussion themes. Non-English messages were excluded from the analysis. **Results**: Keyword filters captured 21,119 smokeless-related posts, with 12,203 messages (57%) classified as commercial. Approximately 9,675 posts originated from the U.S., with the remaining posts containing no geolocation reference. Promotional messages featured lifestyle, sports and patriotism-themed appeals, as well as such new user appeals as "tobacco-free" and "synthetic nicotine" claims, flavored product references, and giveaways. In addition, high-nicotine references and reduced harm appeals to smokers were present. Posts by influencer accounts, including celebrity, meme, and community users (e.g., Copenhagen Nation) generated the highest level of engagement (likes and comments). **Conclusion**: Tobacco control prevention initiatives should include efforts to prevent and reduce smokeless uptake by new users and youth and should take into account the role of social media as a major marketing platform for these products. The social media marketing and sale of smokeless products warrants urgent need for surveillance and serious attention from public health.

PS3-139

ADVERTISING AND SOCIAL MEDIA EXPOSURE TO CIGARETTE, VAPE, AND MARIJUANA CONTENT AMONG CALIFORNIA HIGH SCHOOL STUDENTS

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Significance: Tobacco and marijuana manufacturers have recently turned to new media types, such as digital technology and social media, to appeal to a younger audience. However, very few studies have examined this rapidly changing relationship between advertisements, social media, and substance use among adolescents. We carried out a descriptive study to estimate the prevalence of cigarette, vape, and marijuana advertisement and social media exposure among California youth. **Methods**: The study sample consisted of students who participated in the 2019-2020 California Student Tobacco Survey: a large, cross-sectional random sample of 10th and 12th graders (N=147,757). Descriptive analyses examined cigarette, vape, and marijuana advertisement prevalence and exposure to people using these products on social media by student demographics. **Results**: Students reported that most of the cigarette and vape advertisements they encountered discouraged the use of those products (60.5% and 60.3%, respectively). However, the percentage of ads discouraging the use of marijuana (31.9%) was nearly half that of cigarette and vape ads; in fact, more students reported seeing advertisements promoting marijuana use (35.8%) than discouraging it (31.9%). An overwhelming majority of students reported never/rarely seeing someone on social media smoking cigarettes (72.2%), while only 41.3% and 44.4% of students reported never/rarely seeing someone on social media vaping or using marijuana, respectively. **Conclusions**: Students reported seeing more negative ads that discouraged rather than promoted smoking and vaping, while marijuana ads were found to be almost evenly distributed between negative, positive, and neutral messages. This study also found that students were more likely to encounter marijuana content on a frequent basis on social media compared to vaping and smoking, which held true even among nonusers. These findings indicate that students may be receiving more messaging around marijuana, that in turn is more positive and neutral, compared to vaping and smoking, which could serve to increasingly normalize cannabis use to adolescents.

PS3-140

A RANDOMIZED, CROSSOVER, CLINICAL STUDY TO ASSESS NICOTINE PHARMACOKINETICS AND SUBJECTIVE EFFECTS OF THE BIDI STICK ENDS COMPARED WITH COMBUSTIBLE CIGARETTES AND A COMPARATOR ENDS IN ADULT SMOKERS

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Background: Nicotine pharmacokinetic assessments of electronic nicotine delivery systems (ENDS) are crucial to understand their ability to provide an alternative to cigarette smoking. Subjective e!ects data also strongly contribute to this understanding. The BIDI® Stick is a disposable ENDS product which contains 6% nicotine benzoate salt and various flavours. **Methods:** In this study we assessed nicotine pharmacokinetics and subjective e!ects of BIDI® Stick ENDS in adult smokers, compared to cigarettes and a comparator ENDS product. During each of eight (8) study visits, volunteer smoker subjects randomly used one of either their usual brand (UB) of cigarette, a BIDI® Stick ENDS, or a comparator ENDS (JUUL 5% with Virginia Tobacco flavour), during both defined (10 pu!s, 30 seconds apart) and ad libitum pu"ng sessions. Blood samples were collected at various time points and subjective e!ects questionnaires were administered. **Results:** Plasma nicotine Cmax0-120 was not significantly di!erent between BIDI® Stick ENDS with any flavour (range 15.3 (9.90) ng/ml for BIDI® Stick Winter to 17.6 (9.00) ng/ml for BIDI® Stick Classic) and UB cigarettes [16.2 (9.17) ng/ml]. AUC0-120 and Tmax0-120 values were also not significantly di!erent between BIDI® Stick ENDS and UB cigarettes, while subjective e!ects measures were also similar between BIDI® Stick ENDS and UB cigarettes. **Conclusions:** BIDI® Stick ENDS delivered nicotine to users comparably to their UB combustible cigaretteand also elicited similar subjective e!ects such as satisfaction and relief. Thus, the BIDI® Stick ENDS may be a satisfying alternative to cigarettes among current smokers and may support their transitioning away from cigarette smoking.

PS3-141

A SYSTEMATIC REVIEW AND META-ANALYSIS OF INTERVENTIONS TO INDUCE ATTEMPTS TO QUIT TOBACCO AMONG ADULTS NOT READY TO QUIT

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Background: The prevalence of past year cigarette cessation remains below 10% in the US and most people who smoke are not ready to quit in the near future. Cessation requires both initiating a quit attempt (QA) and maintaining abstinence. Most treatment research has focused on abstinence among people already motivated to quit. We systematically reviewed interventions to promote QAs among people not ready to quit tobacco. Methods: We searched PubMed, CENTRAL, PsycINFO, Embase and personal libraries for randomized trials of tobacco interventions that reported QAs among adults not ready to quit. Two independent reviewers screened 2,418 articles and extracted data from eligible studies. We meta-analyzed findings when =2 studies tested the same intervention and comparison conditions. Studies' odds ratios (OR) were log transformed before being pooled in Mantel-Haenszel, fixed effect meta-analyses. Reported estimates and their confidence intervals are back-transformations. Results: We included 23 trials of interventions to induce QAs. Motivational interventions without medication increased QAs more than no treatment (trials=2; n=463; OR=3.9; 95% CI=1.5, 9.9) but not more than brief advice to quit (trials=5; n=1,027; OR=1.3; 95% CI=0.9, 1.8). Reduction interventions without medication did not increase QAs compared to brief advice (trials=2; n=474; OR=1.0; 95% CI=0.4, 2.5). Relative to no treatment, nicotine replacement therapy (NRT) with reduction counseling appeared to increase QAs (trials=2; n=557; OR=2.5; 95% CI=1.02, 6.0), but not without counseling (trials=3; n=1,625; OR=1.1; 95% CI=0.8, 1.6). Switching to very low nicotine cigarettes increased QAs more than normal nicotine cigarettes (trials=3; n=487; OR=2.2; 95% CI=1.1, 4.2). Conclusions: Interventions to induce QAs varied substantially and thus findings are limited by small samples. Motivational counseling, NRT aided reduction, and very low nicotine cigarettes appeared to increase QAs compared to no treatment, but not in comparison to brief advice. More studies are needed before concluding which interventions are effective for adults not ready to quit smoking, and could change our interpretation of effects.

PS3-142

SMOKING CESSATION TREATMENT MECHANISMS: EVALUATING WITHDRAWAL RELIEF AS A MEDIATOR OF VARENICLINE EFFICACY

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Negative reinforcement models of addiction posit that cessation-induced withdrawal drives relapse back to smoking. Varenicline is hypothesized to aid cessation, in part, by attenuating withdrawal facets; however, this mediational pathway has not been formally evaluated in placebo-controlled trials. The present research used latent growth curves to model trajectories of withdrawal facets (craving, negative/positive affect [NA, PA], sleep problems) and tested the effect of varenicline on these changes (path a in the proposed mediational chain), the relationship between the trajectories and bio-verified smoking status at end of treatment (11 weeks post-quit; path b), and the degree to which these candidate mediators account for the effect of varenicline treatment on smoking status (indirect effect, a × b). Secondary data analysis was conducted on 828 treatment-seeking, cigarette using adults assigned to varenicline or placebo in a randomized controlled trial (NCT01314001). Self-reported craving, NA, PA, and sleep problems were assessed 1 week pre-quit, on the target quit day (TQD), and 1 and 4 weeks post-TQD. Across time, craving declined, NA and sleep problems peaked 1 week post-quit (ps < .05), and PA did not change. Lower elevations in NA trajectories during the first month of treatment modestly mediated the relationship between varenicline and higher cessation rates (Indirect effect 95% CI: 0.002 to 0.07; Model R2 = 0.13). Lower craving 1 week post-quit mediated the relationship between varenicline and higher cessation rates (CI: 0.08 to 0.30; R2 = 0.13). PA and sleep problems were not significant mediators. Sex and race moderated the mediated effect of NA with the effect being significant for females (CI: 0.33 to 1.55) and Caucasians (CI: 0.002 to 0.58) and non-significant for males (CI: -0.05 to 0.16) and people of color (CI: -0.14 to 0.32). The present research provides modest support for the hypothesis that varenicline improves cessation rates via withdrawal-reduction, clarifies the relative importance of specific withdrawal facets for relapse, and suggests mechanisms of varenicline therapy vary depending on key participant characteristics (sex, race).

PS3-143

A VIRTUAL REALITY SCENARIO ON THE HEALTH CONSEQUENCES OF SMOKING: A PILOT RANDOMISED TRIAL WITH SMOKERS UNMOTIVATED TO QUIT

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Background: Individual-level interventions for smokers unmotivated to quit remain scarce and have had limited success. Little is known about the potential of virtual reality (VR) for delivering messaging to smokers unmotivated to quit. This pilot trial aimed to evaluate the feasibility and acceptability of a brief, theory-informed VR scenario, and estimate its likely effect on proximal quitting outcomes. Methods: Unmotivated smokers (recruited in February-July 2021) aged 18+ years who had access to, or were willing to receive via post, a VR headset were randomly assigned (1:1) using block randomisation to view the intervention or a 'sham' VR scenario with a researcher present via teleconferencing software. The primary outcome was feasibility of recruitment (i.e., achieving the target sample size of 60 participants within 3 months from the trial start date). Secondary outcomes included acceptability (i.e., positive affective and cognitive attitudes), quitting self-efficacy and intention to stop smoking (i.e., clicking on a weblink with additional stop smoking information). We report point estimates and 95% confidence intervals (CIs). The study protocol was pre-registered (osf.io/95tus). Results: We randomly assigned 57 participants to the intervention (n=27) or control (n=30) arm within 6 months (34 of whom were recruited within 2 months following an amendment to send headsets via post). The mean (SD) age of participants was 33.8 (11.9) years, with 47.4% identifying as female. The mean (SD) cigarettes per day was 9.4 (6.8). The intervention (85.2%, 95% CI=66.3%-95.8%) and control (93.3%, 95% CI=77.9%-99.2%) scenarios were rated as acceptable. Quitting self-efficacy and intention to stop smoking in the intervention (14.8%, 95% CI=4.2%-33.7%; 3.7%, 95% CI=0.1%-19%) and control (26.7%, 95% CI=12.3%-45.9%; 0%, 95% CI=0%-11.6%) arm were comparable. Discussion: A brief

VR scenario appeared acceptable to smokers unmotivated to quit. The target sample size was not achieved within the feasibility window; however, an amendment to send free headsets via post appeared promising.

PS3-144

MECHANISMS OF SMARTPHONE APPLICATIONS FOR CIGARETTE SMOKING CESSATION: RESULTS OF A SERIAL MEDIATION MODEL FROM THE ICANQUIT RANDOMIZED TRIAL

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Background: Engagement with digital interventions is a well-known predictor of treatment outcome but this knowledge has had limited actionable value. Instead, learning why engagement with digital interventions impact treatment outcome can lead to targeted improvements in their efficacy. Objective: To test a serial mediation model of an Acceptance & Commitment Therapy (ACT) smartphone intervention for smoking cessation. Methods: In this randomized controlled trial (N=2,415), participants from 50 US States were assigned to the ACT-based smartphone intervention (iCanQuit) or comparison smartphone intervention (QuitGuide). Their engagement with the applications (primary measure: number of logins) was measured during the first three months, ACT processes were measured at baseline and three months (acceptance of internal cues to smoke, valued living to motivate quitting smoking), and smoking cessation was measured at 12-months with 87% follow-up retention. Results: There was a significant serial mediation effect of iCanQuit on smoking cessation through multiple indicators of intervention engagement (i.e., total number of logins, p<.001; total number of minutes used, p<.001; and total number of unique days of use, p<.001 and in turn through baseline to three months changes in mean acceptance of internal cues to smoke (p<.001). Analyses of the acceptance subscales showed that the mediation was through acceptance of physical sensations (p<.001) and emotions that cue smoking (p.05). There was no evidence that the effect of the iCanQuit intervention was mediated by changes in valued living (p >.05). Conclusions: In this first study of mediators underlying the efficacy of smartphone applications for smoking cessation, results suggest the effect of the iCanQuit ACT-based smartphone application on smoking cessation was mediated through multiple indicators of engagement and in turn through increases in acceptance of physical sensations and emotions.

PS3-145

GREATER PAIN IS ASSOCIATED WITH LIKELIHOOD OF E-CIGARETTE USE AMONG YOUNG ADULTS

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Youth e-cigarette use remains at epidemic levels, and over 20% of young adults (YA; age 18-24) report recent e-cigarette use. More than 1.3 million YA are introduced to nicotine through e-cigarettes annually, and YA who use e-cigarettes are three times more likely to try cigarette smoking in the next year. Although pain is understudied in YA, emerging evidence suggests that young adulthood may be a critical developmental period for the onset of chronic pain. An increasingly large body of evidence indicates that pain may promote nicotine use in adults, but little is known about associations between pain and e-cigarette use in YA. Participants were 695 YA attending at a large Northeastern University (74% female; Mage = 18.81; 70% White) who completed an online survey of substance use and health for course credit. Half (51%) of participants reported lifetime e-cigarette use, nearly 30% reported current e-cigarette use, and 8% reported daily use. On average, participants reported that their worst pain in the past 3-months was 5/10, and 72% reported experiencing at least moderate pain (>=4/10) at some point during the past 3-months. Approximately 11% of the sample reported experiencing pain that persisted for greater than 90 of the past 180 days. Logistic regression, controlling for sociodemographic and college enrollment characteristics, revealed that for every one-point increase in pain, the likelihood of reporting current e-cigarette use increased by 10% (p = .008). When models were run separately for males and females, every one-point increase in pain was associated with a 17% greater likelihood of current e-cigarette use among males (p = .041). The association between pain and e-cigarette use was not significant for females (p = .094). Results demonstrate the high prevalence of both e-cigarette use and pain among young adults. Consistent with prior research that has demonstrated pain-nicotine associations are stronger among

male adults, findings suggest YA males, but not females, who experience pain are more likely to report e-cigarette use. Results indicate that pain may be an important factor to consider when studying and treating e-cigarette use among YA.

PS3-146

ASSOCIATIONS BETWEEN SMOKING AND PAIN IN EARLY RECOVERY IN RESIDENTIAL TREATMENT SEEKERS

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A growing literature indicates bidirectional associations between pain and tobacco use. Cigarette smokers are at increased risk for chronic pain, and observational and experimental studies indicate that pain increases motivation to smoke. Tobacco use disorder frequently co-occurs with other substance use disorders, which are also associated with chronic pain vulnerability. Although smoking cessation is a common element of residential substance use treatment programs, many treatment seekers either sustain or increase smoking over the course of treatment. Despite evidence that pain significantly predicts smoking and relapse, associations between smoking history/trajectory and changes in pain over the course of treatment have not been characterized. In this study, 230 adult smokers in residential substance use treatment in North Central Florida completed questionnaires assessing cigarette use and pain intensity/interference at treatment entry and discharge (Mean=80.3 days, SD=25.6). Most participants were diagnosed with alcohol use disorder (66.1%). Opioid (27.9%) and cannabis use disorder (29.6%) were also common. Participants were grouped by whether their smoking increased (n=38), decreased (n=48), or stayed the same (n=144) from entry to discharge. Results indicated a positive association between pack years and pain intensity at both baseline and discharge (r=.21, p=.006). Smoking trajectory was associated with pack years, with those who decreased smoking having greater pack years than those who sustained or reduced use (F7,145=7.00, p=.001, ?2p=.09). Repeated measures GLM indicated pain intensity (F1,212=44.51, p<.0001, ?2p=.17) and interference (F1,212=41.30, p<.0001, ?2p=.16) decreased significantly over time. However, there was no main or interactive effect of smoking trajectory with pain intensity. Overall, results indicate that smoking history is significantly associated with pain in residential treatment seekers, and, encouragingly, that pain decreases over the course of early abstinence. However, changes in smoking behavior do not appear to meaningfully alter pain trajectory, or vice versa, during residential treatment.

PS3-147

UTILIZATION AND RELIABILITY OF SMARTPHONE-ENABLED CARBON MONOXIDE DEVICES IN A REMOTE SMOKING CESSATION TRIAL

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Significance: Researchers have increasingly taken advantage of smartphones to collect data, particularly in studies conducted remotely. Unlike conventional clinical studies, many "remote" studies do not require participants to attend in-person visits. A critical challenge in conducting remote smoking studies is the biochemical verification of smoking and abstinence status. Smartphone-enabled mobile carbon monoxide (CO) devices have become available to address this issue. Laboratory research has indicated that these devices provide reliable CO measures for verifying smoking and abstinence status. However, little is known about the real-world utilization and reliability of mobile CO devices in a treatment study. Methods: To fill this gap, we examined mobile CO device data from an ongoing remote smoking cessation trial (NCT04604509). Each participant received a smartphone for counseling and completing questionnaires, a mobile CO device, and cessation medications. Participants were instructed to measure CO levels 3 times during the 12-week treatment but were allowed to take extra CO measures during this time. Results: Among the 219 participants included in this analysis, we found that on average, participants submitted almost 6 CO measures with over 190 participants submitting > 3 measures. Participants submitted about 3 times more measures during the day than during the night. Participants also showed interest in tracking their CO records: on average, participants viewed their CO records over 6 times. In terms of reliability, we found that participants' CO levels were significantly correlated with their self-reported cigarette consumptions (Pearson's r > 0.5). Moreover, with the assumption that self-reported consumptions were true values, using a cutoff of < 6 ppm as abstinent, the CO measures could differentiate abstinent status with desired specificity and sensitivity (both around 0.85). Conclusion: To conclude, participants

in a remote smoking study were utilizing smartphone-enabled CO devices to a greater extent than required by the study protocol, and CO measures derived from the devices were reliable to identify smoking and abstinence status.

PS3-148

THE IMPORTANCE OF CIGARILLO PRODUCT CHARACTERISTICS AMONG YOUNG ADULT CIGARILLO USERS: DIFFERENCES BY DEMOGRAPHICS, CIGARILLO USE AND OTHER TOBACCO/ SUBSTANCE USE BEHAVIORS

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BACKGROUND: Consumption of cigar products has increased in the U.S.— cigarillos in particular, which are disproportionately used by young adults. Cigarillo product characteristics can influence consumer perceptions and the appeal of these characteristics can vary by subgroup. Yet, existing research has only focused on differences based on one demographic characteristic (e.g., race) and has not examined how preferences differ based on cigar and other tobacco use characteristics. The goal of this study was to examine product characteristics important to young adult cigarillo users and to examine differences based on demographics and cigarillo and other tobacco/substance use behaviors. METHODS: In 2016, a convenience sample of 628 past-year cigarillo users rated the importance of the following cigarillo product characteristics when choosing a cigarillo to smoke tobacco: brand, quality of the tobacco filler, quality of the tobacco wrap, flavors, price, graphic design of the packaging and number of cigars in the pack. Demographic, cigarillo use and other tobacco/substance use characteristics were also assessed. Differences in mean importance were analyzed using t-tests and ANOVA tests. RESULTS: The most important cigarillo product characteristics were price, quality of tobacco wrap, and flavors. The lowest scored characteristic was graphic design of packaging. There were differences in importance by demographics and/or cigar and other tobacco/substance use behaviors for all product characteristics. In particular, pack size was rated as more important among current cigarillo users, users of foil pouches (2-3 cigarillos) or cardboard/paper boxes or other packaging styles and current users of cigarettes, blunts and marijuana. Price was rated as more important among Hispanic/ Latino and lower income smokers, as well as current cigarette and blunt smokers. DISCUSSION: Findings suggest that various cigar-related policies, such as those that ban flavors or set minimum pack sizes, could impact sub-populations of cigarillo users differently, however, research is needed to examine this.

PS3-149

SELLING PROPOSITIONS & FLAVORS: PERSUASIVE STRATEGIES USED BY SWISHER SWEETS ON INSTAGRAM

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Introduction: Price promotions (e.g., discounts) and other selling incentives (e.g., product scarcity), as well as the promotion of appealing flavors, influence product appeal and consumer behaviors, such as purchasing, but little is known about whether or how these types of strategies are used in cigarillo digital marketing. Methods: We conducted a content analysis of all posts on the official Swisher Sweets Instagram account, selected because they are one of the highest-selling cigarillo brands and have an active Instagram account. Two research assistants coded all text and visual elements in each post for selling propositions used by Swisher Sweets, including: price promotions, product scarcity, merchandise, and purchasing links. We also coded for flavors promoted, including the presence of distinct (e.g., Grape) and concept (e.g., Black) flavors.Results: All posts from January 23, 2013-December 31, 2019 were coded (N=1233). One third (34.6%, n=427) included price/financial incentives, such as "save on 2 cigars" or "free." Also, 11.4% (n=140) presented product scarcity, such as promoting limited edition flavors that were available for a limited time. Product merchandise was in 10.1% of posts (n=125), and a link to purchase the product or merchandise was in several posts (7.8%, n=96). Cigarillo flavors were depicted in 487 posts (39.5%), with 327 (67.1%) posts containing concept flavors and 232 posts (47.6%) containing distinct flavors. The flavor names frequently appeared in multiple locations within a single post (n=299, 60.2%), such as an image of the packaging, in hashtags, or in the post caption. The majority of flavors belonged to a specific flavor collection (n=471, 96.7%), including "Classics", "Limited Editions", and "Encore Edition".Discussion: The cigarillo industry is using well-established and largely effective marketing tactics, including price promotions and incentives, and flavors, to recruit and retain consumers. Future research

should examine the direct association between these strategies and actual purchasing of products, which could lead to potential product characteristic regulations, including banning flavors and price promotions.

PS3-150

IDENTIFYING AND CHARACTERIZING LOCAL CIGAR MINIMUM PACK SIZE AND PRICE POLICIES

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Municipalities across the US have adopted minimum cigar pack size and price policies in an effort to increase cigar prices and reduce youth access. The purpose of this study was to identify and measure local cigar pack size policies across the US. We used a systematic 14-step process to identify and code 294 local cigar pack policies in five states and DC. For three states (CA, MN, MA) known to have multiple policies, municipal codes were reviewed by two team members for all municipalities within the state. We worked with state-level tobacco control staff in all 50 states to confirm policies identified by our team. Policies were double-coded for adopted, effective, and enforcement dates, cigar definitions, minimum pack size, price floor, differences in pack size/price by cigar type, adjustments or automatic increases in price, whether discounts were accounted for in determining price floor, policy exclusions, compliance, and penalties. We identified 259 municipalities with policies, 35 of which changed the minimum size requirements after initial policy adoption, resulting in 294 policies. Policies specified 8 different pack size requirements ranging from 2 to 20; most prevalent were minimums of 2-packs (N=163; 55.4%) and 4-packs (N=24; 8.2%). Minimum price ranged from $2.00 to $10.00 per cigar (N=196). Most policies (N=238; 91.9%) excluded cigars priced above a specified amount ($2.50-$10.00), and 33 (11.2%) excluded cigars sold at adult-only or tobacco retailers. This is the first comprehensive list of cigar pack size and price policies within the US. Policies vary widely across assessed criteria, both between and within states. In Fall 2021, we will analyze the impact of these policies on youth and adult cigar and cigarette use, based on the identified differences in policy characteristics.

PS3-151

THE HYPOTHETICAL IMPACT OF CIGAR PRICE INCREASE ON TOBACCO USE BEHAVIOR CHANGE INTENTIONS AMONG ADULT CIGAR SMOKERS

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Background: Increasing cigar prices through setting minimal prices and pack sizes, eliminating price promotions, or raising taxes may help reduce cigar smoking. This study examined the correlates of tobacco use change intentions given cigar price increases among adult cigar smokers. Methods: Data from a nationally representative sample of adult current cigar smokers (n=456; mean age=39.8) were collected online in 2021. Respondents were asked, given a hypothetical cigar price increase, whether they would be willing to pay more for cigars, cut down cigar smoking, use cheaper cigars, or use other tobacco products. Weighted multivariable regressions were conducted to assess the correlates of each intended behavior change outcome. Results: Given a hypothetical cigar price increase, 77.2% of respondents would be willing to pay more for cigars, and 44.7%, 39.9%, and 17.1% would cut down cigar smoking, use other tobacco products, and use cheaper cigars, respectively. Cigarillo smokers (vs. non-cigarillo smokers) were more likely to intend to pay more for cigars (AOR=2.57; 95% CI=1.30-5.08) and use other tobacco products (AOR=2.27; 95% CI=1.21-4.26). Those who used first tobacco within 5-29 minutes of waking (vs. >60 minutes) were also more likely to pay more (AOR=2.54, 95% CI=1.09-5.88). While premium cigar smokers (vs. non-premium cigar smokers) were less likely to intend to use cheaper cigars (AOR=0.37, 95% CI=0.15-0.87), those who used tobacco within 5 minutes of waking (vs. >60 minutes) were more likely to intend to use cheaper cigars (AOR=6.81, 95% CI=1.64-12.67). Conclusion: Almost half of cigar smokers may cut down cigar smoking given cigar price increase. The impact of this policy may depend on the cigar type smoked and smokers' nicotine dependence levels. For example, cigarillo smokers may continue to purchase cigarillos or transition to use other tobacco products; those who are more nicotine dependent may pay more or use cheaper cigars to sustain cigar smoking than those who are less dependent. This study can help inform regulations for increasing cigar prices and develop measures for evaluating such policies.

PS3-152

CREATING COHESION: THOUGHTS ON DEVELOPING A GLOBAL ENDGAME MOVEMENT

Marita Hefler, MPH, PhD. Menzies School of Health Research.

Expanding and strengthening the global tobacco endgame initiative, Project Sunset.

PS3-153

BRIEF OVERVIEW OF ENDGAME DISCOURSE AND GLOBAL PROGRESS

April Roeseler. California Tobacco Control Program.

Tobacco endgame planning and policies are spreading globally. The speaker will review progress and summarize how the tobacco control community discussion has shifted.

PS3-154

ADDRESSING GLOBAL HEALTH EQUITY AND DISPARITIES THROUGH ENDGAME

Carol McGruder. African American Tobacco Control Leadership Council.

Speaker will discuss the promise of tobacco endgame policies in addressing health disparities among communities left behind in tobacco control efforts.

PS3-155

CANNABIS PREVALENCE, MISUSE, AND PROBLEMS BY US STATE-LEVEL CANNABIS LEGALITY

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Significance: Cannabis use among young adults is at a record level. Many who use cannabis also use tobacco, a pattern linked with higher toxicant exposure, greater dependence, and worse cessation outcomes. As more US states make cannabis use legal, there is concern that cannabis use, misuse, and problems may increase. The present study investigates how cannabis use, misuse, and problems vary by US state cannabis legality. **Methods:** Young adults aged 18 to 25 years (N=1,039; mean age=20.9 years; 52.9% annual income < \$35,000; 54.3% students) were surveyed from February 16 to May 1, 2021 through a Qualtrics panel. Recruitment focused on states where marijuana was fully legal (n=524) or fully illegal (n=515) for at least four years preceding data collection. Fully legal was defined as both medical and non-medical cannabis use permitted for adults 21 and over, while fully illegal was neither medical nor non-medical cannabis use permitted. Sampling was stratified by race/ethnicity (approximately one third of sample Hispanic, non-Hispanic Black, and non-Hispanic white) and gender (approximately half male and half female). Cannabis misuse was measured with the Cannabis Use Disorder Identification Test-Revised. Marijuana problems were measured with the Marijuana Problems Scale. **Results:** In legal states, current cannabis use was reported by 46.6% and in illegal states by 41%, X^2 (1,1,039)=3.8, p=.05. Cannabis misuse scores were 11.7 (SD=7.9) for those in legal states, and 12.6 (SD=7.0) for illegal states, t(504)=1.3, p=.2. The number of marijuana problems was 6.3 (SD=6.2) for those in legal states, and number of problems was 7.6 (SD=6.6) for those in illegal states, t(498)=2.3, p=.02. Severity of problems was 8.1 (SD=8.9) for those in legal states, and severity was 10.1 (SD=9.4) for those in illegal states, t(498)=2.1, p=.03. **Conclusion:** Cannabis use and misuse were comparable in states in which cannabis was legal compared to illegal, while cannabis problems and severity were lower in legal states. The state-level macro-environment legality of cannabis may contribute to greater problems associated with cannabis use, some of which are external (e.g., jobs, relationships).

PS3-156

DEVELOPING A MHEALTH INTERVENTION FOR HIV+ SMOKERS AMBIVALENT ABOUT QUITTING: AN ITERATIVE, MULTI-MODAL JOURNEY

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More smokers living with HIV (SLWH) now die from tobacco-related disease than from HIV. Reducing smoking in this population is critical, but it is complicated by the fact that most SLWH are ambivalent about quitting: they want to quit someday, but aren't yet ready to quit. As a result, they don't seek and may not be offered cessation treatment. Novel intervention strategies are needed to reach, engage, and support this population through the quit process. mHealth apps are an ideal platform for this given their convenience, low cost, and ability to provide 24/7 support. But to be effective, these apps need to balance design elements and content that are engaging to ambivalent SLWH (which differs from what is engaging to smokers ready to quit) with intervention content grounded in sound theory and empirically-based evidence. In this symposium, we will present an overview of our new mHealth app for ambivalent SLWH. We will discuss the underlying theory and how the intervention content and design were developed using an iterative, multi-modal process including user-centered design interviews with HIV+ and non-HIV+ ambivalent smokers, expert opinion, and lessons learned from our programmatic research, including a recent prospective, randomized pilot trial testing a similar mHealth intervention among non-HIV+ ambivalent smokers (n = 57; 17.5% non-white; 15% LGBTQ+; 72% no college degree; 58% with household income <\$45,000). The final app for SLWH uses a sequential series of discrete exercises to help ambivalent smokers clarify their values and learn basic cognitive and behavioral skills that can help them either cut-back or quit smoking—when they are ready to make a change. Other key features include gamification, peer testimonials, HIV-relevant risk and benefit information, and standard, best-practice tobacco treatment components. The intervention is designed to support individuals' motivation, confidence, and skill mastery, while also encouraging quit attempts and connecting SLWH with access to evidence-based treatment. The development process and app design may serve as a model for others interested in creating motivational digital health interventions.

PS3-157

FUNCTIONAL CONNECTIVITY IDENTIFIED PREFRONTAL TMS TARGET FOR SMOKING CESSATION IN SCHIZOPHRENIA

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With the high rate of smoking, nicotine addiction is one of the most damaging comorbidities in schizophrenia spectrum disorders (SSD). Mortality from smoking-related diseases is 2 to 6 times higher in SSD than in healthy controls. Recent neuroimaging research has addressed an essential role of brain circuitries between prefrontal cortex (PFC) and several subcortical structures in both pathology of SSD and nicotine addiction, likely explaining the high rate of smoking in SSD. To correct these circuits in SSD smokers, we conducted a randomized, sham-controlled and rater-blinded trial: 20 sessions of daily 10 Hz repetitive transcranial magnetic stimulation (rTMS) were applied over circuitry-defined dorsomedial PFC in 30 SSD patient smokers using a 2:1 active rTMS vs. sham rTMS ratio. Functional MRI data were collected before, during and after the treatment. Preliminary results showed that active rTMS increased the rsFC identified to be related to both SSD and nicotine addiction compared with sham at a trend level. Nicotine addiction severity, indexed by the Fagerstrom Test for Nicotine Dependence (FTND), was reduced after 15 and 20 sessions of active rTMS compared with sham (p=0.05). Although cigarette per day (CPD) reduction was not significant compared to sham in this small sample, more increase of rsFC by rTMS predicted more reduction of CPD (p<0.05) and FTND morning withdrawal symptoms (p<0.05) in patients who received active rTMS. In further exploratory analysis, participants in active rTMS group were median split into a more responsive subgroup (n=8) and a less responsive subgroup (n=8) based on rsFC enhancement and reduction of CPD. The more responsive subgroup showed more reduction in overall symptoms indexed by Brief Psychiatric Rating Scale (BPRS) total score than the less responsive subgroup (p<0.05). Most previous studies of TMS treatment for smoking cessation used dorsolateral PFC as the primary target. The present results suggest that rTMS targeting an alternative circuitry-defined site at the dorsomedial area of the PFC may modulate the neural circuitry mechanisms of nicotine addiction and facilitate smoking cessation in patients with schizophrenia.

PS3-158

CIGARETTE SMOKING IN RESPONSE TO COVID-19: EXAMINING CO-MORBID MEDICAL CONDITIONS, COPING, AND RISK PERCEPTIONS

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Introduction: During the initial wave of the Coronavirus Disease 2019 (COVID-19) pandemic in the U.S., information was mixed about relative COVID-19 risks and potential benefits associated with cigarette smoking. Therefore, we sought to understand individual differences in the impact of COVID-19 on cigarette smoking in a sample of adults who reported recent use, with a particular focus on general strategies to cope with the pandemic and chronic medical conditions likely associated with increased COVID-19 risk. **Methods:** Participants completed an anonymous, online Qualtrics survey of these constructs as well as smoking behavior, demographic variables, and COVID-19 risk perceptions between July and August 2020 (N=287). These factors were examined using multivariable logistical regression models of smoking in response to the pandemic. Participants were recruited through paid advertisements on Facebook and Instagram. Separate ads targeted specific age groups to achieve similar numbers of each group: (1) ages 18-30; (2) ages 31-40; (3) ages 41-50: (4) ages 51-60; (5) ages ≥ 61 years of age. We ran ads longer for the last two categories to oversample older participants for whom medical co-morbidities are more common. **Results:** In models evaluating reduced smoking, greater COVID-19 risk perceptions was associated with higher odds of reducing (OR=1.30, 95%:1.05-1.61, p=.02) whereas using avoidant coping strategies was associated with lower odds (OR=.45, 95%:23-.91, p=.03). Conversely, having at least one co-morbid medical condition was related to higher odds of increased smoking (OR=1.91, 95%: 1.01-3.63, p=.048). **Conclusions:** Following the first wave of the COVID-19 pandemic in the U.S., greater perceived risks from COVID-19 and the ability to cope more effectively with the unique challenges of the pandemic appeared to promote reductions in cigarette use for some. Though people with co-morbid medical conditions perceived greater COVID-19 risks, they were less likely to decrease their use. The results have important implications for tobacco cessation treatment and preventive healthcare during public health threats.

PS3-159

EFFECTS OF TBS ON NEURAL MECHANISMS MEDIATING INHIBITORY CONTROL AND SMOKING RELAPSE VULNERABILITY

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Tobacco use disorder (TUD) is associated with deficits in prefrontal mediated inhibitory control (IC). We previously reported findings showing that IC task-state functional connectivity (tsFC) in corticothalamic circuitry mediates the association between successful IC task performance and smoking relapse vulnerability. We've also demonstrated that theta burst stimulation (TBS) to the r.IFG modulates IC task performance among individuals with TUD. The current study examined the effects of TBS to the r.IFG on: a) corticothalamic tsFC; b) IC task performance; and c) smoking related variables. Adult (N =37; age = 47.6 ± 9.5; female: n = 17) nicotine dependent (FTND = 5.4 ± 2.1) tobacco smokers (18.8 ± 5.7 cigarettes per day for 30 ± 9.8 years) performed a baseline IC task during fMRI data collection. Baseline task-related r.IFG BOLD response was used to establish each individual's stimulation target and then, in a crossover, within-session repeated-measures fMRI assessment (pre and post TBS condition), the effects of continuous (cTBS) and intermittent (iTBS) TBS on each outcome listed above were assessed. Safety and tolerability were also assessed. A significant main effect of TBS condition was observed for IC task performance (t = 2.85, p = .007): cTBS improved performance (M = 3.78% ± 12.2), whereas iTBS led to worse performance (M = -3.08% ± 9.49). Over the 24-hr. post TBS period, cTBS produced a significant reduction in cigarettes per day (CPD) (p=.004) and self-reported urge to smoke (p < .05); whereas iTBS only reduced CPD (p = .04), relative to baseline. Moreover, cTBS induced strengthening of tsFC between the r.IFG and SMA was associated with the reduction in CPD (r= -.336, p=.048). No effects of iTBS on associations between brain and behavior were observed. These novel findings provide early evidence to suggest cTBS to the r.IFG may help treat corticothalamic mediated inhibitory control and smoking (re)lapse vulnerability and bolster the need for further research examining the potential of repeated cTBS treatments as a potential therapeutic intervention for treating TUD.

PS3-160

EPISODIC FUTURE THINKING AS AN INTERVENTION FOR DEPENDENT E-CIGARETTE USERS

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Significance: There has been an alarming increase in e-cigarette use and dependence among young people, many of whom would like to quit using e-cigarettes but are finding it difficult to do so. Impulsivity is associated with drug taking across many different types of drugs including nicotine. In prior research with cigarette smokers, cognitive interventions designed to reduce impulsivity, such as Episodic Future Thinking (EFT), have been shown to reduce cigarette demand and self-administration. The aim of the present study was to test if a brief EFT intervention decreases nicotine craving, impulsivity, and smoking choice among daily young adult e-cigarette users. Methods: Participants (N = 24; M = 21 years of age; ~50% female; M = 12 e-cig uses per day) attended three within-subjects experimental sessions administered via Zoom. After a baseline acclimation session, participants attended two experimental sessions in counterbalanced order: 1) EFT in which they pre-experienced and described positive future events and 2) A control intervention in which they described their experiences watching three short videos. Measures of craving, mood, and delay discounting across three commodities: money, e-cigarette products, and food were completed before and after the manipulations. Results: Within-subjects repeated measures ANOVAs revealed decreases in craving and mood in response to the manipulations, but no differences between EFT and control on any self-report measures. At the end of each session, participants also took part in a 40-minute vaping vs. money choice task. Approximately 30% of participants chose to smoke after the EFT condition compared to ~40% after the control condition. Conclusions: EFT may be an effective brief intervention for helping e-cigarette users increase their ability to abstain. Additional findings, methodological issues, and future directions will be discussed. Funding: American University CAS Graduate Research Fund Awards - Spring & Fall 2021.

POSTER SESSION 4: PRE-RECORDED PAPER PLUS

PP-1

A PILOT RANDOMISED TRIAL OF A BRIEF VIRTUAL REALITY SCENARIO IN SMOKERS UNMOTIVATED TO QUIT: ASSESSING THE FEASIBILITY OF RECRUITMENT

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Significance: Individual-level interventions for smokers unmotivated to quit remain scarce and have had limited success. Little is known about the potential of virtual reality (VR) for delivering messaging to smokers unmotivated to quit. This pilot trial aimed to assess the feasibility of recruitment and acceptability of a brief, theory-informed VR scenario and estimate proximal quitting outcomes. **Methods:** Unmotivated smokers (recruited between February-August 2021) aged 18+ years who had access to, or were willing to receive via post, a VR headset were randomly assigned (1:1) using block randomisation to view the intervention (i.e., a hospital-based scenario with motivational stop smoking messaging) or a 'sham' VR scenario (i.e., a scenario about the human body without any smoking-specific messaging) with a researcher present via teleconferencing software. The primary outcome was feasibility of recruitment (i.e., achieving the target sample size of 60 participants within 3 months of recruitment). Secondary outcomes included acceptability (i.e., positive affective and cognitive attitudes), quitting self-efficacy and intention to stop smoking (i.e., clicking on a weblink with additional stop smoking information). We report point estimates and 95% confidence intervals (CIs). The study protocol was pre-registered (osf.io/95tus). **Results:** A total of 60 participants were randomised within 6 months (intervention: n=30; control: n=30), 37 of whom were recruited within a 2-month period of active recruitment following an amendment to gift inexpensive (£7) cardboard VR headsets via post. The mean (SD) age of participants was 34.4 (12.1) years, with 46.7% identifying as female. The mean (SD) cigarettes smoked per day was 9.8 (7.2). The intervention (86.7%, 95% CI=69.3%-96.2%) and control (93.3%, 95% CI=77.9%-99.2%) scenarios were rated as acceptable. Quitting self-efficacy and intention to stop smoking in the intervention (13.3%, 95% CI=3.7%-30.7%; 3.3%, 95% CI=0.1%-17.2%) and control (26.7%, 95% CI=12.3%-45.9%; 0%, 95% CI=0%-11.6%) arm were comparable. **Conclusions:** The target sample size was not achieved within the feasibility window; however, an amendment to gift inexpensive headsets via post appeared feasible. The brief VR scenario appeared acceptable to smokers unmotivated to quit.

PP-2

RANDOMIZED CONTROLLED TRIAL OF A TAILORED WEB AND TEXT MESSAGE INTERVENTION FOR SMOKING CESSATION IN SOCIOECONOMICALLY-DISADVANTAGED YOUNG ADULT CIGARETTE SMOKERS

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SIGNIFICANCE The prevalence of cigarette smoking in young adults (YA) is significantly higher among those with socioeconomic disadvantage than those without. Low treatment-seeking among YA smokers is compounded by a dearth of efficacious smoking cessation interventions targeted to this group, particularly socioeconomically-disadvantaged young adult (SDYA) smokers. The goal of this study was to test a tailored smoking cessation intervention for SDYA smokers. METHODS 343 SDYA smokers aged 18-30 with access to a smartphone and interest in quitting in the next six months were recruited nationally from online ads and randomized in Spring 2020 to referral to a quitline (control; n=171) or a 12-week web and text message smoking cessation intervention (n=172; NCT04379388). Intervention participants received up to 5 text messages daily that addressed cessation themes identified in formative work with SDYA smokers; they also received a weekly check-in quiz. Primary outcomes were self-reported past 30-day point prevalence abstinence (PPA) and confidence to quit smoking assessed in all participants at 12-weeks; secondary outcomes included past 7-day PPA and readiness rulers. Intent to treat analyses examined bivariate relationships between

study condition and outcomes at 12 weeks. RESULTS Retention was 81% (n=139) in intervention and 87% (n=149) in controls. Participants in the intervention group had nearly four-fold higher 30-day PPA at 12-weeks compared to control (26.2% vs. 7.0%; RR 3.73, 95% CI 2.04-6.80); findings were similar for 7-day PPA (39.5% vs. 12.9%; RR 3.07, 95% CI 2.00-4.73). Intervention exposure also increased mean confidence to quit (10-point scale; 1.56 points, 95% CI 0.93-2.19) and readiness to quit (0.87 points, 95% CI 0.33-1.41). There was no effect of the intervention on the importance to quit scale (0.31, 95% CI -0.10-0.72). CONCLUSION A tailored text message intervention for SDYA smokers increased abstinence, confidence, and motivation to quit at the end of treatment. Findings may have been influenced by recruitment at the start of the COVID pandemic, but suggest that text messaging is an acceptable and efficacious cessation strategy for SDYA smokers.

PP-3

RELAPSE TO SMOKING IS ASSOCIATED WITH INCREASED PAIN SENSITIVITY

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Significance: This study examined the relationships between smoking relapse, sex difference, and pain perception. Methods: Nicotine dependent men and women interested in cessation participated in a prospective study that included 3 laboratory sessions (during ad lib smoking, 24 hr after the quit day, 4 weeks after the quit day). This study also included nonsmokers who completed the same protocol as smokers except for the tobacco use. Abstinence from smoking was confirmed by self-reported measures and expired carbon monoxide. Relapse was defined as smoking 7 consecutive days after the quit day. To assess pain perception, the cold pressor test (CPT) was administered in each lab session. In the CPT, participants were instructed to place their hand into a container filled with an ice-water slurry. Participants rated their pain every 15 sec during 90 sec of CPT exposure (6 periods) and then every 15 sec during 90 sec of post-CPT recovery (6 periods). Results: Repeated measures ANOVAs, including smoking status (relapser [n=55], abstainer [n=52], nonsmoker [n=49]) and sex (males [n=83], males [n=73]) as predictors, showed expected increase in pain ratings across assessment periods during CPT and decrease in ratings over time after CPT in all sessions (p < .001). Females had greater pain than men (p < .05). Pain ratings during CPT were higher in relapsers than nonsmokers in all sessions (p < .01). In the post-quit lab, relapsers had greater pain than nonsmokers during the last three periods whereas abstainers had greater pain than nonsmokers during the last two periods (p < .005). Regarding pain ratings post-CPT, there was a smoking main effect in the quit day lab, indicating lower pain in relapsers than in other conditions (p < .05). Conclusion: These results extend previous findings that chronic smoking is related to increased pain perception regardless of withdrawal.

PP-4

DO HARM PERCEPTIONS OF NICOTINE REPLACEMENT THERAPY RELATIVE TO CIGARETTE SMOKING PREDICT ITS USE AS AN AID FOR SMOKING CESSATION? FINDINGS FROM THE ITC FOUR COUNTRY SMOKING AND VAPING SURVEYS

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Significance: Nicotine replacement therapy (NRT) is a government-approved medical therapy for smoking cessation in many countries and is recommended in clinical practice guidelines as a safe and effective smoking cessation aid. However, some smokers do not perceive NRT as much less harmful than cigarettes, which could hinder quit attempts and success. This study examined whether harm perceptions of NRT relative to cigarettes were associated with subsequent use of NRT during their last quit attempt (LQA) among current smokers. **Methods:** A prospective cohort study of 2,030 current smokers at Wave 1 (2016) who made a quit attempt by Wave 2 (2018) in the ITC Four Country Smoking and Vaping Surveys (Australia, Canada, England, US). Multivariable logistic regression examined whether less harmful perceptions of NRT relative to cigarettes predicted NRT use during LQA, controlling for socio-demographics and potential confounders. **Results:** Overall, 34% of smokers believed NRT is *much less* harmful than smoking, 39% believed it is *somewhat less* harmful, 15% believed it is *equally or more* harmful, and 12% did

not know. Compared to smokers who perceived NRT as equally or more harmful than cigarette smoking, those who perceived NRT as much less harmful were more likely to use NRT during their LQA (OR=2.00, 95% CI=1.38-2.90, p=0.000), but not those who perceived it as somewhat less harmful (OR=1.22, 95% CI=0.86-1.74, p=0.265). The perception-behaviour association did not show any between-country variation, although overall misperceiving NRT as equally or more harmful than smoking was highest in the US (22%) and lowest in England (10%) with Canada (16%) and Australia (12%) in between. **Conclusions:** A substantial number of smokers from all four study countries continue to hold misperceptions about the harmfulness of NRT, possibly undermining the use of this effective smoking cessation aid. Comprehensive education about the risk profile of different nicotine products is needed to enable smokers to make accurate estimates of their relative harmfulness so that they can make informed choices about the use of NRT as an aid for smoking cessation.

FUNDING: Federal; Academic Institution

PP-5

DIFFERENCES BETWEEN DAILY SMOKERS WHO DO AND DO NOT CO-USE CANNABIS: FINDINGS FROM THE 2020 ITC SMOKING AND VAPING SURVEY

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Significance: Cannabis and tobacco are often used together. Co-use of cigarettes and cannabis (particularly smoked cannabis) has been shown to be associated with increased toxicant exposure and poorer health outcomes relative to exclusive use of either product. However, it is not clear if adult co-users differ from cigarette-only smokers (e.g., sociodemographics, cigarette-dependence, depressive symptoms, use of other nicotine products, and frequency of alcohol use). This study describes differences between cigarette smokers who use cannabis and cigarette-only smokers. Methods: Respondents included 7061 adult daily smokers from the 2020 ITC Smoking and Vaping Survey conducted in the US, Canada, Australia, and England. Respondents were categorized as: (1) cigarette-only smokers (never used cannabis/did not use in the last 12 months); (2) occasional co-users (used cannabis in the last 12 months, but less than weekly); and (3) regular co-users (use cannabis at least weekly). Multivariable logistic regression analyses were conducted on weighted data. Results: 19.4% of daily smokers used cannabis at least weekly and 11.9% used cannabis occasionally (68.7% smoked cigarettes only). Nearly all co-users (90.5%) reported smoking cannabis. Regular co-users were significantly more likely than cigarette-only smokers to be male, and all co-users were significantly more likely than cigarette-only smokers to be younger, have lower income, have depressive symptoms, use alcohol more frequently, and use multiple tobacco/nicotine products. All co-users were significantly less likely than cigarette-only smokers to have smoked cigarettes for longer than five years. There were no differences on any of the cigarette-dependence measures (e.g., plans to quit smoking, a recent quit attempt, perceived addiction to cigarettes, cigarettes smoked/day). Conclusions: Among adult daily cigarette smokers, cannabis use was not associated with differences in cigarette-dependence. There are, however, other implications of co-use that warrant further research as they may be related to worse outcomes, such as continued cigarette smoking, higher levels of depression, and more frequent alcohol use.

FUNDING: Federal; Academic Institution; Nonprofit grant funding entity

PP-6

CARCINOGENIC AND TOBACCO SMOKE DERIVED PARTICULATE MATTER BIOMARKER UPTAKE AND ASSOCIATED HEALTHCARE PATTERNS AMONG PEDIATRIC EMERGENCY DEPARTMENT PATIENTS

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Significance: Children with higher cotinine levels have higher healthcare utilization patterns, but cotinine may underestimate tobacco smoke exposure (TSE). Less is known on the associations of children's levels of tobacco-specific carcinogenic biomarkers (e.g., 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol (NNAL)) and particulate matter biomarkers (e.g., nicotelline N-oxides). The objective was to assess the associations of children's urinary cotinine, NNAL, and N-oxides levels, and parent-reported smoking and child TSE patterns with total hospital visits, pediatric emergency department (PED) visits, urgent care (UC) visits, revisits, and hospital admissions among 0-9-year-olds who lived with a smoker. Methods: PED/UC patients (N=242) who had baseline urine samples assayed for the TSE biomarkers were included. Biomarker levels were log-transformed, and linear and Poisson regression models were built while adjusting for child sociodemographics (age, sex, race, ethnicity, insurance), past medical histories, baseline visit season and year, and parent sex. Results: The geometric means of child cotinine, creatinine-adjusted NNAL, and N-oxides levels were 11.2ng/ml, 30.9pg/mg creatinine, and 24.1pg/ml, respectively. The mean (SD) number of daily cigarettes smoked by parents was 10.2 (6.1). Each one-unit increase in log-NNAL levels was associated with an increase in total UC visits (aRR=1.68, 95%CI=1.18-2.39) among 0-9-year-olds, and an increase in total hospital visits (aRR=1.88, 95%CI=1.13-3.13) and UC visits (aRR=5.64, 95%CI=2.15-14.82) among 5-9-year-olds over 6-months following their baseline PED/UC visits. Each one-unit increase in child log-NNAL/cotinine ratio (x10³) values was associated with an increase in total hospital visits (aRR=1.39, 95%CI=1.10-1.75) and UC visits (aRR=1.56, 95%CI=1.14-2.13) among 0-9-year-olds over 6-months. Conclusion: Higher urinary NNAL levels in individual and ratio form with cotinine increased young children's risk for healthcare visits over 6-months. Systematic screening for child TSE and the comprehensive assessment of TSE biomarkers during all healthcare visits should be considered to objectively measure young children's exposure.

FUNDING: Federal

PP-7

SMOKING CESSATION TREATMENT MECHANISMS- EVALUATING WITHDRAWAL RELIEF AS A MEDIATOR OF VARENICLINE EFFICACY

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Negative reinforcement models of addiction posit that cessation-induced withdrawal drives relapse back to smoking. Varenicline is hypothesized to aid cessation, in part, by attenuating withdrawal facets; however, this mediational pathway has not been formally evaluated in placebo-controlled trials. The present research used latent growth curves to model trajectories of withdrawal facets (craving, negative/positive affect [NA, PA], sleep problems) and tested the effect of varenicline on these changes (path a in the proposed mediational chain), the relationship between the trajectories and bio-verified smoking status at end of treatment (11 weeks post-quit; path b), and the degree to which these candidate mediators account for the effect of varenicline treatment on smoking status (indirect effect, a × b). Secondary data analysis was conducted on 828 treatment-seeking, cigarette using adults assigned to varenicline or placebo in a randomized controlled trial (NCT01314001). Self-reported craving, NA, PA, and sleep problems were assessed 1 week pre-quit, on the target quit day (TQD), and 1 and 4 weeks post-TQD. Across time, craving declined, NA and sleep problems peaked 1 week post-quit (ps < .05), and PA did not change. Lower elevations in NA trajectories during the first month of treatment modestly mediated the relationship between varenicline and higher cessation rates (Indirect effect 95% CI: 0.002 to 0.07; Model R2 = 0.13). Lower craving 1 week post-quit mediated the relationship between varenicline and higher cessation rates (CI: 0.08 to 0.30; R2 = 0.13). PA and sleep problems were not significant mediators. Sex and race moderated the mediated effect of NA with the effect being significant for females (CI: 0.33 to 1.55) and Caucasians (CI: 0.002 to 0.58) and non-significant for

males (CI: -0.05 to 0.16) and people of color (CI: -0.14 to 0.32). The present research provides modest support for the hypothesis that varenicline improves cessation rates via withdrawal-reduction, clarifies the relative importance of specific withdrawal facets for relapse, and suggests mechanisms of varenicline therapy vary depending on key participant characteristics (sex, race).

PP-8

RESULTS OF THE OASIS TRIAL: IMPLEMENTATION OF SMOKING CESSATION SERVICES WITHIN NCORP COMMUNITY SITES WITH ORGANIZED LUNG CANCER SCREENING PROGRAMS

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Background: CMS mandates that smokers undergoing lung cancer screening (LCS) be offered tobacco use treatment (TUT). How best to implement TUT during LCS is unknown. Methods: OaSiS is an effectiveness-implementation, cluster randomized trial of imaging clinics affiliated with the NCI Community Oncology Research Program (WF-20817CD). Eligible sites had 6 month LCS volume of >50 patients and a program champion to support implementation; eligible patients were current smokers presenting for LCS. Intervention sites received TUT training and co-developed a strategic plan for embedding systems-level changes and TUT into the workflow. Usual care sites received no training nor implementation support. Clinics were encouraged to adopt feasible and appropriate strategies, given existing or attainable imaging clinic and health system resources. The researchers provided no TUT services. The primary effectiveness outcome is 7-day tobacco use prevalence at 6-months. Multilevel logistic regression models adjusting for randomization, time and the random effect of site used an intent-to-treat analysis. Results: 26 imaging sites were randomized; 1 control and 1 intervention site withdrew. 1,100 participants were enrolled, of which 1,094 completed baseline and 956 completed 6-month surveys. 11.7% of participants reported no tobacco use at 6 months. The time trend was significant but tobacco use did not differ by arm (OR=0.96, 95%CI 0.62-1.51). Quit rates varied considerably across sites (0% -27%). The number of cessation services increased in the intervention arm (6.08 to 7.17) and decreased in the control arm (4.92 to 4.42) from baseline to follow-up, but differences were not significant. In both arms, patients were more likely to report being asked and advised to quit and receive self-help materials than to receive the most effective TUTs (pharmacotherapy, counseling). Conclusions: Given heterogeneity across sites in quit rates at 6 months and several high performing sites, further exploration of TUT adoption, fidelity and sustainability and their impact on patient outcomes will yield valuable information for scaling TUT in LCS.

PP-9

A SMART TRIAL OF SMOKING CESSATION INTERVENTIONS IN THE CONTEXT OF LUNG CANCER SCREENING: PLUTO STUDY RESULTS

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Introduction. The objective of the Program for LUng cancer screening and TObacco cessation study (PLUTO) was to identify the optimal sequence of smoking cessation treatments for smokers who respond incompletely and completely to first-line treatment (8 weeks of counseling with NRT), conducted in the setting of lung cancer screening (LCS). Methods. PLUTO was a multisite sequential, multiple assignment, randomized trial (SMART). Enrolled participants were currently smoking and met criteria for LCS – patients aged 55-79 with a cumulative smoking history of =30 pack-years (n=643). All participants received tobacco longitudinal care (TLC) for one year, defined as phone coaching and NRT. Participants with initial incomplete treatment response (any smoking after quit date) were randomized to continued TLC vs. TLC+Medication Therapy Management (TLC+MTM) to add prescription smoking cessation medications (e.g., varenicline or bupropion). Initial treatment responders were randomized to continued TLC monthly (TLC-M) vs. TLC quarterly (TLC-Q). Analysis of complete cases included 7-day point prevalent (PP) abstinence and 6-month prolonged abstinence at 18 months (primary outcome). Abstinence rates are adjusted for age, CPD, and site. Results. 82% of participants were retained at 18 months (n=529). Among incomplete treatment responders (n=416) 7-day PP abstinence for TLC vs. TLC+MTM was 27.4% vs 29.8%

(p=0.59). 6-month prolonged abstinence for TLC vs. TLC+MTM was 16.4% vs. 17.8% (p=0.70). Among complete responders (n=113) 7-day PP abstinence for TMC-M vs. TLC-Q was 69.0% vs. 58.2% (p=0.25). 6-month prolonged abstinence for TLC-M vs. TLC-Q was 58.6% vs. 43.6% (p=0.11). Conclusions. For incomplete responders to initial treatment adding prescription medications to TLC did not yield further benefit. For those with a good initial treatment response monthly follow up showed a nonsignificant benefit. Overall, TLC yielded high quit rates, even for initial incomplete treatment responders. Results from this SMART inform decisions regarding the intensity and sequence of smoking cessation treatments for millions of current smokers who will undergo annual low-dose CT scanning for LCS.

PP-10

NCI SMOKING CESSATION AT LUNG EXAMINATION (SCALE) TRIALS: BASELINE CHARACTERISTICS AND COMPARISON WITH THE US GENERAL POPULATION OF LUNG CANCER SCREENING ELIGIBLE PATIENTS

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Objective. The NCI SCALE collaboration consists of 8 clinical trials that are testing smoking cessation interventions in the context of lung cancer screening (LCS). This investigation compared the pooled demographic and smoking parameters of SCALE trial participants to LCS eligible smokers in the US general population (US POP-LCS ELIG SM). Methods. Baseline variables from the SCALE Special Measures Collection (age, gender, race, ethnicity, education, income, cigarettes per day [CPD], and time to first cigarette) from 3614 smokers enrolled in SCALE trials as of September 2020 were compared to pooled data from TUS-CPS (2018-19), NHIS (2017-2018), and PATH (Wave 4–2017) from US POP-LCS ELIG SM (age 55-80, 30 pack-year smoking history, n=4,803) and smokers in the general population age 55-80 (n=13,141). Standardized sample weights were used in analyses of pooled national data. Results. The average age of SCALE participants is 63.5 years (SD 6.0) vs. 63.3 (SD 6.3) in US POP-LCS ELIG SM. There is a higher proportion of males than females in SCALE (51.6%) and US POP-LCS ELIG SM (57.1%). Race and ethnicity distributions were similar in SCALE vs. US POP-LCS ELIG SM (85.4% vs. 88.5% White, 11.6% vs. 8.1% Black, 0.5% vs. 0.6% Asian, 2.5% vs. 2.8% other race/multi-racial, 3.2% vs. 3.4% Hispanic). Regarding education, 40.6% of SCALE participants vs. 59.9% in US POP-LCS ELIG SM had graduated HS/GED or less. Approximately half in both groups earned 73% smoked within 30 minutes of waking). LCS eligible smokers in SCALE and US POP-LCS ELIG SM had higher CPD and a shorter time to first cigarette than age-matched smokers in the general population. Conclusions. SCALE participants smoke slightly less than US POP-LCS ELIG SM but are otherwise quite representative. Therefore, SCALE trial results will be generalizable to the US population of LCS eligible smokers.

PP-11

READINESS AND CAPACITY OF LUNG CANCER SCREENING SITES TO DELIVER TOBACCO USE TREATMENT

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Background: Lung cancer screening (LCS) provides an unprecedented opportunity to deliver evidence-based tobacco use treatment (TUT) interventions; however, little is known about the current practices and readiness of LCS programs to deliver TUT. The NCI-funded SCALE Collaboration includes 8 clinical trials examining the effectiveness and implementation of TUT interventions during LCS. Methods: Key stakeholders representing 49 nationwide LCS sites completed baseline surveys (1/site) prior to trial enrollment. Survey items assessed organizational characteristics (location, payor mix, screening volume, and type of facility), frequency of 10 evidence-based TUT practices (always/mostly vs. sometimes/rarely/never) and 4 items about organizational priority for

TUT. Sites that reported always/mostly delivery of Ask, Advise, and Assist with medication and counseling were considered to provide high quality TUT. Results: Imaging sites were predominantly hospital owned (53%), in urban areas (94%), and screened an average of 262 patients in the past 6 months. 16 (33%) had a tobacco treatment specialist (TTS) onsite. Most sites reported routinely asking patients about current smoking status (86%) and routinely advising smokers to quit (76%) during LCS. However, less than half reported routine delivery of tobacco treatment assistance, such as providing: self-help materials (47%), quitline referrals (42%), individual counseling (39%), and cessation medication (31%). 13 of 49 sites offered high quality TUT (27%). Despite these gaps, most (61%) sites indicated that integrating TUT best practices is a top priority; strong TUT endorsement was more likely among the sites with an embedded TTS (79% vs. 52%, p=.15). Sites with an embedded TTS were also more likely (44% vs 18%, OR=3.5, p=.09) to offer high quality TUT services. Conclusions: Findings reveal gaps in delivery of high quality TUT in LCS and underscore the importance of addressing barriers for TUT in LCS settings. Findings suggest having access to a TUT specialist supports high quality cessation support and provide a benchmark for subsequent implementation efforts to improve TUT delivery in routine LCS.

PP-12

CHARACTERISTICS OF REGISTERED CLINICAL TRIALS EVALUATING THE ROLE OF E-CIGARETTES IN CESSATION OR REDUCTION OF CIGARETTE SMOKING

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Significance: Although e-cigarettes have been proposed as a less harmful substitute for cigarettes that could promote smoking cessation or reduction, a recent meta-analysis review concluded the published evidence is imprecise, subject to study design biases, and that little is known about the effects of newer types of e-cigarettes, such as pod devices, that may deliver nicotine more effectively. Therefore, an important question is whether new and ongoing studies will address these gaps and help improve our understanding of the effects of e-cigarettes on smoking cessation or reduction. Methods: We searched all clinical trials registered in the WHO Registry Network in January 2021 to identify trials studying the effects of e-cigarettes on smoking cessation or reduction. Search results were screened manually to locate English-language records for trials studying e-cigarette use with primary or secondary outcomes of smoking cessation, reduction, or related biomarkers. For eligible trials, we recorded information about participants, study design, primary/secondary outcomes, and e-cigarette characteristics (e.g., device, nicotine concentration, flavor). Results: We identified 29 completed and 37 ongoing trials on 4 registries. About half (35, 53%) of the 66 completed and ongoing trials were recruiting individuals motivated to quit smoking, but only 23 (35%) included behavioral support for cessation. Although completed and ongoing trials had similar sample sizes (median 140), durations (median 12 weeks), comparators (e.g., Nicotine Replacement Therapy [23/66, 35%]), and outcomes, ongoing trials were less likely to assess outcomes at 6 months or longer (ongoing, 14/37 [38%]; completed, 21/29 [72%], χ2(N=66)=7.80, P=.005). Regarding e-cigarette device characteristics, none of the completed trials reported studying newer pod devices and only a small proportion of ongoing trials did (6/37, 16%). Conclusions: Our evaluation suggests that additional studies will be needed to address important questions about the degree to which e-cigarettes, especially newer devices, influence cigarette cessation.

PP-13

GENOME-WIDE METHYLATION OF SMOKERS AND EX-SMOKERS IS ASSOCIATED WITH COGNITIVE PERFORMANCE

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Significance: DNA methylation is an epigenetic regulator of gene expression critical to normal cellular development. Alterations in DNA methylation profiles have been associated with cancer and can also be influenced by environmental factors such as nutrition, stress/trauma, toxicant exposure, and smoking. A small but growing literature indicates there are reproducible and robust differences in methylation among smokers, never-smokers, and ex-smokers. Here, we compared DNA methylation patterns among current and ex-smokers (at least 2 years abstinent). Methods: Smokers (n = 26) and ex-smokers (n = 30) provided detailed smoking histories, completed the Paced

Auditory Serial Addition Test (PASAT), and submitted a saliva sample. Whole-genome DNA methylation from saliva was performed using the Infinium MethylationEPIC 850K BeadChip. An ANCOVA model and a receiver operating characteristic (ROC) curve analyzed the difference between groups and the performance of significant CpG sites. Results: After controlling for race, age, and gender, smokers had significantly lower methylation levels than ex-smokers in two CpG sites: cg05575921 (AHRR) and cg21566642 (ALPPL2). Based on the ROC analyses, both CpGs had strong classification potentials (cg05575921 AUC = 0.97 and cg21566642 AUC = 0.93). Across all subjects, the percent methylation of cg05575921 (AHRR) positively correlated with the length of the last quit attempt (r = 0.65, p < .001) and PASAT accuracy (r = 0.29, p = .03). Conclusions: AHRR, the aryl hydrocarbon receptor repressor gene, plays an important role in inflammation, cell differentiation, and cell cycle control. In spite of the small sample size, our results replicate previously reported differences in AHRR hypomethylation among smokers. Furthermore, we show that duration of smoking abstinence is associated with a recovery of methylation in ex-smokers, which may be a linked to reduced risk of smoking-associated diseases. The association with cognitive performance suggests that the hypomethylation of AHRR in saliva may reflect systemic exposure to cigarette-related toxicants that negatively affect brain function.

PP-14

TOBACCO TREATMENT OUTCOMES FOR HOSPITAL PATIENTS WITH AND WITHOUT MENTAL HEALTH DIAGNOSES

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Background: Despite significantly higher prevalence of tobacco use, those with diagnosed mental health disorders are understudied within general inpatient hospital settings. The current study seeks to examine the effectiveness of a brief opt-out inpatient tobacco treatment intervention for those with mental health diagnoses as compared to those without, as well as evaluate associations of mental health conditions on smoking characteristics. Methods: Data included 4517 admitted patients from July 2014-December 2019 who completed a tobacco treatment visit. Post-discharge abstinence was obtained via an automated Interactive Voice Response (IVR) phone system. Logistic regressions were conducted using electronic medical recorded-documented mental health diagnoses, smoking status and history, and post-discharge abstinence. Results: Among those who responded to IVR calls, logistic regression analysis indicated poorer response to treatment for those with mental health diagnoses compared to those without such diagnoses (38% abstinence vs 48%). Those with documented psychopathology were 31.5% less likely to be abstinent at follow-up (B = -.378, p < .01). A second logistic linear regression was run using total number of mental health diagnoses on cigarettes per day. Results of this analysis indicated that daily smoking rates increase with the presence of mental health problems (B = 1.13, p < .001). Increases in mental health diagnoses were also associated with decreased self-reported importance of quitting (r=-.10; p < .001), and less self-efficacy related to quitting (r=-.11; p < .001). Conclusions: Brief inpatient tobacco treatment interventions are less effective for those with psychopathology. These patients are more likely to use tobacco following discharge, and report being less motivated and less able to quit. Future research is needed to develop brief, effective tobacco treatment for hospital patients with comorbid mental health diagnoses, while also facilitating bridges to outpatient care.

PP-15

PAIN INTENSITY AS A PREDICTOR OF CIGARETTE AND E-CIGARETTE USE/CO-USE ACROSS WAVES 1-4 OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY: THE MODERATING ROLE OF SEX

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Significance: Pain has been implicated in the onset and maintenance of nicotine addiction (LaRowe & Ditre, 2020), and there is emerging cross-sectional evidence of covariation between the experience of pain and use/co-use of cigarettes and e-cigarettes (Powers et al., 2020; 2021). Although men have been shown to demonstrate greater nicotine analgesia and women with pain tend to report greater nicotine dependence, we are not aware of any previous research that examined the role of sex in pain-cigarette/e-cigarette relations. The goals of the current project were to (1) prospectively test pain intensity as a predictor of initiating co-use of cigarettes and e-cigarettes, (2) examine associations

between pain intensity and likelihood of endorsing exclusive e-cigarette use, exclusive cigarette use, or co-use of cigarettes + e-cigarettes, and (3) examine sex as a moderator of proposed associations. Method: Data were drawn from Waves 1-4 of the PATH Study (2013-2018). Past-week pain was assessed using a 0-10 numerical scale. Population weights were applied for all models. Survival analysis and generalized estimating equation models were conducted (controlling for relevant sociodemographic factors). Results: Among exclusive cigarette users (n = 7,719), pain intensity at Wave 1 was positively associated with likelihood of initiating e-cigarette co-use at a subsequent wave (p < .05). A significant pain x sex interaction (p < .05) revealed this prospective relationship was stronger among female respondents. Cross-sectional Wave 4 analyses (n = 33,822) revealed a significant pain x sex interaction, such that pain was more strongly associated with likelihood of exclusive cigarette use, exclusive e-cigarette use, and co-use of cigarettes/e-cigarettes among female respondents (ps < .001). Conclusion: These findings build upon an accumulating, yet largely cross-sectional, literature indicating that pain may serve as a risk factor in the onset and maintenance of cigarette and e-cigarette use/co-use. Future prospective research is needed to examine trajectories and temporal precedence of pain in relation to use/co-use of cigarettes, e-cigarettes, and other nicotine products.

PP-16

A META-ANALYSIS OF THE EFFICACY OF SMOKELESS TOBACCO FOR SMOKING CESSATION

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Significance: Despite rigorous tobacco control strategies implemented globally, tobacco addiction and smoking remain prevalent. Swedish snus, a type of low-nitrosamine smokeless tobacco, could reduce harms from tobacco addiction due to smoking. Scientific evaluations of the efficacy of smokeless tobacco appear conflicted. The present study aimed to systematically review the findings of studies assessing the efficacy of these products in smoking cessation. **Methods:** Randomised controlled trials (RCTs), longitudinal and cross-sectional studies that evaluated the effectiveness of Swedish snus and other low-nitrosamine smokeless tobacco products were identified using PubMed, Web of Science and PsycINFO. Random effect meta-analytic models were used to test the effect of smokeless tobacco for smoking cessation in RCTs, longitudinal, and cross-sectional studies. **Results:** Use of smokeless tobacco products such as Swedish snus was associated with increased abstinence in longitudinal (RR = 1.38, 95% CI [1.05, 1.82], p = .022) and cross-sectional (OR = 1.87, 95% CI [1.29, 2.72], p = .001) studies. Leave-one-out analysis determined that the significant association in longitudinal studies was mainly driven by one finding, the removal of which yielded statistically non-significant results. Lastly, participants in RCTs that were randomised to receive smokeless tobacco did not have higher rates of abstinence when contrasted against those receiving nicotine replacement therapy or a nicotine-free control. **Conclusion:** There is weak evidence for the efficacy of smokeless tobacco in smoking cessation. Most of the evidence for support of smokeless tobacco was from cross-sectional studies conducted in Scandinavian countries. Wider adoption of Swedish snus is unlikely to significantly reduce smoking and tobacco addiction.

PP-17

UTILIZATION AND EFFICACY OF SMARTPHONE APPLICATIONS FOR SMOKING CESSATION AMONG LOW-INCOME SMOKERS. ANALYSIS OF THE ICANQUIT RANDOMIZED CONTROLLED TRIAL

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Background: Limited access to evidence-based smoking cessation interventions among low-income individuals contributes to high rates of cigarette smoking and poor cessation outcomes. Yet, evidence of digital smoking interventions that are accessible and efficacious among low-income individuals is scarce. In a secondary analysis, data from the two-arm randomized iCanQuit parent trial was used to determine the utilization and efficacy of an Acceptance and Commitment Therapy (ACT)-based smartphone application (iCanQuit) vs. a US Clinical Practice Guidelines (USCPG)-based smartphone application (QuitGuide) for smoking cessation among low-income adults. **Methods:** Individuals who smoked at least 5 cigarettes/day with smartphone access were enrolled

between May 2017 and September 2018. Participants (n=863) were randomized 1:1 to either iCanQuit (n=416) or QuitGuide (n=447) for 12-months. The primary outcome was self-reported complete-case 30-day point prevalence abstinence (PPA) at 12-months. All participants provided consent online and were compensated to up to $105 for completing study data collection. Study retention, treatment utilization and satisfaction, and change in ACT-theory based processes were also compared between arms. **Results:** Among low-income trial participants (n=863) recruited from 48 U.S. states, 24% resided in a rural area, 39% were non-White, and 10% were Hispanic. Data retention was 88% at 12-months and did not differ by arm (p>.05). The 30-day PPA was 27% for iCanQuit vs. 20% for QuitGuide at 12-months (OR=1.46 95% CI: 1.04, 2.06). Increased acceptance of internal cues to smoke mediated the effect of treatment on cessation. iCanQuit participants were significantly more engaged and satisfied with the iCanQuit application relative to QuitGuide. **Conclusions:** In a racially/ethnically diverse sample with high retention rates and participant engagement, this study showed that an accessible smartphone application was efficacious for smoking cessation among low-income individuals. To address smoking-related disparities among socioeconomically disadvantaged smokers, a dissemination trial of the iCanQuit application for smoking cessation is warranted.

PP-18

EXAMINING THE IMPACT OF ECOLOGICAL MOMENTARY ASSESSMENT ON SMOKING CESSATION IN A PUBLICLY AVAILABLE CESSATION SMARTPHONE APPLICATION

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Significance: Smoking remains a leading cause of cancer and cancer-related mortality. Smartphone-based cessation applications (apps) can effectively support smoking cessation. However, little is known about the influence of specific app features on cessation. One feature that provides insight into smoking behavior and can provide personalized support is app-based ecological momentary assessments (EMAs). EMAs have been integrated into commonly used in cessation apps, but less understood is whether EMA participation impacts cessation outcomes. Prior studies that have included EMAs have not had a non-EMA comparator and were not conducted in a real-world setting. The goal of this study was to examine the impact of influencing app-based EMA participation on short-term smoking cessation. Methods: N=152 participants were randomized into an EMA incentivized arm (EMA arm) or a non-EMA incentivized arm (i.e., only survey completion was incentivized). All participants downloaded and used quitSTART, a publicly available app offered through Smokefree.gov, which sends three EMA prompts a day for two weeks as part of normal app functionality (n=42 total prompts). All participants were asked to complete a baseline survey, and follow-up surveys at two and four weeks to assess smoking status. EMA participation was calculated as mean EMAs completed per group and compared using a t-test. Seven-day point prevalence abstinence by arm was compared using chi-square tests with an intention to treat approach. Results: Mean EMAs completed in the EMA arm was 13.3 (SD=11.2, range=0-40) compared to 4.7 (SD=5.8, range=0-28) in the survey only arm (p<0.001). Seven-day abstinence rates were 9.0% and 20.3% at two-weeks (p=0.062), and 17.5% and 36.6% at four-weeks (p=0.013) in the EMA arm and survey only arm, respectively. Conclusions: This study successfully incentivized EMA completion within a cessation app yet, cessation rates were higher in the survey only arm at 4 weeks. The results of this study help us understand the role of EMA when offered within a publicly available setting. It appears that autonomy to use the app as desired resulted in higher short-term cessation rates. Ongoing analyses are exploring other patterns of app use to provide additional context for these initial findings.

PP-19

DEVELOPMENT OF AN AUTOMATED VIDEO-ASSISTED SMOKING TREATMENT FOR PEOPLE WITH HIV

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Efforts to develop, evaluate and implement smoking cessation treatment for people with HIV are a public health priority. We describe the development of an mHealth intervention consisting of dynamically tailored automated video-assisted smoking treatment (AVAST). Data from the team's earlier trials were used to inform decisions about treatment modality, dose, and duration. Next, 2 pilot studies among PWH were conducted: 1) qualitative

interviews (n=10) to evaluate user interface, treatment content, and platform stability; and 2) pilot RCT (n=20) to evaluate feasibility, acceptability and preliminary efficacy at a 3-month follow-up. A phase III RCT (n=474) compared a 12-week intervention of cell phone counseling and reminder text messages to standard care. A significant treatment effect was observed (OR=2.46, 95% CI: 1.03, 5.94) but relapse rates at 12-months were high. A second RCT (n=624) evaluated the utility of automated and dynamically tailored text messaging. Participants who received text messages + counseling were twice as likely to be abstinent (vs. standard care or text messages alone) at 6-months. An implementation trial with approximately 1400 PWH who smoke found that participants preferred an automated mHealth cessation intervention over traditional phone counseling (92% vs. 8%). Findings from our pilot with AVAST established the technical stability of the new mobile application, while also informing an algorithm-based treatment content selection approach. The pilot RCT showed that engagement (i.e., completed sessions) was higher among PWH who received AVAST (12) versus the human-delivered control group (2.5). Abstinence rates at month 3 were greater in the AVAST group vs. the control group (30% vs. 10%). Our findings demonstrated: 1) traditional cessation treatment produced modest (5%) long-term abstinence among PWH; 2) text messaging alone (vs. standard care) did not increase abstinence; 3) PWH preferred automated mHealth (vs. human-delivered) treatment; and 4) our new AVAST intervention produced promising feasibility and preliminary efficacy findings. A fully powered 2-group RCT to evaluate AVAST among PWH in Florida is ongoing.

PP-20

'LOVE MY LUNGS' - A SMOKE-FREE HOME INTERVENTION FOR FAMILIES OF BABIES ADMITTED TO NEONATAL INTENSIVE CARE

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Significance: Tobacco smoking has a severe detrimental impact on parental and child health. Pregnant women who smoke are more likely to give birth to a low birthweight or premature baby, requiring admission to neonatal intensive care (NICU). Preterm birth offers a 'teachable moment' to support parents to quit smoking, remain smokefree, and maintain smokefree environments. UK guidance recommends support for smoke-free strategies in secondary care settings during pregnancy and after childbirth, but interventions are not routinely offered in NICU. **Methods:** This study took a theory-based approach to intervention development, being underpinned by a logic model derived from existing evidence and qualitative development work. Focus groups and interviews with parents and family members of babies admitted to NICUs (n=60) sought feedback on potential intervention approaches, considering 'who' might introduce, 'what' might be the content, and 'when' an intervention might be delivered. A final phase of person-centred intervention development (n=10) working with NICU parents who smoke, assisted with refining 'how' the intervention might best be implemented. **Results:** Parents were amenable to smoking cessation and surprised that it was not offered. Support might best be delivered by a NICU nurse with specialist training, reinforced by a Doctor or Consultant, taking a 'whole unit' approach. Support with cessation and relapse prevention through information about smoke-free homes, and support to use nicotine in less harmful ways were identified as important. Parents wanted health messages to be hard hitting, give factual advice about the harms of smoking on vulnerable infants specifically, come from the perspective of the baby, and wanted information to be delivered in novel ways. **Conclusions:** A complex intervention comprising staff training to facilitate active acknowledgement of smoking status of parents of babies on NICU, timely support, and educational messages delivered by innovative virtual reality (VR) short clips is presented. The intervention will be made widely available across UK NICUs with ongoing implementation evaluation.

PP-21

DEVELOPMENT AND ANALYSIS OF TOBACCO TREATMENT MEASURES FOR CANCER REGISTRIES FOR LONGER-TERM QUALITY IMPROVEMENT

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Significance. Treating tobacco use is a firm recommendation for best practices in cancer care due to the negative impact of continued tobacco use both during and after cancer treatment. The lack of regular tracking/reporting of tobacco treatment metrics may contribute to a failure to provide systematic and comprehensive tobacco treatment

in cancer care settings. **Methods.** As part of the C3i quality improvement initiative to improve tobacco treatment in NCI-designated cancer centers, we developed two new tobacco treatment measures for our local organization's cancer registry to track provision of behavioral support and pharmacotherapy. Tobacco treatment was compared by year, cancer type, and whether or not the cancer type was one of 12 tobacco-related cancers (TRC). These data were used to create feedback reports for cancer center leadership. **Results.** Of 17,735 cancer cases in the registry from 2017-2019, both measures were captured on 99.5% of patients, with 3,091 (17.4%) identified as tobacco users. Overall, 557 (18.0%) of tobacco users received either a tobacco medication or behavioral support; with 478 (15.5%) receiving behavioral counseling, 352 (11.4%) receiving medication, and 273 (8.8%) receiving both. The odds of receiving any type of tobacco treatment was 93% higher (OR=1.93, 95% CI=1.59-2.34, p<0.0001) if the patient had a TRC. Comparing total tobacco treatment by those who had a TRC or a non-tobacco related cancer (NTRC), respectively, 22.2% vs. 12.9% received any type of treatment; 11.3% vs. 5.8% received both types of treatment; 14.3% vs 7.9% received a medication and 19.3% vs 10.8% received behavioral support. The odds of receiving gold standard treatment including both a medication and behavioral support increased from 4.8% in 2017 to 10.8% in 2019 (OR=2.37, 95% CI=1.63-3.46, p<0.0001); but improvements varied substantially across cancer types. **Conclusion**. Tobacco treatment can be captured as part of a cancer registry and used to identify opportunities for improvement and track the changes over time. Patients with TRC are more likely to receive treatment, but there are opportunities to improve tobacco treatment across all cancer types.

PP-22

RANDOMIZED CONTROLLED TRIAL OF A MINIMUM VIABLE PRODUCT (MVP) DIGITAL THERAPEUTIC FOR SMOKING CESSATION

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Significance: Few smartphone apps for smoking cessation have undergone rigorous evaluation. A minimum viable product (MVP) is a digital software application that contains the minimal feature set necessary to meet users' needs and establish efficacy. Clickotine®-MVP (CKT-M) is a digital therapeutic that delivers the essential elements of the U.S. Clinical Practice Guidelines for smoking cessation in a series of daily brief "missions." CKT-M also provides users with supportive 1-way text messages and other content based on cognitive behavioral therapy. Methods: We conducted a randomized controlled trial of CKT-M vs. QuitGuide (QG), a free app from the National Cancer Institute that also delivers content consistent with clinical guidelines. Participants (N = 158) were U.S. adults (68% female) who smoked at least 5 cigarettes daily and wanted to quit within the next 30 days. They were recruited from social media and mail sent to people covered by a value-based care program. After completing a baseline survey, participants were randomized to CKT-M or QG. To minimize bias, participants and investigators were blinded to app assignment and the study sponsor was not revealed until the study was over. Self-reported smoking and breath carbon monoxide (CO) were assessed after 8 weeks of use. Results: There were no statistically significant differences between CKT-M and QG in 7-day (30.4% vs. 31.6%) or 30-day (12.7% vs. 16.5%) self-reported abstinence, nor in mean CO (all p's > .05). Additionally, there were no significant differences between the apps in ratings (5-pt scales) of satisfaction, ease of use, or helpfulness (all p's > .05). More participants in QG (29.1%) dropped out than in CKT-M (16.5%) (p = .09). There were no adverse events related to use of either app. Conclusion: CKT-M is likely to meet the criteria for an MVP. CKT-M serves as a stable ("version-locked"), internal benchmark to inform development of novel current versions of CKT with features such as adaptive, personalized engagement messaging using artificial intelligence (AI), AI-supported 2-way text messaging with licensed clinical social workers, and integrated access to nicotine replacement therapy.

PP-23

EMISSIONS FROM CONVENTIONAL CIGARETTES AND IQOS HEETS: A COMPARATIVE STUDY ASSESSING THE IMPACT OF MORE INTENSE SMOKING PARAMETERS ON EMISSION COMPOSITION

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Significance: iQOS is gaining more and more popularity worldwide, due to the industry claims of reduced toxicity. However, a detailed chemical characterization of iQOS emissions is lacking. Moreover, the impact of different smoking topographies on iQOS aerosol composition is still unknown. In this study, emissions from two conventional cigarettes (CCs) and from nine iQOS HEETS were compared applying Health Canada Intense (HCI) and a total of four more intense smoking topographies. **Methods**: Emissions were generated using a linear smoking machine (for CCs) and a linear vaping machine (for iQOS HEETS). HCI smoking parameters were systematically changed in the more intense smoking regimes (puff volume from 55mL to 90mL,puff duration from 2s to 4s and puff frequency from 30s to 15s). All extraction and determination procedures were in accordance with WHO Tobacco Laboratory Network (TobLabNet) Standard Operating Procedures. Nicotine was measured by GC-FID. Tobacco-specific nitrosamines (TSNAs) were quantified with LC-MS, while carbonyls were assessed with HPLC-DAD. **Results**: Nicotine delivery from iQOS HEETS was 38% lower than from CCs. A clear topography effect was observed for all products: higher puff volume and puff duration caused a mean 22% increase in nicotine release and a 21% increase in TSNAs delivery compared to HCI. Of note, aerosols from the assessed iQOS HEETS showed significant differences in TSNAs levels: mainstream emissions from iQOS Sienna and iQOS Amber contained the highest TSNAs concentrations, on average 26% higher than from the other iQOS HEETS. Higher puff volume and puff duration majorly impacted iQOS HEETS emissions, whereas CCs emissions were mainly affected by higher puff frequency. **Conclusions**: The observed differences in toxicant levels delivery from iQOS HEETS resemble their different product composition, thus distinct tobacco blends and flavoring additives. The more intense smoking parameters induced higher nicotine, TSNAs and carbonyls release in all the analyzed products. As more intense smoking regimes better mirror real-life smoking behaviors, this study shows the inadequacy of HCI as standard smoking regime in laboratory settings.

PP-26

SEX/GENDER DIFFERENCES IN TRIGGERS FOR THINKING ABOUT QUITTING SMOKING. FINDINGS FROM THE INTERNATIONAL TOBACCO CONTROL (ITC) NETHERLANDS SURVEY

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Significance: Studies have identified differences in smoking cessation between women and men, e.g. women have more difficulty with remaining quit than men. Most studies have only examined differences between women and men and have ignored sex/gender minority populations. The first aim of this study is to examine differences between women, men, and sex/gender minority populations in triggers for thinking about quitting smoking. The second aim is to examine interactions with age group, education, and income. **Methods:** We used cross-sectional data from the International Tobacco Control (ITC) Netherlands Survey conducted in 2020. We measured sex assigned at birth, current gender identity, and the extent to which respondents felt masculine or feminine. We distinguished between individuals who (1) were born as female and identified as women and feminine (referred to as women, n=670), (2) were born as male and identified as men and masculine (referred to as men, n=897), and (3) all others (referred to as sex/gender minorities, n=220). We used a list of 15 items and asked respondents whether each of these led them to think about quitting in the past six months. **Results:** For most triggers we found no significant differences between women, men, and sex/gender minorities. There were no significant interactions with age group, education, or income. Sex/gender minorities were significantly more likely to report the following triggers: quit advice from a doctor, an anti-smoking message or campaign, smoking restrictions at work, and the availability of a telephone helpline. Men were significantly less likely to

report the price of cigarettes and the coronavirus outbreak as trigger than women, but these differences were not significant in adjusted models. **Conclusion:** For most triggers for thinking about quitting smoking there were no (or only small) differences between women, men, and sex/gender minority populations. Sex/gender minority populations were more likely to report a number of triggers. A possible explanation is that they feel marginalized, which causes a desire for social inclusion. Such a desire can make one more receptive for all kinds of triggers to quit smoking.

PP-27

PREVALENCE OF CURRENT LARGE CIGAR VERSUS LITTLE CIGAR/CIGARILLO SMOKING AT THE INTERSECTION OF AGE AND RACE/ETHNICITY AMONG U.S. ADULTS, 2018-2019

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Significance: Cigar smoking is increasing among non-Hispanic Black adults in the U.S. We examined the prevalence of large cigar vs. little cigar/cigarillo (LCC) smoking by age and race/ethnicity, and as well as at their intersection. **Methods:** We analyzed data from the 2018-2019 Tobacco Use Supplement to the Current Population Survey (n=134,900). We examined age and race/ethnicity associations with current large cigar and LCC smoking vs. non-cigar smoking in a multivariable multinomial logistic regression model and also examined the age*race/ethnicity interaction. A multivariable logistic regression model was then used to examine these associations for LCC smoking vs. large cigar smoking among cigar smokers. We stratified these models by age and examined associations between race/ethnicity and type of cigar smoking. We adjusted for other sociodemographic variables and other tobacco use in the models. **Results:** Overall, 1.1% and 0.8% of U.S. adults currently smoked large cigars and LCCs. Younger adults (vs. 61+ years-old) were more likely to smoke large cigars vs. not smoke any cigars (e.g., Prevalence[18-30 years-old]=1.2%, Prevalence[61+ years-old]=0.8%; AOR=1.3, 95% CI=1.1-1.6) and LCCs (e.g., Prevalence[18-30 years-old]=1.0%, Prevalence[61+ years-old]=0.4%; AOR=1.9, 95% CI=1.5-2.4). Non-Hispanic Black adults were more likely than non-Hispanic White adults to smoke LCCs vs. not smoke cigars (1.9% vs. 0.6%; AOR=2.9, 95% CI= 2.3-3.5). We found an age*race/ethnicity interaction on cigar smoking (*p*<0.01), and that LCC smoking prevalence was the highest among non-Hispanic Black young adults (18-30 years-old; 2.7%) and lowest among non-Hispanic other race 61+ years-old (0.2%). Compared to 61+ years-old, younger non-Hispanic Black adults were more likely to smoke LCCs vs. not smoke cigars (e.g., 18-30 years-old AOR=3.9 95% CI=2.5-6.1) and vs. large cigars (e.g., 18-30 years-old AOR=4.8 95% CI=2.4-9.7). **Conclusion:** LCC smoking is most prevalent among non-Hispanic Black young adults, while a pattern of large cigar smoking is less clear. LCC smoking prevention and cessation efforts should prioritize non-Hispanic Black young adults, who are disproportionately affected.

PP-28

U.S. TOBACCO USE DISPARITIES AND THE HEALTH OF VULNERABLE PATIENTS IN THE TOBACCO ENDGAME

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BACKGROUND. Smoking prevalence is declining in the U.S. (currently ~14%), but remains high/is declining more slowly in "vulnerable" populations. We used the Simulation of Tobacco and Nicotine Outcomes and Policy (STOP) microsimulation model to estimate the impact of tobacco use disparities on vulnerable populations' health on the way to achieving the tobacco "endgame." METHODS. In the STOP model, we simulated cohorts of people representative of the non-institutionalized U.S. population aged ≥20y starting in 2018, with new 20-year-olds joining annually. We modeled four subgroups: those with low socioeconomic status (SES; income <100% the US federal poverty level, <high school education, or Medicaid participation; smoking prevalence=21%) vs. not, or serious psychological distress (SPD; Kessler6 score≥13; smoking prevalence=32%) vs. not. (Low SES and SPD comparisons were not mutually exclusive). In the model, individuals transition monthly between never/former/current smoking based on rates of initiation, cessation, and relapse. They face tobacco use and subgroup-stratified all-cause mortality. Most input parameter data were derived from the National Health Interview Survey. We assumed smoking prevalence will decline over time due to trends in reduced initiation, ongoing cessation at current rates, and smokers dying. We sim-

ulated each subgroup until reaching 5% smoking prevalence (a common "endgame" threshold), tracking cumulative years of life lived. RESULTS. We projected that those with low SES will achieve 5% smoking prevalence in 33 years, 12 years later than those with higher SES. Those with SPD will reach the 5% threshold in 41 years, 14 years later than those without SPD. If baseline smoking prevalence and declines in smoking initiation for vulnerable populations were to equal those of less vulnerable populations, there would be 22 million (1.2%) (low SES) and 8 million (3.5%) (SPD) more years of life lived than under the status quo. CONCLUSIONS. Absent major efforts to reduce tobacco use disparities, vulnerable populations will suffer substantial tobacco-related health consequences for many years after they have been minimized for less vulnerable groups.

PP-29

SOCIODEMOGRAPHIC DISPARITIES IN TOBACCO RETAILER DENSITY IN THE UNITED STATES, 2000 - 2017

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Significance: Studies find differences in tobacco retailer density according to neighborhood sociodemographic characteristics, raising issues of social justice, but not all research is consistent. This study examined associations between tobacco retailer density and neighborhood sociodemographic characteristics in the United States (US) at four timepoints (2000, 2007, 2012, 2017) and investigated if associations remained stable over time. **Methods:** Data on tobacco retailers came from the National Establishment Time-Series Database. Adjusted mixed-effects linear models examined the relationship between census tract retailer density and census tract sociodemographic characteristics (% non-Hispanic Black [Black], % Hispanic, % vacant housing units, median household income), controlling for percentage of youth, urbanicity and US region. To examine whether the relationship between density and sociodemographic characteristics changed over time, additional models were estimated with interaction terms between each sociodemographic characteristic and year. **Results:** Tobacco retailer density ranged from 1.2-1.4 retailers/1,000 persons from 2000 to 2017. In each year, there were significant, positive relationships between tobacco retailer density and the percentage of Black (b = 0.02 [0.01, 0.02] to 0.03 [0.02, 0.03]) and Hispanic (b = 0.03 [0.02, 0.04] to 0.04 [0.03, 0.05]) residents and the percentage of vacant housing units (b = 0.13 [0.12, 0.14] to 0.20 [0.18, 0.21]) in a census tract. Retailer density was negatively associated with income (b = -0.10 [-0.11, -0.10] to -0.06 [-0.06, -0.06]) in a census tract. From 2000 to 2017, the relationship between retailer density and income and vacant housing units became weaker. **Conclusions:** Despite the weakening of some associations, there are sociodemographic disparities in tobacco retailer density from 2000 to 2017, which research has shown may contribute to inequities in smoking.

PP-30

SOCIOECONOMIC STATUS ACROSS THE LIFE COURSE AND SMOKING TRAJECTORIES OF OLDER ADULT SMOKERS IN THE U.S.

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Significance: Socioeconomic status (SES) at different stages of the life course impacts late-life health. However, whether SES across the life course impacts smoking trajectories in late life is not known. The objective of this study is to assess how lifetime SES impacts smoking cessation among older smokers in the U.S. Methods: We identified 6,058 current smokers 50 years and older from the 1998-2018 waves of the Health and Retirement Study (HRS). The HRS is a nationally representative longitudinal study of older adults in the U.S. The outcome was smoking cessation, defined as a self-reported change from current smoker to former smoker between study waves. The main independent predictor was lifetime SES, defined as: low child and low adult SES (persistent low); low child, high adult SES; high child, low adult SES; and high child, high adult SES (persistent high). Two latent variables were created to operationalize child and adult SES. Child SES was measured by the level of parental educational attainment,

father's occupation, being born in southern U.S., and growing up in a rural area. Adult SES was measured by respondent's educational attainment, longest job occupation, labor force status, household income, and household wealth. Demographic, health and smoking characteristics were compared by lifetime SES at baseline using chi-square tests. Multilevel mixed-effect logistic model was used to examine how lifetime SES predicts smoking cessation at age 65 and over time (interaction between lifetime SES and age), adjusted by sex, marital status, health insurance, race/ethnicity, visit to the doctor in the previous 12 months, chronic diseases and number of cigarettes per day. Results: The majority of older smokers had persistent high SES (60.3%), followed by high child/low adult SES (18.7%), persistent low SES (15.5%) and low child/high adult SES (5.6%). Compared to those with persistent high SES, those with persistent low SES were more likely to be women (49.2% vs. 45.2%, p=.004), Hispanic (25.9% vs. 3.0%, p<.001) or non-Hispanic Black (22.7% vs. 8.7%, p<.001), respectively. The adjusted results showed that at age 65, compared to those with persistent high SES, those with persistent low SES (OR=0.42, 95% CI= [0.31-0.56]), low child/high adult SES (OR=0.37, [0.24-0.55]), and low adult/high child SES (OR=0.53, [0.40-0.70]) were less likely to quit. Similar results were observed over time for those with persistent low SES and low adult/high child SES. However, there was no significant difference for those with low child/high adult SES. Conclusion: Older smokers that have both high child and adult SES are more likely to quit than those with changes in SES across the life course. While those with low child/high adult SES are a minority, they are significantly less likely to quit than those with persistent high SES at age 65, demonstrating the enduring effect of low childhood SES on late life smoking trajectories.

PP-31

THE DIFFERENTIAL IMPACT OF THE 2000 CANADIAN GRAPHIC WARNING LABEL POLICIES ON SMOKING PREVALENCE BY SEX AND EDUCATION - A DIFFERENCE-IN-DIFFERENCE-IN-DIFFERENCE MODEL

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Significance: Graphic warning labels (GWLs) have been shown to reduce overall smoking rates but there is limited evidence of their differential impact on smoking prevalence by sex or education. Using a quasi-experimental design, we compared the impact of the 2000 Canadian introduction of GWLs on smoking prevalence, to the United States (US), where no GWLs were introduced, with a specific focus on whether the impact differed by sex and education. Methods: We pooled data collected from 1999-2004 from the Canadian Tobacco Use Monitoring Survey and the US Behavioral Risk Factor Surveillance System. We used a difference-in-difference model (DD) to assess the causal impact of the Canadian policy intervention on smoking prevalence, and a difference-in-difference-in-difference (DDD) model to examine differences in the policy impact by sex and education, comparing Canada (the treatment group) with the US (the control group). Results: In Canada, smoking prevalence decreased from 21.7% in 2000, before GWLs were introduced, to 18.9% in 2002, after their introduction. In the US, smoking prevalence increased from 20.7% in 2000 to 22.4% in 2002. Results from the DD regression models showed that Canadian respondents reported lower odds of being a current smoker compared to the US respondents, following the 2000 policy intervention (OR= 0.84, 95 % CI 0.74-0.94). The DDD model showed that there were no significant differences in the impact of GWL on current smoking by sex or education, comparing both countries, after the 2000 policy intervention. Conclusion: The 2000 Canadian GWL policy was an effective tobacco control measure that reduced smoking prevalence overall; the impact was the same for males and females, and across education levels. Although GWL policies can reduce smoking prevalence, they may not be sufficient to reduce existing inequities in smoking by education.

PP-32

EXAMINING THE IMPACT OF SMOKING CESSATION SMARTPHONE APPS ON TREATMENT UTILIZATION IN CIGARETTE SMOKERS

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Significance: African American cigarette smokers have lower rates of treatment utilization than their White American counterparts due to various treatment access barriers. There is a growing literature on smoking cessation smartphone apps (SCSAs), with

a handful of randomized clinical trials suggesting that SCSAs can increase quit rates and improve continuous abstinence rates. We sought to determine if previous SCSA use was associated with past year treatment utilization and if race moderated this relationship using a nationally representative sample. **Methods:** The sample consisted of cross-sectional data from Wave 4 of the Population Assessment of Tobacco and Health Study (2016-2018, N = 9,802) which included established cigarette smokers aged 18 to 65 years old. We used logistic and negative binomial regression models to examine the main effect of previous SCSA use on past year treatment utilization and duration of utilization, respectively. Then, we examined the interaction effects of race and previous SCSA use on past year treatment utilization and duration. The final models controlled for age, sex, education, and total household income. **Results:** Overall, prevalence of past year SCSA was 4.44% with some variation between White American and African American smokers,4.19% and 5.95%, respectively X^2(1, N = 9,727) = 7.10, p < 0.01). Our logistic main effects model revealed that previous SCSA use was associated with greater odds of past year NRT (AOR = 2.79, 95% CI:1.87,4.17, p < 0.01) and prescription drug use (AOR = 3.25, 95% CI:2.27,4.66, p < 0.01). Likewise, our negative binomial main effects model revealed that previous SCSA use was associated with a decrease in days of NRT used (IRR = 0.29,95% CI:0.12,0.74, p < 0.05). **Conclusion:** Our results demonstrate that previous SCSA app use is associated with greater past year use of NRTs and prescription drugs and shorter treatment duration for cigarette smokers, regardless of their racial group. These findings highlight the potential of SCSAs to address treatment access disparities in African American smokers. Future studies should investigate the impact of apps on nicotine dependence and motivation to quit.

PP-33

CORRELATES OF AWARENESS AND SUPPORT FOR E-CIGARETTE AND HTPS BANS AMONG MEXICAN SMOKERS

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Background: As in many Latin American countries, Mexico bans the distribution, marketing, and sales of heated tobacco products (HTPs) and e-cigarettes. We assess the level and correlates of smokers' awareness and support of each of these bans. **Methods:** Our sample included 2,302 Mexican adult smokers, including 885 who also used e-cigarettes (i.e, dual users) and 1,119 who were aware of HTPs and, therefore, answered HTP-related questions. Multilevel mixed-effects logistic regression models were used to estimate crude and adjusted odds ratios (OR & AOR) for the likelihood of being aware of and having support for the ban of each product, analyzed separately. Correlates of interest included: sociodemographics, cigarette and e-cigarette use frequency, recent quit attempts, and intentions to quit cigarettes, perception of e-cigarette and HTPs harmfulness, e-cigarette and HTP use by family/friends, last month exposure to ads/information related to e-cigarettes and HTPs; and perceived valence of information about e-cigarettes and HTPs. **Results:** Awareness of the e-cigarette and HTP bans was 32.3% and 34.9%, respectively, and support for each ban was 17.4% and 21.2%. Awareness was positively associated with use of the banned product, whether for e-cigarettes (e.g., $AOR_{frequent\ dual\ users\ vs.\ exclusive\ smokers}$ =1.76) or HTPs use ($AOR_{yes\ vs.\ no}$ =2.27), as was negative perceived valence of information about each device ($AOR_{negative\ vs.\ positive}$ =6.17 & $AOR_{negative\ vs.\ positive}$ =2.36, respectively). Awareness of each prohibition was positively associated with support the e-cigarette ban (AOR =2.33) and HTP ban (AOR =2.42), as was intention to quit smoking (AOR=2.46 & AOR=2.21), and negative perceived valence of information about each device ($AOR_{negative\ vs.\ positive}$ =4.24 & $AOR_{negative\ vs.\ positive}$ =4.46). Support for each ban was inversely associated with perceived harmfulness of e-cigarettes relative to cigarettes (AOR=0.48) and of HTPs relative to cigarettes (AOR =0.28). **Conclusion:** Smokers' awareness and support for Mexico's e-cigarette and HTP bans were low. This may help explain the increasingly widespread use of these illegal products.

PP-34

DIFFERENCES IN RESPONSES TO A MENTHOL CIGARETTE BAN ACROSS MENTHOL AND NON-MENTHOL YOUNG ADULT CIGARETTE SMOKERS AND VULNERABLE SUB-GROUPS OF MENTHOL SMOKERS

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Introduction: In April 2021, the FDA announced renewed interest in banning menthol cigarettes. Menthol cigarettes are disproportionately used by Black and Hispanic smokers, females, and sexual/gender minorities (SGM). This study examined how these vulnerable sub-groups would respond to a menthol cigarette ban. **Methods:** Data are from n = 72 young adult menthol and non-menthol smokers (M age = 24; 50% male; 61.6% White; 26.4% SGM; 24.7% menthol smokers) enrolled in an ongoing clinical trial assessing the reinforcing effects of smoking menthol and non-menthol cigarettes. At baseline, participants provided demographic information and were asked to "select all that apply" to a single item with 15-response options about how they would respond to a menthol ban. **Results:** Menthol and non-menthol smokers did not differ by SGM status or race/ethnicity. The most frequently endorsed items in the full sample were "I would continue to smoke cigarettes about the same as I do now, just a different brand" (18.1%), "I would switch to another cigarette brand that does not have menthol" (16.7%), and "I would try to quit smoking" (15.3%). Compared to non-menthol smokers, menthol smokers were more likely to endorse quitting smoking (36.4% vs 4.3%), smoking less (28% vs 4.3%), switching to menthol e-cigarettes (20% vs 4.3%), switching to some other menthol flavored product (24% vs 0%), switching to a non-menthol cigarette brand (32% vs 8.5%), and purchasing menthol cigarettes on the black market (20% vs 2.2%; all p's < .01). Responses to a menthol cigarette ban did not differ by SGM status or race/ethnicity. **Conclusion:** While more menthol than non-menthol smokers indicated they would find a way to buy a menthol cigarette brand following a menthol ban, most menthol smokers endorsed smoking reduction or cessation. However, SGM and racial/ethnic minority smokers were no different in their responses to a menthol ban. Findings suggest that a menthol cigarette ban may help reduce cigarette smoking among young adult menthol smokers overall, with similar effects across vulnerable sub-groups with high rates of menthol cigarette use.

PP-35

PREEMPTION IN U.S. STATE MLSA LAWS, 2021 UPDATE

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Significance. Preemption language in tobacco minimum legal sales age (MLSA) laws is used to prohibit local jurisdictions from enacting stricter laws than state statutes. In 2014, 19 states preempted local jurisdictions from passing tobacco MLSA restrictions, and eight states clearly granted local authority by expressing that the state law did not preempt local MLSA laws. Since this time, 39 states and the federal government have enacted Tobacco 21, a law that raised the MLSA to 21 years. The current study provides an updated comprehensive assessment of state-level preemption of MLSA laws in the U.S. Methods. Two coders independently analyzed language about preemption included within the 39 state Tobacco 21 laws enacted between September 2020 and August 2021 along with the remaining 11 state MLSA statutes. After determining acceptable inter-rater reliability (κ = 0.70), discrepancies were discussed until consensus was met. Results. Among all 50 states, 24 state laws preempted local governments from enacting stricter MLSA laws than the state. Further, seven statutes explicitly expressed that the law did not preempt local ordinances, and 19 statutes did not mention preemption. Over the past decade, the number of MLSA state laws that included preemption increased; five states (Arkansas, Florida, Massachusetts, Texas, and Utah) expanded language to restrict local control. Alternatively, Colorado prohibited localities from passing purchase policies that set the age below 21 years. Conclusions. While the public health community applauds the enactment of 39 state Tobacco 21 laws, preemption of MSLA laws could slow or prohibit the diffusion of comprehensive tobacco control. Preempting local governments from enacting stricter MLSA laws creates barriers to optimal enforcement of Tobacco 21 (e.g., the inclusion of a tobacco retail license, suspending and revoking the license of repeated violators) and further expansion of age restriction policy components (e.g., prohibiting flavors, vending machines, and sales at pharmacies) at state and federal levels. To reduce inequitable enforcement, state policymakers can preempt localities

from enacting and enforcing purchase, use, and possession laws that ensure tobacco retailers, not underage purchasers, are health accountable for underage tobacco sales. Policymakers in 11 states that have not yet adopted Tobacco 21 and those seeking to amend their state's MLSA should remove preemptive language and clarify that state law does not preempt local authority of tobacco control.

PP-36

IMPACT OF E-CIGARETTE USE ON CIGARETTE QUITTING BEHAVIORS IN BLACK SMOKERS

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Significance: Black people are more likely to die from tobacco related diseases and e-cigarettes may be a potential harm reduction tool. This study aimed to examine factors related to trying e-cigarettes to quit cigarette smoking and quitting success with e-cigarettes compared to other approaches. **Methods**: 231 Black cigarette ever users who participated in The Family and Community Health Study in 2016 were asked: 1) if they quit using cigarettes, 2) which methods they have used to quit (select all that apply) and 3) if the method worked (e.g. e-cigarettes, nicotine patch or gum, Quitline or hotline, Chantix or bupropion, cold turkey). Separate logistic regressions predicted: 1) trying to quit with e-cigarettes vs other methods; 2) success of quitting for any method; 3) success of quitting with e-cigarettes vs other methods. Predictors included age, sex, socioeconomic status (SES), experiences of perceived racial discrimination, health insurance status and endorsement of avoiding going to the doctor because fear of being treated poorly. **Results**: E-cigarette use was the second most endorsed method used to try to quit (25%) after cold turkey (80%). Logistic regression revealed that smokers who were more likely to try an e-cigarette to quit were more likely to report that they avoid going to the doctor because they thought they'd be treated poorly (p < .02). Greater SES was associated with higher quitting success (p < .03). 20% of ever smokers who tried to quit with e-cigarettes reported that e-cigarettes were a successful method and were no longer smoking. However, ever smokers were 3 times more likely to be successful at quitting if they used a method other than e-cigarettes (p=.002). **Conclusion:** E-cigarette use was a less successful method for quitting cigarette smoking in Black people compared to other methods. Of importance, utilization of e-cigarettes as a smoking cessation aid was related to avoiding going to the doctor because of expected negative experiences. Efforts to understand and improve relationships between medical professionals and Black smokers may encourage the uptake of smoking cessation aids that are more successful than e-cigarettes. **Funding Sources**: Research reported in this publication was supported by the National Institute on Drug Abuse of the National Institutes of Health R01DA021898 the Food and Drug Administration 1K01DA051882-01 and the National Cancer Institute R01CA153154, R01CA220254. This content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health or the Food and Drug Administration

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HETEROGENEITY IN E-CIGARETTE USE AMONG ASIAN AMERICAN ADOLESCENTS IN MINNESOTA

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Significance: Asian Americans are an increasingly diverse racial group in the United States, yet little research has described how patterns of tobacco use, particularly of newer products such as e-cigarettes, vary among subpopulations of Asian adolescents. This study aimed to characterize the tobacco use patterns of Asian American adolescent subpopulations in Minnesota. **Methods**: We examined subpopulation differences in the past 30-day use of cigarettes, e-cigarettes, cigars, hookah, chewing tobacco, dual/poly use (2 or more products), and any tobacco use among 8th, 9th, and 11th grade Asian American respondents to the 2019 Minnesota Student Survey. Subpopulations included Asian Indian, Chinese, Filipino, Hmong, Karen, Burmese, Korean, Laotian, Vietnamese, other; multi-ethnic (more than one of the previous Asian ethnicities); and multi-racial (Asian and any other racial group). GLM regressions adjusting for sex, grade, and metropolitan residence and post-hoc Tukey tests were used to compare tobacco use across groups. **Results:** Of the 10,482 Asian respondents, 9.0% identified as Indian, 0.3% Burmese, 7.9% Chinese, 2.5% Filipino, 25.0% Hmong, 3.2% Karen, 4.6% Korean, 2.7% Laotian, 8.2% Vietnamese, 7.5% other, 7.5% multi-ethnic, and 21.6% multi-racial.

E-cigarettes were the predominant form of tobacco use reported by all groups and the prevalence of e-cigarette use varied significantly by ethnic group (p<0.0001). In unadjusted models, Laotian and multi-racial groups reported the highest use of e-cigarettes (16.6% and 16.3%, respectively) whereas Chinese and Asian Indian groups reported the lowest levels of e-cigarette use (4.7% and 5.0%). Adjusted models demonstrated similar patterns of e-cigarette use. All other tobacco use collectively accounted for between 0 and 1.4% of reported past 30-day tobacco use across the groups. ***Conclusions***: E-cigarettes are the most prevalent tobacco product used by Asian American adolescents in Minnesota. However, significant heterogeneity in e-cigarette use exists among Asian subpopulations, underscoring the importance of disaggregating tobacco product use by ethnicity to inform tailored tobacco prevention and control strategies.

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THE IMPACT OF CAREGIVER'S TOBACCO PRODUCT USE ON E-CIGARETTE USE AMONG BLACK ADULTS

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Significance: While caregiver smoking is one of the strongest predictors of adolescent smoking initiation, its relationship to young adulthood tobacco and e-cigarette use remains unclear. This study investigated whether tobacco product use by one's childhood caregiver predicted past month use of e-cigarettes and use of e-cigarettes to quit cigarette smoking among 27-31-year-old Black adults who had reported smoking cigarettes in their lifetime. **Methods:** The data were drawn from the Family and Community Health Study (FACHS), an ongoing longitudinal study of over 800 Black families. Participants with a child in 5th grade who identified as Black (referred to as targets) were recruited from Iowa and Georgia in 1996. Multivariable logistic regressions identified whether caregivers' use of any tobacco product (e.g., cigarettes, cigars, pipes, chewing tobacco) at Waves 3 or 4 (targets' mean age = 15.5, SD = .78; 18.5, SD = .94 years, respectively) predicted targets' use of e-cigarettes in the past month or to quit cigarette smoking at wave 7 (n = 233; mean age = 28.90, SD = 0.88). All models were adjusted for targets' age, sex, and state of residence. **Results:** At Wave 7, 36 targets reported using e-cigarettes in the past month and 50 targets reported using e-cigarettes to quit smoking in their lifetime. Targets with a caregiver who smoked at Waves 3 and 4 had 3.6 (p < .001) and 2.3 (p < .022) times greater odds, respectively, of trying an e-cigarette to quit smoking relative to those who did not have a caregiver who smoked. Notably, 20% of targets who tried to quit using e-cigarettes were successful. Caregivers' smoking status at Waves 3 and 4 did not predict targets' past month e-cigarette use at Wave 7. **Conclusions:** Among Black young adults who ever smoked, adolescent exposure to caregiver smoking was associated with a significantly higher odds of trying e-cigarettes to quit smoking. This finding suggests that young adults whose caregivers smoked during their adolescence may be more willing to try alternative nicotine products to quit cigarette smoking. Further work is needed to clarify what drives these relationships and whether they generalize to a nationally representative sample.

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TACTICS USED SYSTEMATICALLY BY BIG TOBACCO THAT ATTRACT CHILDREN AND YOUTH AT TOBACCO POINTS-OF-SALE

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Significance Tobacco companies have historically targeted children and youth with tobacco advertising. Most literature on tobacco advertising and promotions used at point-of-sale (POS) focuses on high-income countries. We examined tobacco advertising and promotional practices at POS, focusing primarily on low- and middle-income countries. **Methods** Data were collected on cigarette advertising and promotional tactics at POS within 100-250 meters of schools and playgrounds in 42 countries, spanning all six WHO regions. Monitoring in most of the countries utilized a mobile application (others used paper forms) populated with an observational checklist. **Results** Tobacco companies used four consistent strategies. The display of cigarettes near sweets, snacks, and sugary drinks was observed at POS in 90% (n=38) of the countries examined. The display of cigarette ads at the eye-level of children, roughly one meter off the ground, was observed at POS in 100% (n=42) of countries. Large assortments of flavored cig-

arettes and/or flavored cigarette ads were observed at POS in 76% (n=32) of countries. Sale of single cigarettes was observed at POS in 78% (n=33) of countries. In the 15 countries where they were monitored, power walls were observed in 93% and digital screens advertising cigarettes and/or use of lights to illuminate ads or cigarettes were observed in 87% of countries. **Conclusion** In many of the countries where these tactics were observed, existing regulations and the spirit of laws meant to protect customers from exposure to tobacco marketing are being violated. In others, tobacco advertising, promotion, and sponsorship (TAPS) regulations are not comprehensive. Widespread use of these cigarette advertising and promotional tactics at POS and the commonalities in their deployment around the world suggest they are part of a coordinated effort to expose youth to multinational cigarette brands. The most effective way to combat this is for governments to enact and enforce measures supported by the WHO FCTC, which include comprehensive bans on all TAPS, including POS display; bans on single cigarette sales; and regulation of flavoring.

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UNDERSTANDING DISPARITIES IN LUNG CANCER SCREENING AMONG LOW-INCOME SMOKERS IN AN URBAN HEALTH CENTER IN SOUTHERN CALIFORNIA

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SIGNIFICANCE: Tobacco related diseases impact low-income communities disproportionately and motivated examination of barriers to preventive lung cancer screening (LCS) and tobacco treatment interventions in a federally qualified health center (FQHC) that provides primary medical care. **METHOD**: A retrospective analysis of EHR data from 2019 reviewed patients who were 55-64 years old with 30+ pack years and had "tobacco use" as an active problem. The proportion of 1) those referred for LCS; 2) those who completed LCS given referral; 3) smokers receiving referral to tobacco treatments. Demographic characteristics and comorbidities associated with referral types and uptake of services were estimated using mixed-effects logistic or multinomial regression models. **RESULTS**: Among 2459 eligible patients, 1237 (50.3%) had a recorded referral for LCS. Among the 1237 referred patients, 573 (46%) had a record of completing the referral for lung cancer screening (overall screening rate 573/2459 = 23%). Having one or more psychiatric (AOR = 1.62, 95%CI: 1.28 - 2.05) or medical (AOR = 1.54, 95%CI: 1.30 - 1.82) problem was associated with higher odds of referral. When compared to smokers with Medicare, the odds of completing LCS referrals were lower for smokers with Medical (AOR = 0.76, 95%CI: 0.57 - 0.99) and the uninsured (AOR = 0.55, 95%CI: 0.35- 0.85). Completed referrals for LCS were lower for smokers who were Black (AOR = 0.62, 95%CI: 0.43-0.88) than for non-Hispanic White smokers. For smokers who were referred for LCS, the odds of receiving tobacco treatment at the FQHC were 2.13 (95%CI: 1.66-2.74) times higher than for eligible smokers who were not referred for LCS. **CONCLUSION**: Systems designed to enhance identification of eligible smokers, cues to attract provider attention to referral actions, and tracking of provider and patient behavior with use of an electronic health record can facilitate reach of LCS. Overcoming economic and racial barriers remain a high priority for improving rates of LCS. Most (70%) low-income smokers see their PCPs at least once a year, making FQHCs excellent settings to promote LCS and tobacco treatment in low-income communities.

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NEIGHBORHOOD TOBACCO RETAIL ACCESS AND COGNITIVE TOBACCO USE RISK FACTORS IN YOUNG ADOLESCENTS IN URBAN INDIA

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<u>Background</u>: Neighborhood tobacco retail access may influence adolescent tobacco use. In India, we examined the association between neighborhood tobacco retail access and cognitive risks for tobacco use during early adolescence. <u>Methods</u>: In 2019-2020, a population-based sample (n=1759) of 13-15-year-old adolescents were surveyed from 26 neighborhoods in Mumbai and 26 neighborhoods in Kolkata, which were canvassed, and each tobacco retailer was recorded into a Geographic Information System (GIS). Neighborhood tobacco retail access was measured as the frequency of visits to tobacco retailers, perceived tobacco retailer density, and mapped tobacco retailer density. We estimated associations between neighborhood tobacco retail access and cognitive risks for tobacco use (perceived ease of access to tobacco, perceived peer tobacco use, and intention to use tobacco). <u>Results</u>: There was high neighborhood tobacco retail access with nearly 100 retailers present per community on average and well over 50% of adolescents reporting weekly or more visits to tobacco retailers. The density of retailers was higher in lower-income neighborhoods (p<0.001). Adolescent frequency of visits to retailers was positively associated with cognitive tobacco use risks. Mapped tobacco retailer density was associated with perceived ease of access in Kolkata (p<0.05) but not in Mumbai, and it was not associated with perceived peer tobacco use nor intention. Perceived tobacco retailer density was associated with perceived ease of access and perceived peer use (p's<0.05), but not with intention. In Kolkata, higher perceived retailer density and frequency of tobacco retailer visits were negatively associated with perceived ease of access (p's<0.01). <u>Conclusions</u>: The frequency of tobacco retailer visits and perceived tobacco retail density increased cognitive risks of use, with some exceptions in Kolkata that further research may explain. A decrease in tobacco retailer access in India may reduce cognitive tobacco use risk factors in young adolescents. Future research should aim to understand how contextual factors influence the relationship between tobacco retail access and tobacco use initiation.

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TOBACCO USE IN MIDDLE-CLASS PEOPLE OF COLOR: FROM SOCIAL EPIDEMIOLOGY TO BRAIN CIRCUITS

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Background: The protective effect of high socioeconomic status (SES) against tobacco use is very well-established. In the current study, we explored the role of diminished returns of SES as an underlying mechanism behind social inequalities in tobacco use and dependence in youths and adults in the United States. **Methods:** This study was built on the Marginalization-related Diminished Returns (MDRs) framework. This framework suggests the protective effects of SES indicators for marginalized populations are weaker than for socially privileged populations due to systemic disadvantages marginalized populations face. We conducted a secondary analysis of the following existing national data sets: PATH, NHIS, HINTS, HRS, MTF, and ABCD. The independent variables were parental education, own education, income, and employment. The outcomes were lifetime or current use of cigarettes, Hookah, e-cigarettes, as well as tobacco dependence. Moderators were race, ethnicity, nativity, or sexual orientation. **Results:** Analysis of cross-sectional and longitudinal data revealed weaker protective effects of SES indicators on the use of cigarettes, Hookah, e-cigarettes, as well as tobacco dependence for marginalized populations, broadly defined, compared to US-born, heterosexual, non-Latino White people. These diminishing returns were found for all SES indicators in our analysis, however, they were more robust for parental and own education. Although these patterns existed for all marginalized groups such as Latino, Asian American, LGBT, and immigrant populations, they were most pronounced for Black youth and adults. We also found some evidence suggesting that poor quality of education in urban schools, school and residential segregation, discrimination, and predatory marketing partially explains these MDRs. Analysis of brain circuits also

confirmed weaker SES effects on brain regions with implications for substance use. **Conclusions:** Due to the weaker-than-expected effects of SES indicators, we observe higher-than-expected tobacco use in middle-class youths and adults of color.

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CIGARETTE PRICES BEFORE AND AFTER STATE AND LOCAL TOBACCO TAX AND PRICE POLICIES IN BAY AREA CITIES 2014-2020

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SIGNIFICANCE: Enactment of tobacco tax and pricing policies can reduce the demand for tobacco products. California Proposition 56 increased the state tobacco tax by $2 per cigarette pack effective April 1, 2017. In addition, between 2015-2020 some cities in Alameda county passed ordinances establishing minimum retail prices or prohibiting coupons and discounts on tobacco products. The city and county of San Francisco (SF) also increased its Cigarette Litter Abatement Fee, from $0.20/pack in 2015 to $1.00 in 2020. We aimed to compare the magnitude of change in cigarette prices before and after the enactment of pricing policies in SF vs. Alameda county, which has larger racial\ethnic minority groups and more people living in poverty, to inform understanding of public policies' impact on tobacco inequities. **METHODS:** We performed audits of a proportional random sample of SF and Alameda county tobacco retailers, by city, before (2015) and after (2019/20) the implementation of tobacco tax and pricing policies. Using Student's t tests and two-way ANOVA with Tukey-Kramer adjustment for multiple comparisons, we compared inflation-adjusted average prices of the cheapest cigarette pack in 2015 vs. 2019/20 samples overall and among 3 groups: 202 retailers in SF; 41 retailers located in 4 Alameda county cities that enacted any pricing policies between 2015-2020; and 220 retailers in 12 Alameda county cities without pricing policies effective before January 2020. **RESULTS:** From 2015 to 2020, the average price for the cheapest cigarette pack in all cities increased significantly [mean=$5.8(SD=$1.2) vs. $9.2($2.4), a +$3.4 increase overall] and in each policy group (SF:+$4.6; any policy:+$1.9; no policy:+$2.6). Retailers in SF and Oakland had the highest percent change in average price (+76% and +70%), and Fremont and Union City had the lowest increases: (+12% and +10%). The increase in average price of the cheapest cigarette pack in SF (+$4.6) and some Alameda county cities (Castro Valley, Livermore, Oakland, Pleasanton, and San Leandro) exceeded the $2 increase in the California state excise tax (range: +$2.1 to +$3.7). Other Alameda county cities increased less than $2 in the average price (range: +$0.6 to +$1.8). Post-hoc analyses indicated a significantly higher 2019 average price for SF: $10.7($2.5), with +$2.7 and +$2.0 greater differences in price change than retailers in Alameda cities with and without pricing policies. **CONCLUSION:** We observed smaller increases in cigarette prices among retailers in Alameda vs. SF county regardless of local pricing policy status. This may be due to differences in implementation of policies; equitable implementation will be important to address tobacco disparities, especially among price-sensitive youth, minorities, and people of lower SES.

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HOW TALKING ABOUT CIGARETTE WARNING LABELS INFLUENCES SUBSEQUENT QUIT ATTEMPTS. A MEDIATION ANALYSIS OF TOPICS OF CONVERSATIONS AMONG MEXICAN SMOKERS

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Background: Interpersonal communication about health warning labels (HWLs) helps explain HWL effects on quit attempts. This longitudinal study evaluated the topics of these conversations as mediators of the relationship between interpersonal communications about HWLs and smoking cessation behaviors. **Methods**: Cohort of adult smokers recruited from an online consumer panel surveyed every four months across 8 surveys from November 2018 to March 2021. The analytic sample included 2210 smokers who participated in at least two consecutive surveys (n=4537 observations). Participants reported frequency of talking to others about HWLs in the last month (not at all, sometimes, frequently), topics of conversations (smoking harms, cessation benefits, lack of message credibility/utility), as well as socio-demographic and smoking-related

variables (e.g., quit intention, smoking frequency). At four-month follow-up (time "t+1"), two transitions were estimated: a) quit attempt for less than 30 days and b) sustained attempt for at least 30 days over the 4 months period between surveys. Logistic regression models using a Generalized Estimating Equation (GEE) to consider repeated measures regressed transitions (ref=no transition) on study variables (time "t"), along with a bootstrap procedure to assess whether HWL communication topics mediated effects of talking frequency on transitions. **Results:** Most participants reported talking about HWLs sometimes (46.9%) or frequently (15.5%). Of those who talked about HWLs, 80.4% reported conversations about smoking harms, 58.1 % cessation benefits, and 9.9% lack of message credibility/utility. At follow-up, 27.3% reported a quit attempt for less than 30 days and 23.6% for at least 30 days. In adjusted models, greater frequency of talking about HWLs and benefits of quitting and harms from smoking were independently associated with a greater likelihood of both these outcomes. Mediation models indicated that talking about cessation benefits and about the smoking harms both explained the effect of talking frequency on these outcomes in roughly equal measure. **Conclusion**: Conversation topics around HWLs appear to matter in promoting smoking cessation. As Mexican HWLs primarily focus on smoking harms, more research is needed to assess the optimal mix of HWL message content, including messages that best prompt discussions and messages that address cessation benefits.

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RESISTANCE SELF EFFICACY MEDIATES THE RELATIONSHIPS BETWEEN TOBACCO SMOKING OUTCOME EXPECTANCY AND THE DESIRE TO QUIT TOBACCO SMOKING AMONG SAUDI GIRLS

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Background: Smoking is one of the major preventable causes of morbidity and mortality, it has been associated with numerous illnesses. While smoking is prevailing among women, the characteristics of the smoking behavior among Saudi girls related to resistance self efficacy and outcome expectancies are unknown. Therefore, our study purpose is to test whether resistance self efficacy mediates the relationship between tobacco smoking outcome expectancy and the desire to quit tobacco in the future among Saudi girls who smoke tobacco. **Methods**: This is a cross sectional study. The sample was collected by a convenience non-probability sampling of 211 Saudi females who smoke tobacco. A self-administered questionnaire was used to examine several variables that include resistance self efficacy, tobacco smoking outcome expectancy, and desire to quit tobacco smoking in the future. A regression-based mediation analysis was used to answer our research question. We estimated the indirect effects through the bootstrapping of 10,000.**Results**: All the four constructs of outcome expectancies (negative consequences, positive reinforcement, negative reinforcement, and appetite and weight control) were associated with lower resistance self efficacy and desire to quit tobacco smoking. In the mediation analysis, the indirect effect of negative consequences (unstandardized beta = - 0.015, SE = 0.008, 95% CI [- 0.034, - 0.002]), negative reinforcement (unstandardized beta = - 0.014, SE = 0.006, 95% CI [- 0.027, - 0.002]), and appetite and weight control (unstandardized beta = - 0.009, SE = 0.006, 95% CI [- 0.022, - 0.002]) through resistance self efficacy were significant, suggesting mediation, in the relationship between tobacco smoking outcome expectancy and desire to quit tobacco smoking in the future.**Conclusion**: We identified cognitive mechanisms that may explain the lower rate of quitting tobacco smoking among Saudi girls. Although longitudinal studies are needed to determine relationships prospectively, targeted interventions that reduce tobacco smoking outcome expectancies and boost resistance self efficacy skills to quit tobacco smoking may further reduce tobacco smoking among Saudi girls.

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TOBACCO PRODUCT DISPLAY IN RETAIL SETTINGS IN SILIGURI, INDIA

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Significance: In India, the national tobacco control law prohibits tobacco advertising at the point-of-sale (POS). Tobacco products can be displayed but are not permitted to be placed within the reach of a minor. Tobacco retail settings vary greatly in India including permanent structures (bricks-and-mortar shops or permanent kiosks), and temporary structures (movable kiosks, and street vendors). The city government in Siliguri, West Bengal, is developing local policies to support tobacco control, including tobacco vendor licensing. This study identified tobacco vendors throughout Siliguri to assess if tobacco products were on display and if they were displayed within the reach of a minor. **Methods:** Stretches of road (500-1000m) with retailers were identified in each of Siliguri's 47 wards. From Nov-Dec 2020, data collectors conducted observations in these pre-determined environments. Tobacco vendors were identified and classified based on their physical features (permanent or temporary). Data collectors noted if tobacco products were on display including smokeless and combustible tobacco products. If tobacco products were on display data collectors noted if these products were within reach of a minor (approximately 1m from the ground or less, and products not kept behind glass). **Results**: The study identified N=567 tobacco vendors across the 47 wards in Siliguri including 405 permanent vendors and 162 temporary vendors. Tobacco products were on display at 87% (n=493) of tobacco vendors, including 84% of permanent vendors and 94% of temporary vendors. Of the vendors with tobacco products on display, 68% had tobacco placed within reach of minors including 63% of permanent vendors and 79% of temporary vendors. **Conclusions:** Most tobacco vendors observed in this study displayed tobacco products at the POS and had tobacco products within reach of a minor; tobacco vendors that operated out of temporary structures were more likely to have products on display and more likely to have tobacco products within reach of a minor. The city of Siliguri could consider banning product display as a provision of obtaining a tobacco vendor license.

FUNDING: Nonprofit grant funding entity

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USING PUBLIC INVOLVEMENT TO QUALITATIVELY EXPLORE LAY PERSPECTIVES ON A CHANGING LANDSCAPE OF TOBACCO AND NICOTINE USE AND TOBACCO CONTROL POLICIES

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Significance: Together, public involvement (PI) and qualitative methods can provide insights into nicotine and tobacco use that are not easily ascertained from researchers acting alone. This study was co-produced with members of the UCL tobacco and alcohol research PI group. The aim was to qualitatively explore lay perspectives on the changing landscape of tobacco and nicotine use in England, and perceptions of tobacco control policies of the past and ideas for the future. Methods: The PI group (n=9, 5 female; mean age = 44.2 years) shaped the research questions, topic guide and assisted with data analysis. Sixty-five participants formed of never, former and current smokers and current vapers (Mean age=39.7 years) took part in a series of online focus groups. Groups were facilitated by a topic guide; discussion was prompted using slides on the changing trends in smoking and nicotine use in England from the Smoking Toolkit Study (STS). Groups were audio-recorded and transcribed. Data were analysed deductively and inductively via Iterative Categorization. Results: UK smoking prevalence was overestimated; the groups were surprised by the 15% figure. Vaping was commonly confused with smoking and may have contributed to this overestimation. Smoking and vaping were linked to specific age groups - smoking believed to be more prevalent within older adults and vaping within youth, as part of a 'permissive bygone era' and a passing trend, respectively. There was a consensus that credible evidence on vaping was lacking, and the 'post truth era' meant information sources were questioned. Although the NHS and some cancer charities were seen as trusted sources of information because of a lack of financial investment in smoking. There was support for past tobacco control policies (e.g., adverts) but concern about the stigmatisation these caused for loved ones. There was less consensus on what would work in the future, higher taxation was especially divisive. Conclusion: The inclusion of PI alongside

qualitative methods and data from the STS allowed for the triangulation of several data sources. The main results suggest incongruence between population level data and participant observations. Participants viewed themselves as 'passive observers' to tobacco science, lacking trusted sources of information.

FUNDING: Nonprofit grant funding entity

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VAPING PRODUCTS AND PROMOTIONAL AND LABELLING PRACTICES IN CANADA BEFORE AND AFTER PROVINCIAL RESTRICTIONS ON NICOTINE CONCENTRATION AND FLAVOURS: A SCAN OF THE ONLINE RETAIL MARKET

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SIGNIFICANCE. The promotion and sale of vaping products was liberalised in Canada in 2018. However, in the past year several provinces have restricted nicotine limits and flavours. There is little available market data on vaping products (including nicotine concentration, flavours, and packaging/labelling) post-liberalisation in Canada, or how the market has responded to recent provincial restrictions. Such data are important to understand the range of products available, how these products are promoted and how their attributes are communicated to consumers, and how regulations impact the market. **METHODS.** A scan of 31 online vaping retailers was conducted to identify vaping devices and e-liquids available for sale in Canada. Images of products and information on websites were coded and analysed. The scan was conducted from Jan-Sept 2020 and repeated from Jan-May 2021. **RESULTS.** In the 2020 scan, a total of 560 vaping devices, consisting of 3,204 varieties, and 1,778 e-liquids were identified. E-liquids were available in a range of flavours, with fruit being the most common (44%), followed by candy/desserts (28%) and non-alcoholic drinks (12%). Half of e-liquids were 'freebase'/'regular' (53%) or 'salt'-based (47%), and a few (0.2%) 'hybrid'. Among e-liquids containing nicotine, the mean nicotine concentration of salt-base (3.4%) was higher than freebase (0.6%; p<.001). The presence of labels/warnings on the principal display area of e-liquid packaging was inconsistent: 63.2% had labels indicating the presence of nicotine, 73.7% displayed nicotine concentration, and 58.9% displayed health warnings. E-liquids and devices were available in numerous colours and 'themes' (e.g., minimal, geometric, lifestyle). Device 'skins' and other accessories that can enhance product packaging were also identified. Data from the 2021 scan will be presented to examine changes in the market following provincial regulations on nicotine limits and flavours. **CONCLUSION.** The findings depict an incredibly diverse market in Canada in 2020 with respect to the types of products available and packaging/labelling practices. The 2021 scan will illustrate the market's response to provincial regulatory changes.

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IMPLEMENTATION STRATEGIES FOR SMOKE-FREE PUBLIC HOUSING TO PROMOTE BETTER OUTCOMES

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BACKGROUND: In Aug. 2018, smoking was prohibited in federally-funded public housing in the United States. Little is known about how public housing authorities (PHAs) have implemented smoke-free policies (SFPs). **METHODS**: We surveyed all Massachusetts (MA) PHAs in 2018 asking each if they had an SFP and if so, what strategies were used to implement it: information sessions with residents, soliciting resident input on SFP implementation, providing staff training, seeking technical assistance from outside groups, using the US Department of Housing and Urban Development (HUD) toolkit, offering treatment or referral for help with smoking cessation, and/or providing outdoor smoking areas. In PHAs with SFPs in place ≥1yr, we used multivariable regression to investigate associations between implementation strategies and PHAs' self-reports of resident satisfaction, complaints about smoking, and number of violations. Multivariable models included implementation strategies that were related to outcomes at p<0.25 in bivariate assessments as well as PHA size and years since enactment. **RESULTS**: The survey had a 93% response rate (204/218 PHAs). Among 161 PHAs that had a SFP prior to 2018, common implementation activities were offering treatment or referral for smoking cessation (89%), information sessions with residents (85%) and partnering with outside groups (65%). Most (84%) reported residents mostly or completely supported

the SFP; information sessions with residents were associated with higher resident support (adjusted odds ratio [AOR] 4.3; p=.02). Few (14%) PHAs reported a reduction in complaints about smoking. Training staff for implementation (AOR 6.3; p=.03) was associated with report of reduced complaints. On average, 5 violations/100 units/year were reported, but we were unable to detect associations between implementation activities and reports of violations. **CONCLUSION**: Experience in MA suggests that at minimum hosting resident information sessions and staff training are associated with better outcomes following the introduction of SFPs.

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THE HYPOTHETICAL IMPACT OF VAPING PRODUCT REGULATIONS ON VAPE SHOP CUSTOMER BEHAVIOR CHANGE INTENTIONS: OPINIONS OF VAPE SHOP RETAILERS IN LOS ANGELES COUNTY

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Significance: Understanding vape shop retailers' opinions of regulation is critical to inform U.S. Food and Drug Administration (FDA) enforcement, and to anticipate regulatory impact on the vape shop industry, including consumer behavior. This study examined vape shop retailers' perceived customer behavior change intentions given the hypothetical impact of FDA regulations. **Methods:** We conducted phone-based structured interviews of 46 vape shop owners/managers in Los Angeles County during December 2019 to October 2020. Respondents were asked, "For each proposal, please tell me whether you (1) favor it strongly, (2) favor it somewhat, (3) oppose it somewhat, or (4) oppose it strongly. Also, please give me your opinion on how customers would respond to each proposal." Linear regressions were conducted to assess the correlates of each perceived customer behavior change intention outcome, adjusting for vape shop position (i.e., owner, manager). **Results:** Participants were predominantly male (87%), and average age was 31.9 years (SD=8.5). Most participants (43.5%) were managers, followed by owners (26.1%) and clerks (26.1%). Most participants (87%) strongly opposed rules such that only tobacco flavored juices were allowed at all vape shops. Opposition to such rules was associated with opinions that customers would likely not purchase tobacco flavored e-liquids (B=-0.44, p<0.01), and would likely use smokable tobacco products (B=0.47, p<0.05). More than half of participants (52%) strongly opposed rules such that all vape products must be standard, pre-set, or fixed size, and you could not make changes to the device such as watts, volts. Opposition to such rules was associated with opinions that customers would likely not purchase tobacco flavored e-liquids (B=-0.36, p<0.01) and would likely not continue to vape (B=-0.23, p<0.10). Nearly half of participants (39%) strongly opposed rules such that no price deals would be allowed on vape products and e-liquids. Opposition to such rules was associated with opinions that customers would likely not continue to vape (B=-0.19, p<0.10) and would likely smokable tobacco (B=0.23, p<0.10). **Conclusion:** This study found that vape shop retailers in Los Angeles County report potential FDA regulations, including tobacco-flavored e-liquids only or banning price promotions, would have negative impacts on customer behaviors (e.g., not purchasing tobacco-flavored e-liquids, consuming combustible tobacco). Current findings could inform future FDA regulatory actions.

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OUTDOOR SMOKING AS A NUISANCE TO NON-SMOKERS. THE CASE FOR SMOKE-FREE OUTDOOR PUBLIC SPACES IN URBAN AREAS

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Significance. Despite the growing number of smokefree spaces, many nonsmokers continue to be involuntarily exposed to tobacco smoke. Both theory and research suggest that people living in densely populated urban areas are more likely to smoke than those living in less densely populated areas. Consequently, nonsmokers in densely populated urban areas might be more likely to encounter smokers in public spaces and feel bothered or annoyed by their tobacco smoke. We investigated whether the extent to which nonsmokers feel annoyed by tobacco smoke exposure in outdoor public spaces is related to urban population density. **Methods.** We used survey data from the Dutch 'Module Substance Use' survey. This is a nationally representative sample of the Dutch

adult population. Using logistic regression models, we investigated whether urban population density predicts both smoking and nonsmokers annoyance to exposure to other people's tobacco smoke outdoors. **Results.** Survey data show that smoking rates were associated with urban population density. In the Netherlands, people living in extremely population-dense urban areas were more likely to smoke than those living in non-urban areas. Feeling annoyed by tobacco smoke outdoors was also associated with urban population density: nonsmokers living in extremely population-dense urban areas were more likely to be annoyed than respondents living in non-urban areas. **Conclusion.** These results highlight the importance of comprehensive local tobacco control policy programs that include creating smokefree outdoor public spaces. This need for such smokefree outdoor public spaces might be particularly strong in densely populated areas.

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TOBACCO SERVICES AND SMOKE-FREE POLICIES IN MENTAL HEALTH AND SUBSTANCE ABUSE TREATMENT FACILITIES IN THE MIDWEST

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Background: Many smokers with mental health (MH) and substance use disorders (SUD) want to stop smoking and can quit, but few facilities provide treatment. **Methods:** We describe services and policies in behavioral health facilities in Midwestern states not yet adopting Medicaid expansion. We used 2014-2019 data from two SAMHSA national surveys of MH and SUD facilities (N-MHSS & N-SSATS), which are administered annually to around 13,390 US facilities. We shared comparative data and interviewed administrators and advocates from each state to determine policies associated with higher service provision. **Results:** On average, across all 5 years, the percentage of MH facilities that screened for tobacco use was 46% in Kansas, 66% in Nebraska, 73% in Missouri, and 86% in Oklahoma. The US national average was 56%. The 5-year average rate of counseling provision was 24%, 34%, 50%, 68%, and 37% in KS, NE, MO, OK, and the US, respectively. Nicotine replacement therapy (NRT) was offered by 19%, 21%, 39%, 40%, and 25% of facilities in KS, NE, MO, OK, and the US. Non-nicotine medication provision rates averaged 20%, 21%, 34%, 42%, and 23% in KS, NE, MO, OK, and the US. Rates of tobacco service provision in SUD facilities mirrored cross-state differences found in mental health facilities but were in general lower across all services. The 5-year average rate of MH facilities with smoke-free campuses was 46%, 43%, 57%, 80% and 49% in KS, NE, MO, OK, and the US. In SUD facilities, rates were 22%, 34%, 28%, 72%, and 35% in KS, NE, MO, OK, and the US. State leaders associated several policies with high performance: a) requiring programs contracting with the state to have screening, counseling, and smoke-free campuses (OK); b) state-based collection of service provision data (incl. tobacco services) (OK); c) providing facilities free NRT for clients (OK); d) setting benchmarks for service provision (OK); e) liberal Medicaid coverage of cessation medications (MO). **Conclusion:** Screening, counseling, and smoke-free campuses in Oklahoma nearly doubled that of other states. Regardless of state/policy, SUD programs lagged behind MH programs. State policies can have a large impact on services.

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PUBLIC PERCEPTIONS OF TOBACCO RETAIL REDUCTION POLICIES IN NEW ZEALAND

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Significance: Understanding public perceptions on policies can help progress tobacco control. Public attitudes toward tobacco and the ways in which it is sold may influence the development and introduction of tobacco retail policies. Quantitative studies suggest that the New Zealand public are supportive of policies designed to restrict the availability of tobacco to achieve Smokefree 2025. This qualitative study aimed to explore how the New Zealand public perceives five specific policy options designed to reduce the retail availability of tobacco. **Methods:** Through in-depth interviews with 26 participants, this study used thematic analysis to explore adults' opinions of policies to reduce the availability of tobacco, including: i) prohibiting the sale of tobacco within 500m of any school; ii) prohibiting tobacco sales at alcohol on-license premises; iii) only allowing tobacco to be sold at liquor stores; iv) only allowing tobacco to be sold at pharmacies; v) restricting the sale of tobacco to tobacco-only stores. **Results:** While participants were supportive

of reducing the availability of tobacco, there was not universal support for any of the proposals alone. The key themes included impact of the policy on reducing availability, quitting, young people, equity, barriers and stigma, business implications for retailers, opportunity for culture change around how tobacco is sold, and effect of the policy on the link between tobacco and alcohol. Participants generally felt that each policy would contribute to achieving Smokefree 2025, but thought that each would need to be implemented as part of a broader approach. **Conclusions:** This study indicates that there is public support for reducing the number of tobacco retail outlets in New Zealand, but identified positive and negative implications for each policy presented, highlighting the complexity of reducing the supply of tobacco. While no singular policy was universally supported, this study uncovered a number of themes that could be useful in informing alternative policy options, and framing them to achieve public support.

PP-55

IQOS MARKETING STRATEGIES AT POINT-OF-SALES - A CROSS-SECTIONAL SURVEY WITH RETAILERS

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Significance IQOS, with corresponding HEETS sticks, is the leading heated tobacco product globally; emerging in Israel, one of its first markets, in 2016. Given limited research on heated tobacco products' marketing, this study aimed to assess point-of-sale (POS) IQOS marketing in Israel and Philip Morris International's (PMI) involvement in it. **Methods** POS locations in 5 cities (n=712) were identified from IQOS' Israel website. Research staff searched the web for corresponding phone numbers (n=528) and called to confirm eligibility for an online/phone survey (ever sold IQOS or HEETS). Excluding phone numbers that were disconnected/incorrect/no answer/not eligible (n=357), 43/171 (25.1%) completed the survey. Measures included: 1) POS characteristics; 2) IQOS/HEETS products sold; 3) attitudes toward IQOS; and 4) marketing strategies. Bivariate analysis assessed differences between POS selling only HEETS to those selling both HEETS and the IQOS device. **Results** POS (n=43) included convenience (22, 51.1%), grocery (13, 30.2%), liquor (4, 9.3%) and tobacco (4, 9.3%) stores. Most (72.1%) expressed at least one positive attitude toward IQOS, most commonly believing it to be less harmful than cigarettes. The most common form of promotions offered to retailers were financial incentives based on HEETS sales (34.9%). Almost half (48.8%) mentioned receiving instructions from PMI regarding IQOS or HEETS placement, targeting consumers, and strategies for communication with customers (e.g. emphasizing how IQOS compares to other tobacco products). A higher proportion of POS selling the device (n=15, 34.9%), compared to those selling only HEETS, were located in industrial/high tech areas (26.7% vs 10.7%), were tobacco shops (26.7% vs 0%), had special displays (100% vs 17.9%), sold at least 4 HEETS colors (100% vs 55.6%), received incentives based on sales (50% vs 7.7%), and received instructions from PMI (83.3% vs 44%), p<.01 for all. **Conclusion** Findings suggest that specific marketing strategies are employed at the POS to promote IQOS and differentiate IQOS and HEETS from combustible tobacco products. Tobacco control measures should tackle industry-selective promotion strategies.

PP-56

A THEMATIC ANALYSIS OF ARGUMENTS ADVANCED IN TWEETS PROMOTING WORLD VAPE DAY 2020

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SIGNIFICANCE: Use of Twitter as an advocacy platform that potentially reaches regulators has increased. In 2020, World Vape Day (WVD), held on May 30 immediately before World No Tobacco Day, used dedicated social media accounts to disseminate WVD-branded images with campaign messages. Analysing these messages provides important insights into the arguments used to promote liberal ENDS policies. **METHODS:** Using automated scraping, we downloaded a dataset of tweets posted between 26 May and 3 June 2020 that included the hashtag #WorldVapeDay. We used descriptive analysis to classify tweet content and thematic analysis to code arguments contained in a random sample (n=2,200) of just over half the original English language tweets (n=4,387). **RESULTS:** We categorised arguments regarding ENDS into four overall themes: harm

reduction, smoking cessation, rights and justice, and opposition. Tweets criticised actors perceived as opposing liberal ENDS regulation, and used personal testimonials to frame ENDS as a harm reduction tool and lifesaving smoking cessation aid. Rights-based arguments included consumer sovereignty claims that advocated greater recognition of consumers' voices, which were presented as unanimously pro-ENDS, and called on regulators to involve consumers in decision making. A further rights-oriented sub-theme privileged adults' rights over children's rights, claimed youth experimentation could not be prevented, and refuted concern over ENDS use among young people. However, arguments against prioritising children's interests because adults who smoke typically began as children imply perpetuating a cycle of nicotine dependence that begins in childhood is ethically preferable to preventing that dependence in the long-term. **CONCLUSIONS:** World Vape Day tweets presented a one-sided pro-ENDS narrative that did not depict the spectrum of experiences individuals have with ENDS. Widespread use of rights-based arguments attempted to imbue tweets with moral authority. Further analyses that identify and critically assess pro-ENDS arguments will help policy actors assess the merits of assertions used to promote liberal ENDS policies.

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A SOCIAL NETWORK ANALYSIS OF E-CIGARETTE BRANDS AND SOCIAL MEDIA INFLUENCERS ON INSTAGRAM

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Significance: Exposure to visual posts featuring e-cigarette products on social media is associated with increased e-cigarette use among U.S. adolescents. Instagram is the largest source of e-cigarette social media marketing, where influencers - who also describe themselves as, e.g., models, bloggers, brand ambassadors - post promotional materials on behalf of e-cigarette brands for monetary compensation or other rewards. This study analyzed the network of e-cigarette brand-influencers on Instagram, characterizing the most central players in e-cigarette social media marketing. **Methods:** From October to December 2020, we tracked influencers with public profiles on Instagram who posted promotional e-cigarette content at least once a month in 2020, had over 1,000 followers and high user engagement (ratio of likes and comments to followers). By conducting a social network analysis, we identified the most central influencers and the most central e-cigarette brands the influencers collaborated with. We also characterized the influencers by their user engagement and the number of their underage followers (13 to 17 years old). Finally, we assessed the influencers' age verification practices to restrict youth access to their e-cigarette content on Instagram. **Results:** There was a highly interconnected network of engaging e-cigarette influencers (n=55) worldwide, primarily from the U.S., Asia, and Europe, who collaborated with over 600 e-cigarette brands in 2020. The Asian and U.S. influencers had 5 to 6 times more underage followers compared to the European influencers. The e-cigarette content posted by the Asian influencers was 2-3 times more engaging than that posted by the U.S. and European influencers. 75% of the influencers did not use an age verification tool available on Instagram to restrict youth-access to their promotional content on this platform. The brands Voopotech, Innokin, Geekvape, Lost Vape, Smok and Vaporesso collaborated with the largest number of influencers (mean n = 20) and hired predominantly the same influencers. **Conclusions:** It is important to understand the impact of influencers on the U.S. and international youth to better monitor and regulate social media e-cigarette marketing.

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NEW TOBACCO AND NICOTINE PRODUCTS IN LATIN AMERICA AND THE CARIBBEAN: ASSESSING THE MARKET AND REGULATORY ENVIRONMENT

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SIGNIFICANCE: Over the past two decades, the Latin American and the Caribbean (LAC) region has experienced some great success in adopting and implementing many WHO FCTC-based comprehensive tobacco control policies. However, several countries have either adopted these policies before new tobacco and nicotine products (NTNPs) entered their markets or have not formally included them explicitly into their regulatory frameworks. As a result of an increasing aggressive tobacco industry efforts to subvert

this progress, presence, and prevalence of electronic nicotine delivery systems (ENDS) and heated tobacco products (HTPs) are rising in LAC, especially amongst youth, threatening tobacco control progress. The goal of this study is to document the market and regulatory environment of NTNPs in LAC. METHODS: Review of market research databases, regulatory websites, and reports from Euromonitor International, GlobalData, ECigIntelligence, TobaccoIntelligence, Campaign for Tobacco-Free Kids, and the 2021 WHO Report on the Global Tobacco Epidemic. RESULTS: ENDS entered the LAC market in 2014 but are now available in most LAC countries. Consumer spending on ENDS in LAC has grown 80% (2015-2021) and is expected to grow another 45% (2021-2025). A majority of LAC countries (n=18) have either banned the commercialization of ENDS (n=7), or regulated ENDS as tobacco products (n=7), medicinal products (n=1), or consumer products (n=3). The remaining LAC countries (n=15) do not ban or have any regulations for ENDS. HTPs were first introduced in 2017 and have been officially launched in five countries (Colombia, Guatemala, Dominican Republic, Mexico, and Costa Rica). Although relatively new, HTPs are also growing in the LAC market. Few countries have banned HTP commercialization (n=3) and regulated commercialization and use (n=7) while the majority of countries have legislation that applies to HTPs (n=19). A few countries (n=4) have no tobacco control legislation. CONCLUSION: NTNPs are rapidly growing in the LAC region causing concern about their use, especially amongst youth. Governments should follow the FCTC and ban or regulate them as tobacco products otherwise NTNPs could create a new generation of tobacco and nicotine users.

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WHAT IMPACT DOES A TOBACCO RETAILER PROXIMITY LIMIT HAVE ON TOBACCO AVAILABILITY IN NEW ZEALAND?

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Significance: Tobacco outlet density can be reduced through a range of mechanisms, including restricting the distance retailers can be located to each other. This type of policy has been implemented in a small number of jurisdictions, however, no New Zealand (NZ) research has been done to examine the impact of this type of policy. We use a geospatial approach applying a proximity limit of 150m, 300m and 450m between tobacco retailers looking at deprived communities, density of retailers around secondary schools, and urban and rural access to tobacco. **Methods:** A Python script was developed to randomly remove tobacco retailers based on a minimum distance between retailers of 150m, 300m and 450m until there were zero retailers present within each selected scenario. The script was run 100 times for each scenario to create an ensemble of outputs that were summarised statistically. **Results:** The implementation of either a 150m, 300m, or 450m distance restriction between tobacco retailers would decrease retailer density by an average of 35%, 49% or 58% respectively, and increase the current median distance to the closest retailer from 110m to 377m, 568m, or 718m respectively. The average median distance to the closest school also increases across the three proximity limits. The percentage of retail outlets in each of the low, medium, and high socio-economic deciles would change from 10%, 39%, and 51% to 13%, 42%, and 45% respectively. The proportion of retailers situated in a small/medium urban area would remain relatively consistent under all three scenarios. There is, however, a progressive increase in the proportion of retailers located in rural areas as the proximity limit increases, corresponding to a decrease in those located in large/major urban areas. **Conclusions:** The density of tobacco retailers decreases under each of the proximity limit scenarios, with the largest distance of 450m resulting in a 58% reduction and an increase in the average distance between retailers by 608m. A reduction in the density of tobacco retailers and increased travel distance between the consumer and the retailer can have a positive impact on smoking rates through increased search and purchase costs. A number of studies have identified that a threshold level of reduction is needed to have an effect on smoking behaviour. A proximity limit of 450m between tobacco retailers would not, as a standalone policy, realise the NZ Smokefree 2025 goal, therefore a combination of retail reduction policies is needed.

PP-60

HEATED TOBACCO PRODUCT USE OVER TIME, ITS CORRELATES, AND REASONS FOR USE AMONG MEXICAN SMOKERS AND VAPERS

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Background: Little is known about the use of novel heated tobacco products (HTPs) in low- and middle-income countries. We examined among smokers in Mexico (1) the prevalence and correlates of HTPs use and (2) reasons for using HTPs. **Methods:** We analyzed data from five online surveys (November 2019-March 2021) of an open cohort of adult smokers (n=6,500), including an oversample of those who also use e-cigarettes (n=2,273). Self-reported measures included: sociodemographics, current use of HTPs, smoking and vaping frequency (i.e., dual sporadic and frequent user, e-cigarettes use less than once a week and at least once a week, respectively), recent quit attempt and intentions to quit smoking, smoking, vaping and HTPs use by partners/family and friends, perception of HTPs harmfulness relative to cigarettes, exposition to information related to HTPs. Multilevel mixed-effects multinomial logistic models regressed current HTP use or prior HTP trial without current use (vs. never tried) on study variables, weighting observations to reflect the sociodemographic characteristics of the general population of smokers. **Results:** The overall weighted prevalence of current HTP use was 1.1% which was stable over time. Independent correlates of current HTP use include greater smoking frequency, intention to quit, frequent e-cigarette use, having a partners/family who use e-cigarettes or HTPs, lower perceived harm of HTPs relative to cigarettes, and exposure to HTP information online or outside shops where tobacco is sold. Having tried HTPs (and not using currently) was more likely among smokers with a partners/family who use e-cigarettes or HTPs and exposure to HTPs information outside shops and on newspapers/magazines. Among current users, the top two reasons for using HTPs were greater social acceptability (50.2%) and lower perceived harm (40.0%). **Conclusions:** Uptake of HTPs appears relatively low among Mexican smokers, and correlates of use are similar to those for e-cigarette use, which is also a strong correlate. Further research is needed to determine whether using HTPs promotes smoking cessation.

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IT IS REALLY GROSS, BUT IN A GOOD WAY, IT GETS THE MESSAGE ACROSS, THIS COULD BE YOU - EVALUATING WATERPIPE SPECIFIC HEALTH WARNING LABELS AMONG YOUNG PEOPLE IN THE US: A FOCUS GROUP STUDY

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Objectives: Waterpipe (WP) smoking has increased dramatically among young adults in the US mainly due to the misperception that it is safer than cigarette smoking. Mounting evidence show that WP smoking is addictive and harmful. Pictorial Health Warning Labels (HWLs) are effective in communicating smoking-related risks. This study aims to adapt 24 WP pictorial HWLs recently developed by an international expert panel in a Delphi study. HWLs were grouped into 6 themes (T): T1-Addiction, T2-Harm compared to cigarettes, T3-Harm to others, T4-Health effects, T5-Quitting, and T6-Specific harms. **Methods:** We conducted 8 focus groups combined with a brief survey among regular WP smokers (used WP at least once/week in the past 6 months) (n=21; 57% females; age 18-35 years). Participants completed a brief survey to rate and rank the HWLs based on attention, reaction, and overall effectiveness. Then, participants provided in-depth feedback on HWLs' design/content in term of attention, reaction (fear, avoidance), effect (e.g., harm perception, intention to quit), and improvement (e.g., relatedness, clarity, text synergy with images). We also explored the optimal placement of the HWLs. Sessions were audio-taped, transcribed verbatim, and analyzed thematically. **Results:** The top ranked HWLs were becoming lonely as a sign of addiction (T1), oral and lung cancer (T2 & 4), child with asthma (T3), spreading COVID-19 due to WP sharing (T4), quitting WP during pregnancy (T5), and rat poison (T6). Focus group discussion revealed that the ranking was mainly based on eliciting shock, fear, disgust, and concern about the negative effect of WP smoking. Suggestions for improvement were to use a shorter text, add statistics, and add the source of the information (e.g., CDC). Participants preferred images that were realistic, graphic, gross, and congruent to the text. Participants recommended placing HWLs mainly on the WP device and using text-only HWLs in WP

café entrances and menus. **Conclusion:** This study is the first in the US to attempt to advance WP policy by developing an innovative set of WP pictorial HWLs based on feedback from young WP users. Emotion provoking HWLs were the top ranked HWLs.

FUNDING: Federal; State; Academic Institution

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HARM PERCEPTIONS AND BEHAVIORAL INTENTIONS IN RESPONSE TO SMOKELESS TOBACCO GRAPHIC HEALTH WARNING LABELS IN BANGLADESH

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Significance: Smokeless tobacco (SLT) use has increased in Bangladesh over the last twenty years, and rates of use are highest among women. Evidence from Bangladesh shows that SLT graphic health warning labels (HWLs) are effective in communicating SLT-related harms, but more limited data are available on the influence of different graphic HWLs on current and never SLT user behavioral intentions. This qualitative study explored perceptions of the two current SLT graphic HWLs among adults in Bangladesh. **Methods:** In February 2021, we conducted 28 focus groups in three cities in Bangladesh: Dhaka, Sylhet, and Khulna. Groups were stratified equally by urbanicity, gender, and SLT use. Focus group participants were shown SLT products with the two different graphic HWLs: images of (1) a baby on a nasal oxygen cannula and (2) a woman with oral cancer. Trained facilitators led group discussions on the influence of the HWLs on harm perceptions and behavior change. Data were collected in Bangla, translated into English, and analyzed thematically. **Results:** Both graphic HWLs generated strong responses concerning perceived harm across all groups. In particular, the image of the baby prompted strong, emotional responses about harm to children, especially from women, who also discussed perceived harm to pregnancy. For example: "If consumed, it's harmful for health. And if [a] pregnant woman consumes it, her baby will be affected as well." For both men and women, many groups agreed on the potential for both images to impact reduced use and cessation for SLT users, citing that adults may see the images and reduce SLT use "because the children are suffering." **Conclusion:** Findings from this study indicate the current SLT graphic HWLs in Bangladesh resonate with viewers and are effective in producing strong emotional responses, which can influence SLT harm perceptions and behavioral intentions. Future development of graphic HWLs should incorporate images as effective as the current SLT graphic HWLs in Bangladesh.

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PP-63

PERCEIVED EFFECTIVENESS OF WATERPIPE-SPECIFIC HEALTH WARNING LABELS AMONG YOUNG ADULTS IN THE US: RESULTS FROM AN ONLINE SURVEY

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Objectives: This study aimed to test 24 waterpipe (WP) pictorial health warning labels (HWLs) among young adults. HWLs were grouped into 6 Themes (T): T1-Addiction, T2-Harm compared to cigarettes, T3-Harm to others, T4-Health effects, T5-Quitting, and T6-Specific harms. **Methods:** We conducted an online survey among regular WP smokers (used WP at least once/week in the past 6 months) (n=44; 58.5% females; age 18-35 years). Participants were instructed to rate HWLs on several communication outcomes (risk perceptions, intention to quit, preventing youth from starting WP use, overall effectiveness) using a scale from 1=least effective, to 10=most effective, and then to rank HWLs in each theme from most to least effective. ANOVA tests or Kruskal-Wallis tests were used to test difference in effectiveness between HWLs within each theme. The pairwise difference in effectiveness between two HWLs within the same theme was established by Wilcoxon signed rank test with Bonferroni adjustment for multiple comparisons. Friedman test (p < 0.05) was used to evaluate difference in HWL rankings within each theme. **Results:** HWL5 (oral cancer) was the top rated in T2 in preventing youth from starting WP smoking (8.3 $\pm$ SD [1.8]) and overall effectiveness (8.5 $\pm$ [1.5]). HWL13 (lung cancer) was the top rated in T4 in motivating smokers to quit (8.1 $\pm$ [1.7]), preventing youth from starting WP smoking (7.9 $\pm$ [1.7]), and overall effectiveness (8.0 $\pm$ [1.6]). HWL20 (pregnant women cutting the WP hose shown as the umbilical cord) was the top rated in T5 in overall effectiveness (6.5 + [1.7]). HWL21 (mouth disease from WP sharing) was the top rated in T6 in motivating smokers to quit (7.9 + [1.7]),

preventing youth from starting WP smoking (7.5 + [1.9]), and overall effectiveness (7.9 + [1.6]) (p<0.05 for all). The overall top ranked HWLs were HWL5 (71.8%), followed by HWL9 (T3-low weight newborn baby; 53.9%), and HWL21 (51.3%). **Conclusion:** HWLs are promising regulatory approaches for addressing the spread of WP smoking among young adults in the USA. Results will inform the selection of the top 12 ranked HWLs for further adaptations, improvement, and testing in experimental study design.

FUNDING: Federal; State

PP-64

BEHAVIORAL INTENTIONS IN RESPONSE TO A POTENTIAL MENTHOL BAN A STUDY OF MENTHOL SMOKERS LIVING IN PUBLIC HOUSING

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Signficance: Local, state, and national policies are being proposed to ban the sale of menthol-flavored tobacco products to improve quit rates and address health disparities. This study examined public housing residents' behavioral intentions if menthol cigarettes were no longer sold. Public housing residents may be uniquely affected by a menthol ban because rates of smoking are higher in public housing than in the general population (33% vs. 15%). **Methods:** Data were collected between March 2019 and March 2021 from 221 District of Columbia Housing Authority residents ages 18-80 who reported smoking menthol cigarettes (83.3% African American/Black). Descriptive statistics and logistic regression models were used to examine quitting and switching intentions as well as the association between quit intentions and resident characteristics. **Results:** Nearly one-half (48.0%) of residents said they intended to quit smoking if menthol cig-arettes were banned, 27.2% were unsure, and 24.9% said they would not quit. Older residents (OR=0.94 per year, 95% CI=0.91, 0.97), senior/disabled building versus family building residents (OR=0.50, 95% CI=0.25, 0.97), those who smoked within 30 minutes of waking (OR=0.48, 95% CI=0.23, 0.98), and daily smokers (OR=0.42, 95% CI=0.21, 0.84) had lower odds of reporting quit intentions associated with a menthol ban. Of those not intending to quit, 40.7% indicated they would switch to non-menthol cigarettes and 20.4% would switch to another non-menthol product. One-third of resi-dents indicated switching to menthol e-cigarettes (13.0%) or another menthol product (20.4%). **Conclusions:** Nearly three-quarters of residents indicated a possibility of quitting smoking with a menthol ban. Resources and supports should be provided to help menthol smokers quit when bans are enacted. In addition, bans that include flavors for all tobacco products may be more effective, as one-third of residents who did not intend to quit, indicated switching to another menthol product.

FUNDING: Federal; Academic Institution

PP-65

DISPARITIES IN CIGARETTE, E-CIGARETTE AND CIGAR USE AT THE INTERSECTION OF MULTIPLE IDENTITIES IN THE U.S. ADULT POPULATION. RESULTS FROM THE TUS-CPS 2018-2019 SURVEY

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Significance: Sociodemographic disparities in tobacco use have been identified in the U.S. population. Nevertheless, few studies have examined disparities in tobacco use from an intersectionality perspective. This study aims to identify disparities in cigarette, e-cigarette, and cigar use at the intersection of multiple identities and develop a visual-ization tool to aid characterization and interpretation. **Methods:** We analyzed data from the 2018-2019 Tobacco Use Supplement to the Current Population Survey (n=137,471). We estimate the prevalence of cigarette, e-cigarettes, and cigars at the intersection of age (18-34, 35-54, 55+ years), sex (male, female), race/ethnicity (NH Whites (NHW), NH Blacks (NHB), Hispanics, NH Others (NHO)), and annual household income (<$50,000, $50,000-$99,999, ≥$100,000), resulting in 72 sociodemographic combinations. All estimates were adjusted for the sample design. **Results:** NHW males (30.7%) and females (29.7%) aged 35-54 years making <$50,000 had the highest cigarette use prevalence, while NHB females aged 35-54 years making ≥$100,000 had the lowest (1.6%). For e-cigarettes, adults aged 18-34 years had the highest prevalence within each of the three income groups (i.e., male/NHW/18-34years/<$50,000 (8.8%), male/NHW/18-34years/$50,000-$99,999 (6.5%), female/NHW/18-34years/<$50,000 (6.2%) and male/Hispanic/18-34years/≥$100,000 (5.6%). The highest cigar use prevalence was among young and middle-aged males NHBs and NHWs, regardless of income

(male/NHB/35-54years/<$50,000 (6.6%), male/NHB/35-54/$50,000-$99,999 (5.6%), and male/NHW/18-34years/≥$100,000 (4.8%)). **Conclusion:** Our visualization tool allows detailed characterization of disparities in cigarette, e-cigarette, and cigar use at the intersection of age, sex, race/ethnicity, and income. This information is critical for surveillance and for the implementation of tobacco control policies that can reduce inequalities in tobacco use.

FUNDING: Federal

PP-66

THE IMPACT OF STATE-LEVEL FLAVOR RESTRICTIONS ON TOBACCO PRODUCT SALES

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Introduction: Several states restricted sales of various tobacco products in response to EVALI outbreaks. Massachusetts restricted the sale of flavored vape products in December 2019, followed by further restrictions on the sale of flavored combustible cigarettes and other tobacco products in June 2020. In New Jersey, a ban on non-tobacco flavored vape products began in April 2020. Few studies have explored the impact of state-wide flavored tobacco sales policies on retail sales of tobacco products. **Methods**: We used NielsenIQ Retail Scanner data to construct four log per capita dependent variables: e-liquid milliliters, cigarette packs, cigars, and smokeless tobacco ounces for products flavored as fruit, menthol, mint, tobacco and other. All models use difference-in-difference (DID) regressions and use Virginia (with no flavored policies) as a control. We control for state level product prices, population percentages by race/ethnicity, proportion male, median household income, unemployment rate, minimum legal sales age, tobacco 21 policies, and cumulative cases and deaths of COVID-19. Due to perfect collinearity we only controlled for vape-free air laws in the e-cigarette models. We account for time-specific factors by using 4-week period fixed-effects. **Results:** In MA, all flavored per capita sales of e-cigarettes (measured by milliliters of e-liquid) decreased by 85-99% (p<0.001) compared to only a 51% (p<0.001) decrease in fruit-flavored e-cigarettes in NJ. Sales of menthol-flavored cigarette packs per capita decreased 89% (p<0.001) in MA and did not decrease at all in NJ. In MA, all flavored per capita smokeless tobacco ounces decreased by 40-82% (p<0.001) compared to 14-52% (p<0.001) increases in NJ. Lastly, in MA, all flavored per capita cigars sales decreased 16-74% (p<0.001) compared to 7-23% (p<0.001) increases in NJ. **Conclusions:** A comprehensive federal ban of all flavors on tobacco products, such as the one passed in MA, is needed to help reduce youth initiation and support tobacco cessation. Comprehensive bans appear more effective than e-cigarette-specific flavored policies such as those passed in NJ in reducing the accessibility of flavored tobacco.

FUNDING: Other

PP-67

CHARACTERIZING THE US CIGAR MARKET AHEAD OF THE FDA'S PROPOSED RULE TO REMOVE FLAVORED CIGARS

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Significance: The 2009 Tobacco Control Act prohibited the sale of non-menthol flavored cigarettes only. Since then, menthol cigarette and flavored little cigar and cigarillo (LCC) use has surged - particularly among Black youth, who are disproportionately targeted by advertising and price promotions of these products. For many years, the FDA has stated its intent to ban these products, most recently again in April 2021, but has not issued a proposed rule to date. This analysis describes the current cigar market and how it could be impacted by the potential proposed rule. Methods: We analyzed US cigar sales using Nielsen Retail Scanner Data from October 2013 through September 2020. Inflation-adjusted sales dollars were classified into cigar products (little cigars, cigarillos, and large cigars) and flavors (fruit/sweet, menthol, mint, tobacco, and other). Results: From October 2013 to September 2020, cigar sales increased by 70.6%. During this period, cigarillo sales increased by 96.2%, large cigar sales increased by 21.3%, and little cigar sales changed little. As of September 2020, the composition of the cigar market was 79.5% cigarillos, 13.9% large cigars, and 6.6% little cigars. About half of all cigars sold throughout 2013-2020 were a flavor other than tobacco, with over half of cigarillos sold at any point being a non-tobacco flavor. In September 2020, the most popular non-tobacco cigarillo and large cigar flavors were fruit/sweet (cigarillos: 21.4%; large cigars: 40.9%) and other (cigarillos: 12.0%; large cigars: 1.59%), while the most popular non-tobacco little cigar flavors were fruit/sweet (23.6%) and

menthol (14.6%). Conclusion: The proposed rule would restrict the sale of nearly half of the current cigar market, with cigarillos being most impacted. It is important that the proposed rule includes removing menthol cigarettes and flavored LCCs at the same time, as products like menthol little cigars closely resemble menthol cigarettes. Given the growth of the cigar market and the proliferation of flavored cigars in particular, the proposed rule holds great potential in restricting products that are attractive to youth and in reducing health disparities.

FUNDING: Other

PP-68

FUTURE PROSPECTS FOR THE DEVELOPEMENT OF ANTI-SMOKING RESEARCH IN FRANCE: RESULTS OF A QUALITATIVE STUDY

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In France, tobacco is the number one risk factor associated with avoidable cancers. Combating smoking is at the core of public health policy. Taxes have been imposed on tobacco products in order to fund research in this field, and funding structures have been put in place. With a view to ensuring that these structures are compatible with the needs of researchers, it is now necessary to analyse the expectations and perceptions of the researchers with regard to this topic: such is the objective of this qualitative study. We conducted a qualitative survey using open-ended questions. The questions sought to ascertain the expectations of researchers with regard to research on tobacco, and the development of funding policies and strategies in this field of research. We constructed a sociologically-representative (Michelat 1975) sample of 30 researchers from different disciplines of humanities and the social sciences concerned with matters of public health. The survey was conducted between February and April 2019, in France. We then conducted thematic categorical analysis on the whole corpus of responses (Bardin 2013). We provide extracts from the responses to illustrate the results. Our analysis of the interviews reveals a problem of information overload. Researchers' expectations are largely concerned with the structuring of calls for projects and the development of scientific fields with the help of dedicated structures and funds devoted to: electronic cigarettes, specific groups, the role of the tobacco industry and lobbying. Finally, one of the most pertinent findings concerns their perceptions. For a majority of respondents, tobacco research is considered unattractive and offers "little potential for innovation," since "there is nothing left to say on the matter." We include a typology of researchers to illustrate these perceptions. In conclusion, this study provides concrete indications on how to improve the support available to research focusing on tobacco: make the field more attractive, clarify its scientific contours and the priority issues to be addressed, create a new forum for reflection.

FUNDING: Other

PP-69

A LONGITUDINAL ANALYSIS OF MPOWER IMPLEMENTATION FROM 2008 TO 2018

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Significance This study is the first to report 10-year longitudinal results of MPOWER implementation with full numerical results provided for 195 countries including breakdowns by region and national income levels with analysis of several covariates. **Methods** The numerical MPOWER data tables for 195 countries and all reporting periods from 2008 to 2018 were obtained from the WHO. The data reflects the seven MPOWER measurable variables. The scores of each country were prepared and assembled according to the six zones of the WHO and by the four national income gradients established by the World Bank. The data were analyzed for correlations with several potential covariates. **Results** *Longitudinal national results from 2008 to 2018.* A total of 176 out of 195 countries increased their MPOWER scores between 2008 and 2018. Twenty-three (23) countries recorded a minimum MPOWER scoring increase of 10 points out of a possible maximum of 34 between 2008 and 2018 representing a population of 840 million or 11.2% of the global population. Two countries achieved a perfect score of 34. Six (6) countries recorded a decline in MPOWER scores between 2008 and 2018, and 13 countries recorded no change in scoring. The mean point change rankings of WHO regions from highest to lowest are (1) South Asian, (2) East Asia, (3) Europe and Central Asia, (4) North America, (5) Latin America and Caribbean, (6) Middle East and North Africa and (7) Sub-Saharan Africa. The highest mean point change rankings according to national income levels are (1) lower-middle income; (2) upper-middle income; (3) high income

and and (4) low income. The highest degree of implementation of MPOWER elements between 2008 and 2018 was (1) *Warn (packaging)*, followed by (2) *Protect*, (3) *Enforce (advertising ban)*, (4) *Offer*, (5) *Raise,* (6) *Warn (mass media), and* (7) *Monitor.* Selected covariates that were positively associated with MPOWER implementation included *reduced cigarette affordability*, the existence of *national tobacco control objectives*, the *human development index score*, the *national corruption index score*, and the *political regime index score*. **Conclusion** More work is needed to improve national MPOWER implementation, especially among low-income countries including measures to *Raise (taxes)*, *Warn* (mass media) and *Offer* (help to quit). A number of social, economic and political indicators appear to influence MPOWER progress including national income, human development and government structure. Future efforts to improve MPOWER implementation should take these factors into consideration.

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DOES SELF-REPORTED EXPOSURE TO TOBACCO MARKETING AT TOBACCO RETAIL OUTLETS INFLUENCE THE TRAJECTORY OF TOBACCO USE AMONG YOUTH?

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Significance: Marketing at tobacco retail outlets (TRO) has been found to influence cigarette and e-cigarette use among youth. However, much of the previous work has been cross-sectional or limited to two time points and has not examined this relationship over the course of adolescence. This study examined the relationship between self-reported exposure to cigarette and e-cigarette TRO marketing and current use of these products across adolescence from ages 11-18. **Methods**: Participants were 3,130 students (56.9% female; 36% Hispanic, 15% Black, 49% White/other race-ethnicity; *m* age=13.44 [*SD*=1.61] at wave 1) from 111 schools in Texas participating in a longitudinal study (2014-2017). Current product use (past 30-day) was measured at each wave with one item each for cigarettes and e-cigarettes (coded as 1=any use, 0=no use). Self-reported TRO marketing exposure for each product was measured by multiplying each student's response about how often they remembered see marketing at TROs (including gas stations, drug stores, grocery stores) for each product separately (responses ranged from never to every time) by each student's self-reported weekly store visit frequency. For this study, waves 2, 4, 5, and 6 were used (spring 2015 through spring 2017). Growth curve models, with age as the time variable and school as the cluster variable, controlling for baseline sex, age, race/ethnicity, socioeconomic status, and any other tobacco product use at wave 1, and also including both participant and wave as random effects, examined the association between self-reported exposure to TRO marketing for each product and current product use. **Results**: Both cigarette and e-cigarette use increased across adolescence. Self-reported exposure to cigarette TRO marketing was significantly associated with the growth in cigarette use (β=5.49, 95% C.I.=4.28-6.69). Self-reported exposure to e-cigarette TRO marketing was also significantly associated with the growth in e-cigarette use (β=3.26, 95% C.I.=2.65-3.87). **Conclusions**: Exposure to TRO marketing continues to be an important risk factor for tobacco use. Longitudinal studies such as this document the importance of enacting regulations that reduce exposure to tobacco marketing at retail outlets.

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SUPPORT FOR NICOTINE REDUCTION IN TOBACCO PRODUCTS FINDINGS FROM THE 2016-2020 ITC FOUR COUNTRY SMOKING AND VAPING SURVEYS

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Background: Countries such as the United States, Canada, and Australia have proposed or shown interest in reducing nicotine levels in combustible cigarettes or e-cigarettes to little or no nicotine. The current study aims to examine support for nicotine reduction in cigarettes and e-cigarettes and change in support over time. **Methods:** Data were drawn from the 2016-2020 ITC Four Country Smoking and Vaping Surveys conducted in Australia, Canada, England, and the United States. The analytic sample was restricted to adult smokers, vapers, and former smokers who reported their support for a law that limits nicotine levels in cigarettes (n= 12,087 in 2016, n=3,757 in 2018, n=5,665 in 2020) and in e-cigarettes/e-liquid (n= 24,914 in 2016 and 2018). In logistic models, support for each law was regressed on socio-demographics, country, smoking/vaping status, perceived harm of nicotine and warning labels, social norms, adjusted for sampling weights. **Results:** More than half of respondents supported nicotine reduction in cigarettes (US = 57%, England = 61%, Canada = 70%, Australia = 61%), averaged across the years. Fewer respondents supported nicotine reduction in e-cigarettes (US = 47%, England = 53%, Canada = 66%, Australia = 47%). When asked about their likely response to reduced nicotine policy in 2018, 49% responded they would quit entirely, compared to 25% in 2016, and those trying the non-nicotine cigarette dropped from 51% in 2016 to 14% in 2018. Those worried about the effects of nicotine on their health were more likely to support nicotine reduction in cigarettes (AOR=1.5 for very worried vs. not at all), as well as e-cigarettes/e-liquids (AOR=1.3 for very worried vs. not at all). Compared to exclusive smokers, former smokers were more likely to support nicotine reduction in cigarettes (AOR=1.6). Dual users (AOR=.75) and exclusive e-cigarette users (AOR=.58) were less likely to support nicotine reduction in e-cigarettes than exclusive smokers. **Conclusions:** Most tobacco product users support laws limiting nicotine levels in cigarettes and e-cigarettes, and support changes over time. Efforts to adopt and implement these regulations should consider these findings.

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THE CREDIBILITY OF TOBACCO CONTROL AND PREFERENCE OF SMOKING CESSATION PROGRAMS AMONG SAUDI SMOKERS

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Background: Saudi Arabia has extensively reformed its tobacco control policies and extended its smoking cessation services in recent years. A public rhotic among smokers was witnessed especially after the implementation of plain cigarette packaging and significant effort of tobacco treatment services was observed. However, we are not aware of how the perceived credibility of tobacco control and preference of smoking cessation programs among Saudi smokers might affect their quit attempts, use of nicotine replacement therapy, and desire to quit. **Method**: Saudi current tobacco smokers (n = 518) were recruited through a cross-sectional sampling. The smokers were asked questions related to the credibility of tobacco control (Modified FDA Tobacco Credibility Scale), preferences of smoking cessation program (not smoker provider, religious provide, gender of the provider, and service settings), quit attempts in the past, use of nicotine replacement therapy in the past, and the desire to quit tobacco smoking in the future. Logistic and linear regression models were used in the analysis. **Results**: The higher credibility of tobacco control, but not the preferences of smoking cessation program, was significantly associated with quitting tobacco smoking in the past (β = 1.011, 95%CI = 1.000 - 1.022) and the desire to quit tobacco smoking in the future (β = 0.277, t = 4.788, *p* = ≤ 0.005. All the models were controlled for gender, age, educational attainment, income, and occupational status. **Conclusion**: The perceived credibility of the tobacco control program among Saudi smokers showed a significant impact on quitting tobacco smoking in the past and the desire to quit tobacco smoking in the future. Tobacco control policies may be perceived as aggressive; therefore, significant efforts of health communication should be disseminated to increase smokers' acceptance of such policies to increase their attempts and desire to quit tobacco.

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EXTRACTION OF COTININE IN URINE USING A MOLECULARLY IMPRINTED POLYMER

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Significance: Molecularly imprinted polymers (MIPs) are synthetic polymers that are designed to selectively capture an analyte based on its size, shape, and functional groups. MIPs are commonly used in place of traditional solid phase extraction (SPE) sorbents for the separation of an analyte from matrix. Commercial MIPs have been designed for the selective extraction of tobacco specific nitrosamines (TSNAs) in urine, but literature has demonstrated that TSNAs have some level of cross-reactivity with the TSNA metabolite 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol (NNAL). Cotinine, nicotine's main urinary metabolite, has a similar size, shape, and functional group chemistry to TSNAs. The purpose of this project was to determine if the TSNA MIP columns could be used for the extraction of cotinine in urine. **Methods:** A modified TSNA MIP extraction protocol was used for the extraction of cotinine in urine and water. Recoveries of cotinine with MIP and a non-imprinted polymer (NIP) were measured in water via HPLC-PDA, and the selective interaction with the MIP material was determined. Cotinine recovery was

also measured in the presence of commonly encountered nicotine/tobacco constituents, n-nitrosonornicotine, nicotine, and trans-3-hydroxycotinine. Cotinine recovery and matrix effects in urine at low, medium, and high concentrations was measured via LC-MS/MS. **Results:** The average recovery of cotinine with the MIP material was 85%, and the selectivity coefficient of the MIP vs the NIP was &gt 1, suggesting that the cotinine recovery was due to specific interaction with the imprinted material. The recovery of cotinine with the imprinted polymer was not significantly affected by the presence of other analytes (p &gt 0.05). Average recovery of cotinine in urine at 10, 100, and 1000 μg/mL ranged from 95-106% with matrix effects of -7.8%. **Conclusions:** The successful recovery of cotinine with the commercial TSNA MIP suggests that the TSNA imprinted polymers can be used for simultaneous detection of multiple biomarkers of exposure to nicotine and tobacco products. **Funding:** Matthew Halquist was funded as the PI of the Bioanalytical Core Laboratory, The Central Virginia Center on Drug Abuse Research, NIDA, 2P30DA033934-08

PP-74

ASSESSING THE TOXICITY OF DIY ADDITIVES IN RESPONSE TO A FLAVOR BAN IN ECIG LIQUIDS

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Significance. Electronic cigarettes (ECIGs) aerosolize liquids that contain nicotine, propylene glycol (PG), vegetable glycerin (VG), and appealing flavors. In the U.S., regulations have been proposed and implemented that may limit the availability of non-tobacco flavors in ECIG liquids. Research demonstrates that some ECIG users may attempt to make their own liquids (i.e., do-it-yourself (DIY) liquids) in response to a flavor ban. This study examined the toxicity of DIY flavored ECIG liquids. **Methods.** DIY liquid additives were identified by reviewing ECIG users' reported responses to a hypothetical flavor ban and a review of 15 ECIG internet forums to include essential oils, cannabidiol oil (CBD), sucralose, ethyl maltol. Concentrations of additives and PG/VG ratio were based on popular recipes identified in ECIG forums or DIY websites. A total of 27 liquids containing different levels and combinations of sucralose, CBD, essential oil, nicotine, and tobacco and menthol flavors were prepared. These liquids were used to assess reactive oxygen species (ROS) emissions in machine-generated aerosols. DIY flavor concentrates and commercially available flavored liquids were tested for comparison. **Results.** Data showed that aerosols generated from DIY flavor concentrates or from menthol and tobacco flavors mixed with DIY additives yielded similar ROS levels compared to commercially available flavored liquids. Moreover, mixing menthol flavor with CBD or essential oil yielded significantly higher, while sucralose yielded lower, ROS emissions than menthol or PG/VG liquid. Only CBD yielded significantly higher ROS with tobacco flavor. Varying sucralose concentration in the liquid yielded the same levels of ROS as PG/VG base liquid. However, increasing power within the same concentration condition yielded significantly higher ROS. Interestingly, nicotine form affected ROS emissions from a liquid containing sucralose. **Conclusion.** Our data showed that DIY liquids may be as toxic as commercially available flavored ECIG liquids. Restricting flavor availability while keeping DIY concentrates and DIY additives available for ECIG users reduces the impact of the introduced policy.

FUNDING: Federal; FDA CTP

PP-75

DEPRESSED MOOD AND COGNITIVE IMPAIRMENT ARE ASSOCIATED WITH STRIATAL DOPAMINE DYSFUNCTION AND BETA2*-NACHR AVAILABILITY IN RECENTLY ABSTINENT TOBACCO SMOKERS

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Significance. Chronic nicotine in animals increases the number of beta2*-subunit containing nicotinic acetylcholine receptors (b2*-nAChRs) and reduces the striatal dopamine (DA) response. This human positron emission tomography (PET) imaging study examined b2*-nAChR availability, striatal DA function, and neural correlates of cognition and mood in recently abstinent tobacco smokers and nonsmokers. **Methods.** 27 smokers receiving contingency management (9F; aged 38+/-10 y; FTND: 5.9+/-2.1; 14+/-11 pack-years) and 28 nonsmokers (11F; aged 30+/-11 y) participated. PET scans measuring b2*-nAChR availability were acquired 90-120 min after bolus-infusion of 254.9+/-44.9 MBq [^{18}F]Flubatine (Kbol=360 min) from 14 smokers (6+/-2 d abstinent) and 19 nonsmokers. PET scans of DA D$_{2/3}$ receptor availability were acquired from 19

smokers (11+/-9 d abstinent) and 18 nonsmokers after bolus injections of [^{11}C]PHNO before (443.1+/-156.6 MBq) and 3 h after (424.6+/-168.4 MBq) amphetamine (0.5 mg/kg, PO). Subjects completed the 1-back working memory task and Center for Epidemiologic Studies Depression scale (CES-D) on scan days. Regional [^{18}F]Flubatine free fraction corrected distribution volumes (V_T/f_p) at equilibrium (b2*-nAChR availability) and amphetamine-induced percent change in [^{11}C]PHNO non-displaceable binding potential BP_{ND} (DA release) were estimated. Two-sample tests and correlations evaluated group effects on, and associations of cognition and mood with, PET estimates. **Results.** Preliminarily, there were no group differences in frontal cortex, caudate, or putamen b2*-nAChR availability. Abstinent smokers had less percent change in ventral striatum BP_{ND} (less DA release) than nonsmokers (p=0.02). Higher frontal b2*-nAChR availability and less striatal DA release was associated with higher mean reaction time for correct 1-back responses (worse working memory) (n=13, r=0.68, p=0.01) and higher CES-D scores (worse mood) (n=15, r=-0.63, p=0.03), respectively, in abstinent smokers only. **Conclusions.** Abstinent smokers exhibited less striatal DA release than nonsmokers, consistent with 'blunted' DA release in other substance use disorders. Higher frontal cortex b2*-nAChR availability and less striatal amphetamine-induced DA release were associated with worse working memory and mood in abstinent smokers, suggesting potential neural correlates of cognitive impairment and anhedonia during quit attempts. Elucidation of within-subject relationships between b2*-nAChR availability and DA function is ongoing.

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PP-76

POWER- VERSUS TEMPERATURE-CONTROLLED ELECTRONIC CIGARETTES: IMPLICATIONS FOR EMISSIONS TESTING AND EXPOSURE

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Smoking machines are commonly used to compare toxicant yields across tobacco products. These machines are usually programmed to execute a number of puffs according to some pre-determined regimen. Prior to the advent of temperature controlled electronic nicotine delivery systems (ENDS), it was found that puff velocity did not impact nicotine emissions, unlike combustible products. Nicotine emissions of a given device and liquid were proportional to puff duration and count, but not flow rate. With temperature-controlled devices (TCDs) such as JUUL, this assumption does not hold in theory; physical principles suggest that for TCDs, greater flow rates result in greater vaporization rates and toxicant emissions. Because flow rates vary widely depending on device design, reports of toxicant yields would need to account for the flow rates at which a given product is used. In this study we investigated how flow rate affects JUUL emissions. We generated and sampled JUUL aerosols using the Aerosol Lab Vaping Instrument. Ten puffs of 4sec duration and 10sec interpuff interval were executed for three flows: 1, 1.5, and 2LPM. Total particulate matter was measured gravimetrically. We found that emissions increased with flow rate; a doubling of flow rate from 1 to 2LPM resulted in approximately a 50% increase in emissions. Unlike the case of power-controlled ENDS, nicotine emissions from TCDs depend on flow rate. The results suggest that previous estimates of JUUL flux and yield using the 1LPM CORESTA method may have been greatly underestimated. This highlights the need to use topography parameters appropriate to the device when measuring emissions.

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PP-77

DUAL USERS' PERCEPTIONS OF THE ADDICTIVE PROPERTIES OF CIGARETTES VS. E-CIGARETTES

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Significance: Electronic cigarettes ("e-cigarettes") are commonly promoted as an alternative to combustible cigarettes, yet many individuals concurrently use both products (e.g. "dual users"). Little is known about the extent to which dual users' perceptions of the addictive properties of these products differ, or to what extent there are similarities or differences in the situational and affective factors that elicit craving for each product. *Methods:* An online survey was used to assess the situations and affective states that evoke craving, and perceptions of the addictive properties of both cigarettes and e-cigarettes in a sample of Canadian adult dual users (n = 175; 79 female). *Results:* Dual users rated cigarettes as more addictive than e-cigarettes and reported higher levels of craving for cigarettes across a number of negative affective states and situational cues (e.g., being in the presence of others' smoking, drinking alcohol). While

the addictive properties of combustible cigarettes were largely attributed to nicotine, non-nicotine factors (e.g. flavouring, other non-nicotine ingredients) were believed to make a stronger contribution to the addictive properties of e-cigarettes. *Conclusions:* Dual users perceive cigarettes to be more addictive than e-cigarettes and attribute the addictive properties of each product to different factors (e.g. nicotine vs. non-nicotine ingredients). Further, craving for combustible cigarettes appears to be more strongly linked to negative affective states and certain situational cues elicit stronger craving for cigarettes, relative to e-cigarettes. *Implications:* An improved understanding of dual users' perceptions of the reinforcing and addictive properties of e-cigarettes vs. cigarettes represents an important step toward developing more effective prevention and cessation efforts. Findings from this study suggest there may be limited substitutability between combustible and electronic cigarettes, and that the use of e-cigarettes alone may be insufficient for some smokers for cessation purposes.

PP-78

EFFECTS OF COMPUTED NICOTINE FLUX AND PROTONATION ON PUFF TOPOGRAPHY AND PLASMA NICOTINE EXPOSURE

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Regulating electronic nicotine delivery systems (ENDSs) is a public health priority. Previous regulatory efforts focused on restricting liquid nicotine concentration. However, these efforts are unlikely to succeed because ENDS nicotine emissions depend on multiple variables in combination (e.g., device power, liquid composition, puffing behavior). Therefore, to achieve the intended effect, regulations targeting addiction must focus on nicotine delivery. While nicotine delivery cannot be regulated directly, nicotine flux, the rate at which ENDSs emit nicotine, is a readily computed metric that can be regulated. In this study, we tested whether nicotine flux can predict plasma nicotine concentration. Plasma nicotine concentration measurements were obtained from four clinical studies that tested the effects of ENDS use conditions on nicotine delivery and puffing behavior in 10-puff directed (N=394) and 60 min ad lib use episodes (N=205). Puff topography was measured using the AUB eTop puff topography instrument. The conditions examined span 15 different nicotine fluxes ranging from 10 to 108μg/sec and included protonated and freebase nicotine. General linear models (GLMs) were used to examine the associations between computed nicotine flux with plasma nicotine concentrations. A random effect was included to account for within-subject dependence. GLMs were also used to examine the associations between flux and nicotine form with puff topography. Analyses were stratified by session type (directed; ad lib). Baseline-adjusted plasma nicotine concentrations in directed and ad lib ENDS use episodes increased with nicotine flux. In ad lib episodes, puff duration decreased with increasing flux; puff number and flow rate were unrelated to flux. Interestingly, nicotine form was associated significantly with puff duration; protonated nicotine resulted in a 1 sec increase in puff duration. This study shows that nicotine flux is a powerful regulatory lever because it can predict nicotine delivery to the blood, a key factor in abuse liability.

PP-79

VAPING-INDUCED PROTEOLYSIS CAUSES AIRWAY DEHYDRATION

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Significance: Proteases play important roles in pulmonary health and help regulate lung hydration, via their control of the epithelial sodium channel (ENaC). Impaired airway hydration contributes to mucus stasis in the lung, which is causal for increased infection and inflammation. Indeed, lung dehydration is a key aspect of chronic obstructive pulmonary disease (COPD) which contributes to the disease severity. Previously, we have demonstrated that vaping increased proteases (neutrophil elastase and matrix metalloproteases) in the lung. Proteases cleave and activate ENaC causing airway dehydration. Our current study explores the impact of increased protease activity in vapers' airway secretions on airway dehydration and ENaC cleavage. **Methods:** Human bronchial epithelial cells were cultured at air-liquid interface and exposed to pooled bronchoalveolar lavage fluid (BALF) from age and sex-matched non-smokers, smokers and vapers. Airway surface liquid (ASL) height was monitored over time using confocal microscopic imaging. ENaC subunits were expressed in human embryonic kidney (HEK293T) cells and subsequently treated with elastase to identify ENaC cleavage products by Western blot. **Results:** Neutrophil elastase cleaved ENaC subunits in HEK293T cells.

Accordingly, concentrated BALFs from smokers and vapers also caused cleavage of ENaC indicating increased protease activity in tobacco product users' lungs may cause airway dehydration. Further, BALFs from smokers and vapers significantly decreased ASL height compared to the non-smokers', indicating ASL dehydration. The ASL height decrease was ENaC-dependent and was prevented by protease-inhibitors, confirming that increased proteolysis in vapers and smokers BALFs caused the ASL dehydration. **Conclusions:** The current study demonstrated that the elevated protease levels in vapers airways may have functional significance, and that they can cleave and activate ENaC, resulting in airway dehydration. Airway dehydration is associated with a decline in lung function, development of pulmonary diseases, and increased mortality. Hence, more research is required before we can say that e-cigarettes do not cause COPD-like lung disease. **Acknowledgements:** Funded by HL120100, HL135642 and HL153698.

PP-80

EVALUATION OF EARLY INFLAMMATORY AND IMMUNE CELL RESPONSES IN THE MURINE LARYNX FOLLOWING SUBACUTE LOW AND HIGH DOSE WHOLE-BODY CIGARETTE SMOKE EXPOSURE

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Significance: The larynx is a multifunctional organ situated at the upper-lower airway divergence that plays a vital role in swallowing, breathing, coughing, and voice production. Despite well-documented cigarette smoke (CS) induced laryngeal histopathological changes in animal and human subjects, the underlying immunopathological mechanisms remain largely unexplored. The goal of this study was to examine the early immunological responses of the CS-exposed laryngeal mucosa. Specifically, we investigated inflammatory and immune cell responses in the murine larynx after subacute low and high dose whole-body mainstream CS exposure (CSE). **Methods:** Adult C57BL/6 male mice were assigned to air-exposed control, low (LD; 1h/day), and high (HD; 4h/day) dose CSE groups. Mice were euthanized after 4 weeks of exposure. Laryngeal tissues were harvested for mRNA expression using a Nanostring inflammation panel and immunohistochemical staining. Global and differential gene expression analyses were performed. Biological interpretation of the differentially expressed genes (DEG) was performed via StringDB protein-protein interaction (PPI) network analysis, KEGG pathway enrichment, and Ingenuity Pathway Analysis (IPA). Macrophages, neutrophils, and T-cells were quantified via immunohistochemistry (IHC). **Results:** Global gene expression analysis revealed a unique gene expression profile in HD, as compared to LD and control mice. Differential gene expression and bioinformatic analysis identified 26 DEG only in the HD group associated with various proinflammatory pathways including TNF, MAPK, TLR, and IL-17. Furthermore, inflammatory responses remained inhibited in conjunction with predicted activated states of anti-inflammatory regulators like PPARG and Nrf2. Immune cell recruitment responses remained inhibited as corroborated by IHC outcomes. **Conclusion:** Overall, subacute high dose CSE was anti-inflammatory and immunosuppressive. Longer time assessments are needed to see when CS-induced inflammatory and immune cell responses sustain and become pathologic. Furthermore, the identification of biomarkers can help improve future therapeutic interventions of CS-induced laryngeal diseases.

PP-81

EFFECTS OF CIGARETTE SMOKE AND E-CIGARETTE AEROSOL EXTRACT ON INTRACRANIAL SELF-STIMULATION IN RATS

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Significance. Conventional tobacco cigarettes have greater abuse liability than non-combusted products such as electronic cigarettes (ECs) and nicotine replacement therapy (NRT). This may be due to the higher levels of behaviorally active non-nicotine constituents (e.g, volatile organic compounds (VOCs) such as acetaldehyde, minor tobacco alkaloids such as nornicotine) in cigarette smoke (CS) compared to non-combusted products. Evaluating this hypothesis could lead to identification of new Harmful or Potentially Harmful Constituents and development of addiction-related product standards that extend beyond the FDA's current focus on nicotine. To this end, the current studies compared the relative abuse liability of CS and EC aerosol extracts to that of nicotine alone (NRT analog) using intracranial self-stimulation (ICSS) in rats. *Methods and Results.* Chemical analyses indicated that CS extract contained higher levels of

several behaviorally active non-nicotine constituents (e.g., acetaldehyde, nornicotine) than EC extract. Nicotine alone reduced ICSS thresholds at a moderate nicotine dose, suggesting a reinforcement-enhancing effect that may promote abuse liability, and elevated ICSS thresholds at a high nicotine dose, suggesting an aversive/anhedonic effect that may limit abuse liability. In contrast, CS extract did not lower ICSS thresholds at any nicotine dose, and produced greater elevations in ICSS thresholds than nicotine alone at high nicotine doses. Effects of EC extract on ICSS did not differ from those of nicotine alone. These findings demonstrate lower abuse liability of CS extract, but not EC extract, compared to nicotine alone as measured using ICSS. *Conclusion.* Together these findings suggest that the centrally-mediated effects of non-nicotine constituents may not contribute to the greater abuse liability of cigarettes compared to non-combusted products, and that other factors (e.g., sensory effects, etc.) may play a more important role. Further work to identify the non-nicotine constituent(s) mediating the effects of CS extracts in this study could help clarify the role of non-nicotine constituents in tobacco use and inform FDA product standards.

PP-82

ADOLESCENT NICOTINE TREATMENT ENHANCES THE MOTIVATION TO SELF-ADMINISTER NICOTINE IN RATS: A BEHAVIORAL ECONOMICS APPROACH

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Significance: Tobacco use is on the decline among US adults, but e-cigarettes use has increased alarmingly among young people in recent years. Adolescent nicotine use increases the risk for becoming a regular smoker and developing a nicotine addiction later in life. The FDA has the authority to regulate the sale and marketing of tobacco products to protect public health. An increase in the price of cigarettes reduces smoking. Therefore, we investigated if adolescent nicotine exposure enhances the motivation for nicotine self-administration in adulthood using a behavioral economics approach. **Methods:** Adolescent male Wistar rats were treated with saline or nicotine (0.4 mg/kg, sc) from postnatal day (P) 24-42. Nicotine-induced locomotor sensitization was studied in the small open field test (OFT) after the 1st, 2nd, and 6th nicotine injection. During adulthood (>P75), locomotor activity was measured in the OFT in a drug-free state and then a catheter was implanted in the jugular vein. The acquisition of intravenous nicotine (0.03 mg/kg/inf) self-administration (3h/day) was measured for 12 days under a fixed ratio (FR) 1 and FR 2 reinforcement schedule. After this, the price of nicotine was gradually increased by increasing the response requirements (FR 2-480). A behavioral economics approach (demand curve analysis) was used to estimate the elasticity of demand for nicotine. **Results:** Repeated nicotine administration increased locomotor activity over time and did not affect locomotor activity in a drug-free state in adulthood. During the acquisition phase, the nicotine-treated rats self-administered the same amount of nicotine as the saline-treated controls. When the response requirements (price) were increased, nicotine intake declined. The demand for nicotine was less elastic in the nicotine-treated rats than in saline-treated controls. **Conclusion:** These results indicate that adolescent nicotine treatment enhances the motivation for nicotine self-administration in adulthood. Therefore, the use of nicotine products during adolescence may make it more difficult to quit using tobacco or e-cigarettes in adulthood.

PP-83

MODELING CHRONIC NICOTINE EXPOSURE IN MICE USING AN ELECTRONIC NICOTINE DELIVERY SYSTEM

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Significance: Nicotine dependence is among the leading causes of preventable death worldwide, with high relapse rates in those attempting to quit. Electronic Nicotine Delivery Systems (ENDS) represent a novel approach to create preclinical animal models of nicotine dependence via inhalation. The aim of this study was to validate a new model of chronic nicotine exposure in mice using an ENDS. **Methods:** We chronically exposed the mice to either nicotine (20 mg/ml), vehicle (propylene glycol:glycerol, 50:50), or room air during 8-hour daily sessions for 5 days per week (M-F) for up to 10 weeks, and produced a dose-response curve using different inter-vape frequencies (5, 10, 15, or 60 min). **Results:** First, we validated vapor chambers (La Jolla Vapor) by performing a pharmacokinetic study using ultra performance liquid chromatography tandem mass spectrometry (UPLC-MS/MS) to quantify nicotine and cotinine levels in blood. Next, we assessed the effect of different exposure doses on body weight, locomotor activity,

and physical signs of nicotine dependence (spontaneous somatic signs and tactile allodynia). At a dose that produces signs of nicotine dependence (10 min frequency), we evaluated the effect of nicotine abstinence on anxiety-like behaviors (open field test and light/dark box) and depressive-like behaviors (splash test and sucrose preference test). **Conclusions:** These results indicate that ENDS produce dose-dependent molecular and behavioral effects in mice that recapitulate nicotine dependence.

PP-84

EFFECTS OF E CIGARETTE AEROSOL EXPOSURE ON THE MUCOCILIARY AIRWAY EPITHELIUM

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The last decade has witnessed a rapid increase in the use of e-cigarettes (e-cig), especially among teenagers and young adults. It is a serious public health concern because we do not yet know the extent of the possible health effects. The market for e-cigs is not well regulated and that is compounded by the fact that very little is known about the potential adverse effects of e-cigs on the airway. In this study we used an *in vitro* culture system to test e-cig aerosol components. We used primary human and mouse airway basal stem cells (ABSCs) to generate air-liquid interface cultures with a well differentiated mucociliary airway epithelium and subsequently tested the effects of e-cig aerosol components on ABSC proliferation and the percentage of mucus and ciliated cells. We found that the aerosol carriers, propylene glycol (PG) and vegetable glycerin (VG) with or without nicotine increased ABSC proliferation rates and reduced the percentage of ciliated cells. The addition of 3% and 5% nicotine to PG/VG induced more mucus cells. However, the most striking effect was seen with the addition of four different Juul flavors. Of the four different flavors tested, each had slightly different effects on the repair and regeneration process. It is interesting to note that the mango, mint and classic tobacco flavors showed very similar effects to combustible cigarette smoke in terms of increased ABSC proliferation, loss of ciliated cells and increased $Muc5AC^+$ mucus cells. Staining of the mucociliary epithelium with dihydroethidium (DHE) dye for reactive oxygen species (ROS) revealed that ROS levels were increased to different levels with aerosols from the four different Juul flavors. Overall, our data suggests that there could be significant deleterious health effects on mucociliary clearance induced by e-cigs and that these could be similar to the airway health effects seen with traditional combustible cigarettes.

PP-85

OVER ONE YEAR LATER - EVALI AWARENESS, KNOWLEDGE AND IMPACT ON E-CIGARETTE USE INTEREST AMONG SMOKERS AND YOUNG ADULT NON-SMOKERS

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Significance: The e-cigarette or vaping product use-associated lung injury (EVALI) outbreak caused serious lung injuries in over 2800 people in fall 2019. By February 2020, most cases were determined as being linked with vaping tetrahydrocannabinol (THC), including black market products using vitamin E acetate. However, public knowledge about the determinants of EVALI is unclear. This study examined EVALI awareness, knowledge and perceived impact on e-cigarette interest approximately 16 months after its peak. Methods: Between January-February 2021, we surveyed 1018 adult smokers and 1051 young adult (YA) non-smokers (ages 18-29) from a nationally representative US research panel. Participants were asked if they had heard about EVALI prior to COVID-19, knew its main cause, and if EVALI had impacted their interest in future e-cigarette use.Results: Approximately 54% of smokers and YA non-smokers had heard of EVALI. Among those who had heard of EVALI (n=1111), about one-third believed its *main* cause was e-cigarettes used to vape nicotine, like JUUL. Fewer (15.3%) thought the main cause was products for vaping marijuana/THC, and 19.1% did not know. About 27% had heard vitamin E acetate was associated with EVALI, and 47.1% indicated EVALI made them less interested in using e-cigarettes in the future (including over 50% of those who had ever used e-cigarettes before). Smokers who were less interested in e-cigarettes because of EVALI had a lower prevalence of past 30-day use of e-cigarettes (33.4%) relative to those who said it had no impact on their interest (53.1%) (p=0.01). EVALI awareness was also associated with a higher prevalence of perceiving e-cigarettes as being as or more harmful than smoking (*p*<.01).Conclusions: Despite

the passage of time, considerable lack of knowledge and misperceptions about EVALI remain. Our findings suggest the need for cross-sectoral collaboration to promote better understanding of EVALI and appropriate behavioral and policy responses.

PP-86

BLUNTS AND BLACK AND MILDS: UNPACKING LITTLE CIGAR AND CIGARILLO TERMINOLOGY AMONG AFRICAN AMERICAN/BLACK AND HISPANIC/LATINO TEENS

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Significance: Despite recent decreases in the use of little cigars and cigarillos (LCCs), African American/Black and Hispanic/Latino teens remain disproportionately more susceptible and likely to use these products compared to White teens. Addressing this disparity requires a clear understanding of the way current and susceptible users refer to and categorize LCCs. Prior research among adults has revealed key differences in the terminology used by researchers and policy makers compared to users of LCC products which can hinder public health efforts. This study, funded by the Food and Drug Administration, adds to the literature by looking at terminology used by teens. Methods: Twenty-eight virtual focus groups with teens ages 13-17 (*n* = 105) were conducted across the U.S. Groups were split by race/ethnicity, with 14 African American/Black and 14 Hispanic/Latino groups, and further divided by LCC experimenters and susceptible users. Topics covered during focus groups included LCC use behaviors, harm and risk perceptions, and knowledge, attitudes, and beliefs. Participants also completed an online survey about tobacco use behaviors and risk perceptions. Demographic and use pattern information from survey data along with transcripts were reviewed and analyzed. Results: When shown photos of LCC products during focus group discussions, teens across groups identified and labeled these products into three subcategories. Untipped cigarillos were commonly identified as "blunts" or specific brand names (e.g., *Dutches, Backwoods*), and categorized as cannabis products. Tipped cigarillo products were often synonymous with the brand *Black and Mild* and categorized as tobacco products. Little cigars were generally unfamiliar and sometimes confused with cigarettes. While results were comparable across groups, susceptible Hispanic/Latino teens were more unfamiliar with LCCs compared to susceptible African American teens. Conclusions: The current study underscores the need to rethink the terminology of LCCs to better align with the language used by teens in order to strengthen future research and surveillance, instrument design and public health messaging.

PP-87

E-CIGARETTES FOR SMOKING CESSATION AND THEIR LONG TERM USE IN THIS POPULATION. COCHRANE LIVING SYSTEMATIC REVIEW

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Significance: There is interest in both whether e-cigarettes (EC) help people to quit smoking and how long people continue to use EC or other pharmacotherapy after quitting. We incorporate this new outcome into our Cochrane living systematic review of EC for smoking cessation after feedback from readers and stakeholders. We also assess the evidence on the effectiveness, tolerability and safety of using EC to help people who smoke achieve long-term smoking abstinence and now also present findings on the proportion of people still using study product, EC or pharmacotherapy, at study end or longest follow up (FU). Methods: We searched monthly for studies that tested EC interventions in people who smoke. Studies had to report abstinence from cigarettes at 6 months or longer and/or data on adverse events or other markers of safety at a week or longer. Results: We include 63 studies (n=16,944) in the analysis. We found moderate-certainty evidence that ECs with nicotine increase quit rates compared to ECs without nicotine and compared to NRT. Evidence comparing nicotine EC with usual care/no treatment also suggests benefit, but is less certain. We did not detect any clear evidence of harm from nicotine EC, but longest FU was two years and the overall number of studies was small. Where available we extracted data on the proportion of people still using study product at longest FU. Studies of nicotine EC

vs NRT gave differing results, one found no difference in the proportion of participants still using study product at longest follow-up, and the other found significantly higher levels of EC use than NRT. In studies comparing nicotine EC with non-nicotine EC, there was no evidence of a difference in proportion of people still using EC at longest FU. Of the included studies which reported study product use at 6 months or longer 8 of 12 reported 50% or more participants still using EC at longest follow up. Conclusion: Data consistently signal benefit of nicotine EC for smoking cessation and we did not detect any clear evidence of harm. In many studies, more than half the participants who were using EC continued to use EC at longest FU. Funding: This work is supported by Cancer research UK (CRUK)

PP-88

COMMUNITY WIC SYSTEM-INITIATED MULTILEVEL INTERVENTION IMPROVES MATERNAL SMOKERS' BIOVERIFIED ABSTINENCE, BABIES LIVING SAFE AND SMOKEFREE RCT

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Significance: Low-income maternal smokers experience greater difficulty quitting than other smokers. More intensive treatment than standard care is necessary to facilitate long-term abstinence. This study tested the efficacy of Babies Living Safe & Smokefree (BLiSS), a translatable multilevel intervention initiated in an urban WIC system offering safety net health promotion programs. BLiSS applied a behavioral ecological framework to guide multiple strategies promoting child tobacco smoke exposure (TSE) reduction as an initial step toward long-term smoking abstinence. Methods: This RCT used a parallel 2 group design with assessments at baseline, 3-mo end of treatment and 12-mo follow-up. Participants were gt17 years old, daily smokers with children lt 6. All participants received brief, clinic-based intervention from WIC nutrition professionals trained to follow pediatrics' best practice guidelines for tobacco intervention (Ask, Advise, Refer/AAR). After AAR, mothers were randomized to the multimodal BLiSS behavioral intervention (AAR+MBI, n=199) or an attention control nutrition intervention (AAR+Control, n=197). Results: There was a significant treatment effect on bioverified (cotinine) abstinence through 12-month follow-up (OR 9.55, 95%CI 1.54 59.30, p=.015) favoring AAR+MBI. There were significant effects of time and condition x time (p's lt .001) on reported child TSE through 12 months favoring AAR+MBI, but no group differences in child cotinine. Higher baseline tobacco dependence was significantly associated with greater reported child TSE, higher child cotinine and lower likelihood of maternal abstinence. Conclusions: The BLiSS intervention was acceptable, feasible and efficacious in a population with elevated challenges to smoking behavior change. The abstinence outcome is particularly notable. Future directions will be discussed.

PP-89

PERCEPTIONS OF HARM AND ADDICTION ON THE AGE OF INITIATION OF CIGAR USE AMONG YOUTH-FINDINGS FROM THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY, 2013-2017

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Objective To examine if perceptions of harmfulness and addictiveness of cigar products are associated with the age of initiation of any cigar product use among youth. **Methods** Youth (12-17 years old) never users of any cigar product at their first wave of PATH participation in waves 1-2 (2013-2015) were included in the analysis. Participants had their age of initiation followed-up in waves 2-4 (2014-2017) for (i) ever, (ii) past 30-day, and (iii) fairly regular use of any cigar product (cigarillo, filtered cigar or traditional cigar). An upper and a lower age bound was specified, between which the initiation of each outcome occurred. Two exposures measuring perceptions of harm and addictiveness at the first wave of PATH participation were used. The interval-censored Cox proportional hazards models with the piecewise constant baseline hazard function were used to study the interaction of perceptions of harm (high vs low/medium) and addiction (high vs low/medium) on the age of initiation of any cigar product use, adjusting for sex, race/ethnicity, and the total number of other tobacco products used previously. **Results** Youth who perceived any cigar to be low/medium harmful and high addictive (HR: 1.33, 95% CI: 1.15-1.53), and low/medium harmful and low/medium addictive (HR: 1.60, 95% CI: 1.36-1.89) were more likely to initiate ever any cigar product use at

earlier ages than those who perceived any cigar to be high harmful and high addictive. Youth who perceived any cigar to be low/medium harmful and low/medium addictive (HR: 1.46, 95% CI: 1.14-1.86) were also more likely to initiate past 30-day use of any cigar product at earlier ages than those who perceived any cigar to be high harmful and high addictive. Youth who perceived any cigar to be high harmful and low/medium addictive (HR: 0.24, 95% CI: 0.07-0.83) were less likely to initiate fairly regular use of any cigar at earlier ages than those who perceived any cigar to be high harmful and high addictive. **Conclusions** The perceptions of harmfulness and addictiveness of cigar products should be addressed in education campaigns for youth to prevent earlier age of initiation of all cigar products.

PP-90

LONGITUDINAL ASSOCIATIONS BETWEEN EXCLUSIVE AND DUAL USE OF ELECTRONIC NICOTINE DELIVERY SYSTEMS AND CIGARETTES AND CARDIOVASCULAR DISEASE AMONG ADULTS

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Significance: The cardiovascular health effects of electronic nicotine delivery systems (ENDS) use are not well characterized, making it difficult to assess the potential of ENDS use as a harm reduction tool for adults who use cigarettes. Methods: Using waves 1-5 of the Population Assessment of Tobacco & Health Study, we analyzed the risk of incident myocardial infarction (MI) and stroke associated with ENDS and/or cigarette use among adults aged 40 and older using discrete time survival models. We employed a time-varying tobacco product exposure lagged by one wave, defined as exclusive or dual established use of ENDS and/or cigarettes every day or some days. We controlled for demographics (age, sex, race/ethnicity, educational attainment), clinical factors (hypertension, diabetes, family history of premature heart disease), and past smoking history (cigarette pack-years). Results: The analytic sample (n=11,031) was predominantly female (55%) and non-Hispanic White (71%) with a mean age of 58 years. At baseline, 14% of respondents exclusively smoked cigarettes, 0.6% exclusively used ENDS, and 1.0% used both products. Incident MI and stroke were rare during the five-year follow-up period (<1% at each wave). Compared to no cigarette or ENDS use, exclusive cigarette use increased the risk of MI (aHR 1.99, 95% CI 1.40-2.84) and stroke (aHR 2.26, 95% CI 1.51-3.39), while exclusive ENDS use (MI: aHR 0.61, 95% CI 0.12-3.04; stroke: aHR 1.74, 95% CI 0.55-5.49) and dual use (MI: aHR 1.84, 95% CI 0.64-5.30; stroke: aHR 1.12, 95% CI 0.33-3.79) were not significantly associated with the risk of either outcome. Conclusions: While exclusive cigarette use increased the risk of incident diagnosed cardiovascular disease over a five-year period compared to non-use, ENDS use did not. For adults using cigarettes, transitioning to exclusive ENDS use would decrease the short-term risk of cardiovascular disease.

PP-91

CO-DESIGNING NOVEL VAPING CESSATION INTERVENTIONS WITH YOUTH AND YOUNG ADULTS: THE STOP VAPING CHALLENGE AND POSTCARDS FROM THE FUTURE

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Significance: In 2020, the US Surgeon General's Report on Smoking Cessation identified the development of vaping cessation interventions as a research priority. To this end, we recruited help-seeking youth in the co-design of vaping cessation interventions. Meaningful co-design in applied health services research has been shown to benefit researchers and end users, as well as the research process and research outcomes. We present evaluation findings of the co-design process and explore its impact on the development of two novel vaping cessation interventions. **Methods**: Between May and June 2020, we held two intensive design activities aimed at developing vaping cessation interventions: a weekend 'hackathon' with young adults (ages 19-29) and a series of longitudinal asynchronous activities with youth (ages 16-18). The implementation of the co-design process was evaluated using anonymous evaluation forms and confidential phone interviews (total n = 35). Responses were coded using a five-step constant comparative analysis approach. Due to COVID-19, all data collection activities were conducted remotely through various Internet-based research platforms. **Results**:

The co-design events demonstrated that frameworks used for smoking cessation are insufficient when applied to vaping and that novel interventions are needed. Insights from participants led to several proposed interventions, two of which were identified for further development and production: Stop Vaping Challenge and Postcards from the Future. Evaluation data demonstrated high satisfaction with the engagement process. Notably, some participants reported changing their behaviour as a result of their participation in the design process and the self-reflection this engendered. **Conclusions**: There is an urgent need for vaping cessation interventions developed for and by young people that take into account their subjective experiences and the differences from smoking cessation paradigms. Meaningful co-design research is a promising approach to developing effective interventions that capture the complexities of health behaviour change.

PP-92

PATTERNS OF DAILY CIGARETTE AND E-CIGARETTE USE AMONG US YOUTH AND YOUNG ADULTS: INSIGHTS FROM THE TRUTH LONGITUDINAL COHORT BETWEEN 2018 AND 2019

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Significance: Patterns of experimentation with tobacco products has changed considerably over the past decade, with more youth and young adults experimenting with multiple tobacco products. A recently conducted study, using the nationally PATH Study data, suggested that youth who use e-cigarettes are at markedly increased risk of later daily cigarette smoking. However, this study was undertaken prior to the introduction of JUUL, a high nicotine e-cigarette that has gained market predominance. **Methods:** This study examines temporal patterns of daily cigarette and e-cigarette use among ever tobacco users from the Truth Longitudinal Cohort (TLC). The TLC includes youth and young adults surveyed at six-month intervals. The analytic sample (N=7891) includes individuals aged 15-36 years, who had ever used any tobacco product at wave 7 (2018) and provided information about daily tobacco use at wave 9 (2019). **Results:** At Wave 7, 12.6% indicated that they were daily tobacco users and 18 months later, an additional 3.0% became new daily users. By Wave 9, 45% of daily cigarette smokers only used cigarettes and 56% of daily e-cigarette users only used e-cigarettes. An estimated 27.2% of e-cigarette experimenters at Wave 7 had transitioned to become daily cigarette smokers at Wave 9 - a much smaller proportion than that seen in the PATH Study. This may be attributed to the predominance of JUUL, as two thirds of all e-cigarette users at Wave 9 used JUUL products. Furthermore, new daily users were more likely to be under 21 years old and to have less than a high school education. Patterns of daily use changed across age groups, as >60% of daily users were under 21 years, 39.7% among those 22-24 years, 32.7% among those 25-28 years, and 25.9% among those 29-36 years. **Conclusion:** These are the first results to show that the epidemic of JUUL experimentation among adolescents in recent years has led to high rates of addiction to e-cigarettes, while confirming that over a quarter of e-cigarette experimenters become daily cigarette smokers. Results suggest that policies and public education focused on reducing nicotine use among youth and young adults are essential to change the trajectory of this epidemic.

PP-93

TOBACCO AND E-CIGARETTE USE BEHAVIOR TRANSITIONS AMONG A YOUTH AND YOUNG ADULT SAMPLE

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Significance: Several cross-sectional and longitudinal studies demonstrate significant associations between e-cigarette use and future combustible use, as well as continued use of e-cigarettes. Though, information on patterns of use across time remains limited. The purpose of this study was to characterize patterns of use across cigarettes, e-cigarettes, and little cigars, cigarillos, and cigars (LCCs) and determine trajectories of these use patterns using latent class and latent transition analyses. **Methods:** Survey data were drawn from the Truth Longitudinal Cohort, a nationally representative, probability-based cohort which includes youth and young adults (15-27 years). To be included in this study, participants had to have indicated that they had ever used cigarettes, e-cigarettes, or LCCs at wave 7 (2018) of data collection. Participants also had to have provided information on past 30 day use of these tobacco products at waves 7, 8, and 9 (N = 5748, 2018-2019). **Results:** Four latent classes characterizing use were identified: noncurrent users, infrequent polytobacco users, frequent cigarette users,

and frequent e-cigarette users. Although users tended to retain their latent status over time (91% of noncurrent users, 64% of infrequent polytobacco users, 62% of frequent cigarette users, and 68% of frequent e-cigarette users from wave 7 to wave 8), transitions from one latent class to another also occurred. The probability of transitioning from noncurrent user to frequent e-cigarette user was 7%, infrequent polytobacco user to frequent e-cigarette user was 9%, and frequent cigarette user to frequent e-cigarette user was 15% from Time 1 (2018) to Time 2 (Early 2019). During the same time, the probability of transitioning from noncurrent tobacco user to frequent cigarette user was 1%, infrequent polytobacco user to frequent cigarette user was 11%, and frequent e-cigarette user to frequent cigarette user was 4%. Similar patterns are found for the transition from Time 2 (Early 2019) to Time 3 (Late 2019). **Conclusion:** Results suggest that although users remained loyal to their initial product, a considerable proportion of tobacco users transitioned to e-cigarette use. More research is needed to determine predictors of changes in tobacco product use across time and how these transitions influence product cessation.

PP-94

NICOTINE DEPENDENCE, OTHER TOBACCO USE, AND CANNABIS USE: DIFFERENCES AMONG LIGHT AND HEAVY ADOLESCENT AND YOUNG ADULT E-CIGARETTE USERS

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Significance: Among adolescents and young adults (AYAs), current use of e-cigarettes (EC) is commonly defined as any use in the past 30 days. However, few studies have examined differences between users within that broad category. Understanding how current EC users may differ based on the frequency of use is important to inform more targeted intervention and cessation efforts. This study examined characteristics (e.g., nicotine dependence, other tobacco product use, cannabis use) of AYAs who used ECs infrequently (light users) and those who used ECs more frequently (heavy users). **Methods:** Our analysis included nearly 500 Ohio AYAs between the ages 15-24 who reported using an EC to vape nicotine in the past 3 months. Using previous literature to define frequency of use, participants who used an EC ≤ 19/30 days were classified as light users and 20-30 days were classified as heavy EC users. Participants completed online measures assessing characteristics outlined above. Two-sample t-tests and chi-square tests were used to detect differences between the user groups. **Results**: Heavy EC users had higher nicotine dependence scores, assessed by the e-cigarette dependence scale (EDS), (p<.001), were more likely to have tried cigarettes as their first tobacco product (p=.01), were more likely to know what type of nicotine was in their EC (p<.001), and were more likely to have used cannabis (any form) in the past 30 days (p=.02) than light users. No difference was observed between light vs. heavy EC users with co-use of another tobacco product (e.g., cigarettes). **Conclusion**: Our results suggest that frequency of use is an important characteristic in understanding EC use among AYAs, suggesting any past 30 day use may not be a sensitive enough measurement for understanding dependence among this population. Monitoring co-use of cannabis will be important in understanding how this relates to EC use among AYAs. Characterizing current EC users by their frequency of use may provide meaningful information that allows public health professionals to better target intervention and cessation efforts to AYAs.**Funding:** This study was funded by the American Heart Association (20YVNR35490079).

PP-95

INVESTIGATING THE SUBSTITUTABILITY OF ALTERNATIVE TOBACCO AND NICOTINE PRODUCTS FOR CONVENTIONAL CIGARETTES IN THE EXPERIMENTAL TOBACCO MARKETPLACE AMONG VULNERABLE POPULATIONS

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The experimental tobacco marketplace (ETM) is an online marketplace wherein, through increasing the price of cigarettes, one can investigate the substitutability of other fixed-price nicotine and tobacco products (e.g., e-cigarettes) for cigarettes. As such, the ETM is useful for modeling the effects of potential policy changes on use of various concurrently available products. To our knowledge, the ETM has *not* been used to investigate cigarette demand and product substitutability among populations

especially vulnerable to smoking. In this study, participants were 22 adult daily smokers with comorbid psychiatric conditions or socioeconomic disadvantage. In each session, cigarette prices increased ($0.12, $0.25, $0.50, $1.00, $2.00 per cigarette) while prices for other products (JUUL e-cigarettes, little cigars and cigarillos (LCCs), snus, chew, gum, lozenges) remained fixed. Across three ETM sessions, either all products, all products except LCCs, or all products except JUUL were available. Linear regression was performed on group mean data as a function of log-transformed cigarette price to determine demand and substitution. Cigarette demand decreased as a function of increasing price in all sessions, as evident by significant non-zero slopes (*p*s≤.001). When all products were available, JUUL substituted for cigarettes. That is, JUUL purchasing increased as a function of increasing cigarette price, as evident by a positive, significant non-zero slope (*p*=.002). When JUUL was unavailable, LCCs did not substitute for cigarettes, with a slope not significantly different than zero (*p*=.47). When LCCs were unavailable, the JUUL slope remained positive, but not significantly so (*p*=.06). Participants rarely purchased other products. Overall, JUUL was the preferred substitute when constraints on cigarettes increased in the current study with vulnerable populations, suggesting that JUUL availability could be an important moderator of the effect of tobacco regulatory policies on conventional combusted cigarettes. We saw no evidence that LCCs substituted for cigarettes, but that observation should be interpreted cautiously pending further investigation. Funding: Centers of Biomedical Research Excellence (COBRE) NIGMS NIH award P20GM103644; Tobacco Centers of Regulatory Science (TCORS) NIDA and FDA award U54DA036114

PP-96

EFFECTIVENESS OF WHATSAPP ONLINE GROUP DISCUSSION FOR SMOKING RELAPSE PREVENTION: A PRAGMATIC RANDOMIZED CONTROLLED TRIAL

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Study aims This study aims to examine the effectiveness of WhatsApp group discussion intervention for smoking relapse prevention compared with SMS (short message service) text messages. **Design** This is a 2-arm open-labeled pragmatic randomized controlled trial. **Setting** The recruitment sites were smoking cessation clinics in Hong Kong. **Participants** Smokers who smoke at least one cigarette per day at the service intake and no smoking for 3 to 30 days before enrolment in the study (n=928; 79.7% male). **Interventions** Participants were randomized to receive 8-week standardized messages about relapse prevention in a WhatsApp discussion group led by trained moderators (experimental, n=469) or SMS with similar content for 8-weeks (3 messages each week, control, n=459). The messages sent in the experimental and control groups were based on the US Clinical Practice Guidelines on Treating Tobacco Use and Dependence. **Measurements** The primary outcome is biochemically validated tobacco abstinence at 12-month follow-up. Secondary outcomes include the prevalence of self-reported 7-day and continuous abstinence over the study period and relapse rate. Text-mining of the WhatsApp group conversations were conducted by using structural topic modelling. **Results** By intention to treat, the experimental group (13.6% and 11.5% at 6- and 12-month follow-up) and the control group (13.9% and 11.3% at 6- and 12-month follow-up) showed a similar rate of biochemically validated quit rate (RR (risk ratio) =0.98 and 1.02 for the 6- and 12-month follow-up, respectively, all p-values > 0.05). The self-reported 7-day quit rate (RR=0.97, 0.91 and 0.91 for 3-, 6-, 12-month follow-ups, respectively, all p-values > 0.05), continuous abstinence and relapse rate were similar in both groups. The text mining showed that the WhatApp groups facilitated moderators' delivery of quitting methods and psychological encouragement. Quitters were more likely than smokers to share experience in seeking help from healthcare proviers and quitting methods. The unsupervised text mining showed similar classifications as the pre-defined contextual lexicons in the heat-map visualization. **Discussion** The study's findings showed that the WhatsApp group intervention did not significantly improve relapse prevention results compared with the SMS messages. The unsupervised text mining apparently showed its validity in classifying posts as our pre-defined contextual lexicons, supporting its future application to analyze online health-related group conversation.

PP-97

ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS) USE DURING A SIX-YEAR PERIOD IS NOT ASSOCIATED WITH SELF-REPORTED CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) AFTER PROPER ADJUSTMENT OF CIGARETTE SMOKING HISTORY; A LONGITUDINAL ANALYSIS OF PATH DATA

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Significance: Understanding the relationship between electronic nicotine delivery systems (ENDS) use and chronic obstructive pulmonary disease (COPD) and other respiratory conditions is critical. However, previous studies have not adequately controlled for history of cigarette smoking. **Methods**: Using waves 1-5 of the PATH study, we examined the association between ENDS use and self-reported incident diagnosed COPD among adults aged 40+ using discrete time survival models. Current ENDS use was measured as a time-varying covariate, lagged by one wave, defined as 1+ days used in the past 30 days. We controlled for baseline demographics (age, sex, race/ethnicity, education), health characteristics (asthma, obesity, exposure to second-hand smoke), and smoking history (smoking status, cigarette pack-years and years since quit). **Results**: Incident COPD was self-reported by 926 respondents during the five-year follow-up period. At baseline, 1.4% of respondents reported past 30-day ENDS use. Prior to adjusting for other covariates, time-varying ENDS use nearly doubled the risk of incident COPD (HR 1.98, 95% CI 1.44-2.73). However, ENDS use was no longer significantly associated with COPD (aHR 1.11, 95% CI 0.79-1.57) after adjusting for current cigarette smoking (aHR 2.93, 95% CI 2.43-3.65). The risk of self-reported incident COPD increased with the log of cigarette-pack-years and was higher for older respondents, females, less educated, and those with baseline asthma and obesity. **Conclusions**: ENDS use did not significantly increase the risk of self-reported incident COPD over a five-year period once current smoking status and cigarette pack-years were included in multivariable models. Cigarette pack-years, on the other hand, was associated with a net increase in the risk of diagnosed COPD. These findings highlight the importance of using prospective longitudinal data and properly controlling for cigarette smoking history to assess the independent health effects of ENDS use. **Funding Statement**: Supported by NIH/FDA grant U54CA229974. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or the FDA.

PP-98

CHANGES IN PERCEPTIONS OF HARMFULNESS OF HEATED TOBACCO PRODUCTS COMPARED TO COMBUSTIBLE CIGARETTES: FINDINGS FROM THE 2018-2020 ITC JAPAN SURVEYS

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Significance: Heated tobacco products (HTPs) are often advertised by their manufacturers as significantly less harmful than combustible cigarettes. Currently, there are only a few studies that have examined public perception of the relative harm of HTPs, and none have examined how public perception may change over time. Methods: We analyzed longitudinal data from the ITC Japan Survey, a nationally representative web cohort survey of individuals aged 20 and older who participated in all 3 waves (2018, 2019, 2020). In 2018, the cohort was comprised of exclusive smokers (n=1,403), exclusive HTP users (n=43), concurrent cigarette-HTP users (n=230), and non-users (n=215). Weighted estimates of HTP harm perceptions relative to cigarettes were computed. Generalized estimating equations examined correlates of perceived relative harm of HTPs with sociodemographics, survey year, and nicotine use status (current [at least monthly] use of cigarettes and/or HTPs). Results: There was a significant decrease in the proportion of Japanese adults who perceived HTPs as less harmful than cigarettes—from 47.1% (95% CI: 39.5-54.8%) in 2018, 48.1% (40.8-55.5%) in 2019, to 28.3% (22.8-34.5%) in 2020, and a corresponding significant increase in perceiving HTPs as equally harmful, or more harmful, than cigarettes—from 30.0% (23.1-38.0%) in 2018, 25.7% (19.8-32.6%) in 2019, to 46.0% (38.8-53.3%) in 2020. No significant changes were observed in the proportion of Japanese adults who were uncertain of perceived relative harms of HTPs (22.9% [17.1-29.9%] in 2018, 26.2% [19.9-33.6%] in 2019, 25.7% [20.1-32.2%] in 2020). Respondents in 2020 had lower odds of perceiving HTPs as less harmful than cigarettes compared to 2018, while exclusive HTP users and concurrent cigarette-HTP users had higher odds of perceiving lower harm

compared to non-users. Conclusion: From 2018/2019 to 2020, there was a substantial reduction in the proportion of Japanese adults who believed HTPs to be less harmful than combustible cigarettes. In addition to continued monitoring of public perception of HTPs, further study examining relationships between relative harm perceptions and use of HTPs over time is warranted.

PP-99

TRENDS IN PRICE MINIMIZING BEHAVIORS BY SMOKERS IN EUROPE BETWEEN 2006 - 2020. EVIDENCE FROM THE INTERNATIONAL TOBACCO CONTROL (ITC) PROJECT

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Significance Effectiveness of tobacco taxation can be undermined through smokers applying price-minimizing behaviors rather than quitting or reducing consumption. Common legal price-minimizing strategies are buying cheaper tobacco (discount brands or roll-your-own tobacco), bulk buying per carton and cross-border purchasing. This study analyzes trends in and factors associated with such behaviors in four European countries from 2006-2020. **Methods** Data came from adult smokers participating in the International Tobacco Control (ITC) surveys conducted between 2006 and 2020 in England (9 waves, *n*=768-4149), France (4 waves, *n*=1415-1735), Germany (5 waves, *n*=513-1515), and the Netherlands (10 waves, *n*=1191-2177). Country-specific generalized estimating equation regression models were fit to assess trends in and characteristics associated with buying roll-your-own tobacco, discount brands, in bulk, and cross-border purchasing within the European Union. **Results** Buying cheaper tobacco was the most used strategy in all countries. Except for buying discount brands, recent prevalences were highest in France (2019: RYO=35.1%, discount brands=37.0%, bulk buying=30.6%, cross-border purchasing=34.3%), and lowest in Germany (2018: RYO=19.2%, discount brands=38.1%, bulk buying=10.6%, cross-border purchasing=10.2%). Direction and magnitude of trends differed by country and behavior. Low-income individuals were more likely to buy cheap tobacco, and less likely to buy in bulk or across borders. Young people were more likely to buy RYO tobacco, and less likely to smoke discount brands and buy in bulk. **Conclusion** Smoking cheaper tobacco is the most common price-minimizing strategy, and more likely applied by young and low-income individuals. Harmonizing prices should be prioritized to discourage individuals from switching to cheaper tobacco.

PP-100

PREVALENCE OF USE AND REAL WORLD EFFECTIVENESS OF SMOKING CESSATION AIDS DURING THE COVID-19 PANDEMIC

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Significance: This study examined whether the prevalence of use and real-world effectiveness of different smoking cessation aids has changed in England since the Covid-19 pandemic. **Methods:** Data were from representative cross-sectional surveys of adults in England, collected monthly between Jan 2015 and Jun 2021. Eligible participants were 7300 adults (≥18y) who had smoked in the past 12 months and made at least one quit attempt during that period. The independent variable was the Covid-19 pandemic (pre-pandemic [Jan 2015-Feb 2020] vs. pandemic [Apr 2020-Jun 2021]). We analysed (i) the association between the pandemic and self-reported use (vs. non-use) during the most recent quit attempt of: prescription medication (NRT/varenicline/bupropion), NRT bought over-the-counter, e-cigarettes, standard behavioural and remote (telephone/written self-help materials/websites) support; and (ii) the interaction between the pandemic and use of these aids on self-reported abstinence from quit date to survey. Covariates included age, sex, social grade, cigarette addiction, and characteristics related to the quit attempt. **Results:** Relative to the pre-pandemic period, there was a significant increase in the prevalence of use of standard remote support (5.9% vs. 3.5%; OR 1.75 [95%CI 1.36-2.26]) - specifically telephone support (1.4% vs. 0.5%; OR 3.17 [1.79-5.61]) and websites (4.1% vs. 2.1%; OR 2.06 [1.51-2.80]). There was a significant reduction in the use of e-cigarettes (28.8% vs. 33.4%; OR 0.80 [0.71-0.91]). Use of other cessation aids did not change significantly. There was no significant interaction between the pandemic and use of any cessation aid on abstinence, after adjustment for covariates and use of the other aids, although the data were insensitive (Bayes factors 0.56-1.21). **Conclusion:** In England, the Covid-19 pandemic was associated

with an increase in use of remote support for smoking cessation and a reduction in use of e-cigarettes by smokers in a quit attempt. The data were inconclusive regarding an association between the pandemic and changes in the real-world effectiveness of popular smoking cessation aids.

PP-101

COMPARING PREDICTORS OF ELECTRONIC NICOTINE PRODUCT QUIT ATTEMPTS AND CESSATION - ANALYSIS OF WAVES 3 AND 4 OF THE PATH STUDY

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Significance: Nicotine cessation is a complex process. Understanding how sociocontextual and individual predictors of electronic nicotine product (ENP) quit attempts differ from predictors of successful cessation can optimize interventions designed to target ENP users at different stages of the quitting process. **Methods:** We analyzed waves (W) 3 and 4 from the PATH study. Among W3 adult ENP users (n=1,136, 4.0% of sample), we used logistic regression to identify W3 predictors (sociodemographics; tobacco, ENP and substance use characteristics; psychosocial and environmental factors) of W4 ENP quit attempts. Among those making a quit attempt (n=497, weighted %: 41.3%), we examined predictors of successful cessation (n=411, weighted %: 85.6%). All analyses used sample and replicate weights to account for the complex survey design. **Results:** This sample was 48.7% ages 25-44, 57.3% male, and 78.8% non-Hispanic White; 56.2% and 26.0% concurrently used cigarettes and marijuana, respectively. In multivariable analyses, W3 predictors of increased W4 odds of a quit attempt included being 18-24 (vs. 45+; OR=1.61), current smoking (vs. non-smoking, OR=1.94), non-combustible tobacco use (OR=2.42), past 30-day marijuana use (OR=1.64), lower ENP dependence (OR=1.35), using a disposable device (OR=2.04), higher interest in quitting (OR=1.1.6), higher self-efficacy (OR=1.37), and living in home not allowing ENP use (OR=1.54; all p's <0.05). Among those making a quit attempt, predictors of greater odds of cessation included greater self-efficacy (OR=1.46) and less exposure to ENP advertising (OR=1.96, p's <0.05). **Conclusions:** Concurrent use of other combustible and noncombustible tobacco and marijuana, as well as vape-free homes, increased odds of attempting to quit but not successful cessation. However, higher self-efficacy led to quit attempts and successful cessation. These findings underscore the need to understand the differential role in catalysts for cessation attempts vs. success, particularly with regard to concurrent other product use, given the potential harm reduction, substitution, and synergistic effects concurrent use may imply.

PP-102

CORRELATES OF AWARENESS AND USE OF 'TOBACCO-FREE' ORAL NICOTINE PRODUCTS AMONG SMOKERS AND VAPERS IN THE UNITED STATES: FINDINGS FROM THE 2020 INTERNATIONAL TOBACCO CONTROL FOUR COUNTRY SMOKING AND VAPING SURVEY

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Significance: 'Tobacco-free' oral nicotine products (ONPs) are an emerging class of non-combustible nicotine products. ONP sales have increased since 2016, but few research studies have been conducted on ONPs. This study examined correlates of ONP awareness and use in the United States (US). **Methods:** Data are from 5014 US cigarette smokers and nicotine vaping product (NVP) users in Wave 3 (2020) of the International Tobacco Control Four Country Smoking and Vaping Survey. Primary outcomes included ONP awareness, ever use, and current use, in comparison to other alternative nicotine products such as NVPs and heated tobacco products. Correlates of use included demographics, tobacco product use, and quit attempts. Chi-squared analyses were used to test for difference in ONP awareness and use by these correlates; binary logistic regressions were used to predict ONP awareness and lifetime use based on these correlates. **Results:** 18.9% were aware of ONPs, 2.9% reported ever use, and 0.8% were current users, all lower than NVPs (99.3% awareness, 65.8% ever use, 17.2% current use) and heated tobacco products (23.9% awareness, 8.2% ever use, 2.4% current use). ONP awareness and use was higher among never and non-daily smokers than among daily and former smokers, whereas it was higher among never and

non-daily vapers than former and never vapers. ONP use was more common among dual cigarette-NVP users than among exclusive product users and non-users. ONP use was higher among those who made quit attempts in the past two years. Ever use of ONPs was more common among younger ages (e.g., 18-24 years), males, and users of smokeless tobacco and NVPs. **Conclusion:** ONP use prevalence was low among smokers and vapers in the US. ONP users were similar demographically to smokeless tobacco users, and ONP use was most common among dual tobacco users. Continued surveillance of ONPs is essential to determine if use is increasing over time and to the extent to which their use is associated with use of other tobacco and nicotine products. Studies spanning a breadth of methodological approaches should be conducted to examine the use of ONPs to inform evidence-based approaches to their regulation.

PP-103

TRENDS IN RURAL AND URBAN CIGARETTE SMOKING QUIT RATIOS IN THE UNITED STATES, 2010-2019

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Significance: Cigarette smoking prevalence is higher in rural versus urban areas of the United States (US) and the difference in smoking prevalence between these groups has widened over time. It is unknown whether there is a similar trend for a rural/urban difference in smoking cessation. The current study examined rural and urban cigarette quit ratios from 2010-2019 among US individuals. Methods: Data were derived from the 2010-2019 National Surveys on Drug Use and Health, annual cross-sectional surveys of the non-institutionalized US population 12 years or older. Yearly rural and urban quit ratios (i.e., the proportion of former smokers among ever-smokers) were estimated from 2010-2019. Linear regression estimated trends in quit ratios over time. Results: In 2019, the past-month smoking prevalence was higher for individuals living in rural areas (26.4%; 95% CI 24.4%, 28.4%) compared to urban areas (18.2%; 95% CI: 17.6%, 18.9%). In addition, quit ratios for those in rural areas (44.4%; 95% CI: 41.1%, 47.7%) were lower than the quit ratios for persons in urban areas (50.9%; 95% CI: 49.5%, 52.2%). Rural quit ratios were lower than urban quit ratios from 2010-2019 (OR: 0.90; 95% CI: 0.81, 0.99). After adjusting for background characteristics, the quit ratio did not change for rural individuals from 2010-2019 (p-value=0.73), while there was a non-linear increase in quit ratios for urban individuals (p-value=0.03). Conclusions: Smoking prevalence has decreased in urban populations, consistent with increases in quit ratios over time. Quit ratios for individuals in rural areas were lower than those in urban areas and have not changed over the past decade in the US. These findings highlight important rural-urban differences in smoking cessation that may contribute to differences in smoking prevalence. Interventions to increase cessation in rural areas are needed to stem disparities in tobacco use and its effects on the health of rural populations.

PP-104

CHANGING AGE PATTERNS OF CIGARETTE AND ENDS TRANSITIONS IN THE PATH STUDY: A MULTISTATE TRANSITION MODEL ANALYSIS OF ADULTS AND YOUTH BEFORE (WAVES 1-4) AND AFTER (WAVES 4-5) 2017

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Significance. The landscape of electronic nicotine delivery systems (ENDS) has changed dramatically, particularly with the rise of pods and disposables, starting in late 2017. It is not known how these changes have impacted transitions between cigarette, ENDS, and dual use and how those changes depend on age. Methods. A multistate transition model was applied to 24,306 adults and 12,168 youth in Waves 1-4 (2013-2017) of the Population Assessment of Tobacco and Health (PATH) Study and 23,709 adults and 12,217 youth in Waves 4-5 (2017-2019). One-year transition probabilities between product use were estimated for Wave 1-4 vs 4-5 as a function of age group and of continuous age (splines). Results. Among youth, the 1-year probability of ENDS initiation increased after 2017 from 1.4% (95%CI: 1.2-1.7%) to 2.6% (95%CI: 2.4-2.9). There was no significant change in ENDS initiation among adults. Persistence of sole ENDS use (the 1-year probability of not transitioning) increased after 2017 for youth from 42.4% (95%CI: 36.9-47.9%) to 70.5% (95%CI: 65.1-75.8%) and for adults from 56.9% (95%CI:

53.7-59.9%) to 78.5% (95%CI: 76.0-80.9%). After 2017, youth sole cigarette users were more likely to transitions to dual use (with 13.5% (95%CI: 7.6-19.3%) transitioning in 1-year before 2017 compared to 28.2% (95%CI: 17.2-39.2) after 2017), while dual users were more likely to transition to sole ENDS use (transition probability increased from 5.8% (95%CI: 1.5-10.1%) to 19.0% (95%CI: 5.4-32.7%)). For adults, there was little change after 2017 in the transitions of sole cigarette users, but dual use became more persistent (from 41.0% (95%CI: 38.7-43.4%) remaining after 1 year to 63.9% (95%CI: 60.0-67.8%)). Conclusions. Adult dual users have become less likely to return to sole cigarette use but not more likely to discontinue cigarettes. Youth cigarette or ENDS users have become more likely to become sole ENDS users.

PP-105

QUITTING VAPING FROM THE PERSPECTIVES OF REDDIT USERS

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Significance: Despite an increasingly larger number of e-cigarette users who want to quit, there are few cessation resources unique to vaping. Understanding e-cigarette users' experiences with cessation is critical to informing the development of relevant resources and interventions that are specific to e-cigarette use. Social media forums, like Reddit, provide opportunities to understand the experiences of behavior change, like quitting vaping, from the perspectives of end users. The aim of this study, therefore, was to examine a quit vaping subreddit to understand how e-cigarette users' were approaching quitting, their reasons for quitting, and experienced barriers and facilitators to quitting. **Methods:** A total of 1228 posts were collected. Using conventional content analysis, the posts were inductively coded to generate categories and subcategories. Data was analyzed using NVivo 12 qualitative data analytic software. **Results:** Most users reported a preference for gradual reduction in use as their approach to quitting, particularly through tapering the nicotine content in their own devices. Their reasons for quitting primarily related to experiencing negative physical consequences associated with vaping, especially in relation to their lungs (e.g., tight chest), and tired of feeling "stuck to the vape". The top barriers to quitting related to withdrawal symptoms and intensity of addiction. The top facilitators to quitting related to employing distraction techniques (e.g., hobby, gaming, mindfulness exercises), as well as having a positive mindset. **Conclusions:** The findings of this study reveal unique aspects that encompass the process of quitting vaping. These findings have significant implications for both policy and intervention development.

PP-106

VALIDATION OF A MEASURE OF CIGARETTE PACKAGING BRAND APPEAL

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Background: Tobacco industry marketing is used to generate appeal for branded cigarettes. Assessing the effectiveness of Graphic Warning Labels (GWLs) that aim to reduce product appeal will require a measure with demonstrated reliability and validity to estimate the impact this regulatory action has on cognitions and smoking behavior. **Methods**: Psychometric evaluations of a 6-item measure of cigarette brand appeal were conducted among 357 adult daily smokers. Differential item functioning was examined for biological sex. After viewing GWLs, smokers' reactivity to current US packaging and brand perceptions (i.e., harshness, healthiness, and affordability) were used to establish concurrent validity. Conditional mixed effects models assessed predictive associations with weekly ratings of appeal. **Results**: Given factor analytic support for a single primary construct with no item-level differences for biological sex we describe effective option response characteristics using a graded item response model. The Omega-hierarchical reliability was 0.84 and coefficient alpha was 0.92. Concurrent validity regressions with covariate adjustment suggested positive reactivity to US branded packaging (β=0.32 [95%CI=0.19, 0.46], *p*<.001) and expected brand harshness (β=-0.29 [95%CI=-0.39, -0.19], *p*<.001) maintained significant independent relationships with levels of brand appeal. Increasing levels of initial brand appeal were associated with subsequent ratings of appeal across 4 weeks of assessment (β=0.12 [95%CI=0.07, 0.16], *p*<.001). **Conclusions**: We found strong scalability, reliability, and validity of a 6-item measure of brand

appeal. Attractive packaging attributes may reinforce socially desirable characteristics and forecast subjective effects of smoking. Thus, branding that generates appeal may directly motivate persistent tobacco use behavior.

PP-107

A COMPARISON OF RESPIRATORY SYMPTOMS AMONG ADULT CANNABIS USERS, TOBACCO USERS, CO-USERS, AND NON-USERS

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Background: Despite the recent increases in the co-use of cannabis and tobacco, the health effects of co-use, relative to the use of either product alone, remain unclear. The purpose of this study was to compare respiratory symptoms of 1) tobacco-only users, 2) cannabis-only users, 3) tobacco-cannabis co-users, and 4) non-users. **Methods:** A sample of 1,912 adults (70.9% White, 37.8% male, M age = 38.2) completed a cross-sectional survey in September/October 2020 that examined the correlates of medical cannabis legalization in Oklahoma. Participants reported their past 30-day use of cannabis and tobacco, their current respiratory symptoms via the 8-item American Thoracic Society Questionnaire (ATSQ), and demographics (age, race/ethnicity, gender). **Results:** The sample was comprised of 44.6% non-users, 26.4% tobacco-cannabis co-users, 19.5% tobacco-only users, and 9.4% cannabis-only users. Chi-square results indicated the groups differed by race/ethnicity, gender, and age (p's <.01). Tobacco-only users had the highest proportion of non-Hispanic individuals of "other" race (19%) compared to other groups; while cannabis-only and co-users had the highest proportions of non-Hispanic-Black and younger participants compared to other groups. Non-users had the highest proportion of White participants and were also of the greatest age. The proportion of female cannabis-only users was more than two times higher than the proportion of male cannabis-only users. A one-way ANOVA indicated significant differences in ATSQ scores across the four groups (p < 0.001). A Tukey's post-hoc test revealed co-users had significantly higher ATSQ scores (M =17.0) than non-users (M = 13.4) and cannabis-only users (M = 14.5). Tobacco-only users (M = 16.6) had significantly higher ATSQ scores than non-users (all p's < 0.001). **Conclusion:** Tobacco and cannabis co-use was associated with greater respiratory symptoms compared to cannabis use alone, though respiratory symptoms did not differ from tobacco use alone. Respiratory symptoms of cannabis-only users did not differ significantly from non-users. Taken together, findings suggest tobacco use may be the key influence of respiratory symptoms.

PP-108

THE EFFECTS OF CIGARETTE LABELING POLICIES ON CONVERSATIONS ABOUT SMOKING HARMS AND CESSATION: ASSESSING MODERATION BY SOCIAL NETWORK CHARACTERISTICS

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Significance: Smokers who discuss anti-smoking messages are more likely to attempt to quit, yet little is known about whether social network characteristics influence these conversations. This study assessed whether network size and smokers interact with cigarette labeling policy configurations to affect conversations about smoking harms, cessation, and cessation messages. **Methods:** We conducted a two-week 2X2 between-subject randomized trial (inserts with efficacy messages vs. no inserts; pictorial vs. text-only HWLs) with 359 adult smokers. At baseline, participants named up to five close network ties with whom they communicated frequently, providing smoking status for each tie. Participants received a 14-day supply of their preferred brand of cigarettes with packs modified to reflect experimental condition. Each evening, participants reported conversations in the prior 24 hours about smoking harms, quitting benefits, and informativeness of the messages. Among participants reporting conversations, zero-inflated negative binomial models regressed frequency of conversations about each topic on experimental condition relative to control (no inserts and text-only HWLs), testing interactions between condition and network characteristics (size and number of smokers). Models were stratified by condition when F-tests indicated significant interactions. **Results:** Around half of participants reported conversations about smoking harms (48%) and quitting benefits (54%), while fewer discussed message informativeness (25%). Relative to control, participants in the group that received both efficacy inserts and pictorial HWLs had more conversations about message informativeness

(b=1.05, p=0.01). Experimental conditions were otherwise unassociated with conversation frequency. Significant interactions between number of network smokers and message condition (F-tests: p=0.04 and <.01 for informativeness and quitting benefits, respectively) indicated a positive association between number of network smokers and frequency of conversations about message informativeness (b=0.87 p<.01) and quitting benefits (b=0.42 p=0.03) in the control group but no association in experimental groups. **Conclusion:** Having more smoking ties appears to encourage more conversations about message informativeness and quitting benefits under the current US labeling policy but not under stronger policies. Future research should investigate the smoking status of conversation partners under different network and labeling conditions and their impact on cessation.

PP-109

EXPLORING VARIATION IN HOW MEDIA DEPICTIONS OF TOBACCO USE AFFECT NORM PERCEPTIONS: THE ROLES OF PERCEIVED AND DESIRED SIMILARITY

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Significance. Normative perceptions can affect smoking behavior. Exposure to repeated depictions of smoking in media can impact young people's smoking-related norm perceptions, yet prior research has shown heterogeneity in exposure effects. We tested whether heterogeneity of exposure effects was contingent on how similar young people perceive themselves to be (perceived similarity) or want to be (desired similarity) to smokers depicted in YouTube videos. **Methods.** First, 290 young (aged 18-28) non-tobacco users recruited from Amazon Mechanical Turk (MTurk) rated 49 YouTube videos featuring smoking depictions for their perceived and desired similarity to the smoker in each. Each video was rated by ~19 different people and assigned the average participant's perceived and desired similarity to the depicted smoker. In the subsequent experiment, we randomly assigned 351 young non-tobacco users recruited from MTurk to 1 of 3 conditions. Each participant in the two exposure conditions watched a stratified random sample of 6 videos either drawn from those videos with higher (HS) or lower (LS) similarity ratings in the prior study, and then reported their smoking-related injunctive and descriptive norm perceptions. The control condition only answered the norm perception questions. **Results.** The HS and LS conditions didn't differ from one another on any outcome. Likewise, the HS condition didn't differ from the control condition. Participants in the LS condition differed from participants in the control condition in their injunctive norm perceptions. As expected, participants in the LS condition reported that their friends would be less approving of them smoking (B= -.3, p=.02). In contrast, participants in the LS condition reported higher perceived approval of smoking in society in general (B= .24, p=.04). **Conclusions.** The differences found between the LS and control conditions in their injunctive norm perceptions warrant further study. Intriguingly, the contrasting effects we saw for different injunctive norm perception measures raise the possibility that perceived and desired similarity may have different effects on different types of norm perceptions.

PP-110

FACTORS MOTIVATING YOUNG ADULTS' CONTINUED VERSUS REDUCED USE OF FLAVORED E-CIGARETTES

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Significance: In recent years, young adults (YAs) are using flavored e-cigarettes at alarming rates, making it a pressing public health concern. Using qualitative data from vapers, this study aimed to identify respective factors that drive YA vapers' sustained and reduced use of flavored vapes. The findings from this study will help inform anti-vaping campaign strategies. **Method**: We distributed an open-ended survey to YA ever vapers (*N*=396; mean age=19.66, *SD*=1.45). Participants were queried to identify factors that may influence people's decisions to vape flavored e-cigarettes. Factors were identified and coded qualitatively by two coders (*alphas*=0.81-1.00). **Results**: Of the factors that sustain the use of flavored vapes, 47.0% mentioned situational triggers, including being in a social setting (e.g., at parties, in bars), or in situations that elicit boredom (e.g., being at home alone, driving) or stress (e.g., doing schoolwork). Marketing influence, such as the appealing, vivid ad images of the flavored products was the second most cited factor (15.3%). Participants also frequently noted enjoyment and mood (7.9%) as a motivating factor, with many describing vaping as relaxing and stress-relieving. For factors that motivate reduction or cessation of vaping, participants cited negative health effects (e.g., "nic sick"; 35.3%), financial/time costs (15.8%), and hearing about others' negative experiences (11.2%). Notably, a non-trivial number of participants perceived

there to be a limited amount of research about flavored vaping, noting that if there was scientific consensus that flavored vapes were harmful, they would be motivated to quit (10.0%). **Conclusion**: Anti-vaping messages addressing e-cigarette flavors can focus on 1) addressing powerful situational triggers by enhancing YAs' refusal efficacy in social settings, and guiding them with healthier alternatives to manage boredom and stress; 2) increasing the reach of scientific findings through media channels commonly used by YAs; and 3) amplifying demotivating factors through the utilization of exemplars narrating their negative experience with flavored vapes and emphasizing the high costs incurred by use.

PP-111

NEURAL MARKERS OF CRITICAL THINKING AND VAPING FREQUENCY FOLLOWING ANTI-VAPING CAMPAIGN MESSAGE EXPOSURE IN YOUNG ADULT VAPERS

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Significance: Anti-vaping public service announcements (PSAs) often utilize cognitive and emotional appeals. However, evidence regarding the mechanism and utility of each message type is sparse. We used fMRI to determine if neural response to PSA appeals reflects critical thinking response and predict one-month vaping frequency. **Methods**: 38 young adult vapers (<25yrs; >15 days/month) viewed visual PSAs with cognitive or emotional appeals during whole-brain fMRI. Participants rated the degree to which PSAs engaged critical thinking about vaping. Subsequent weekly vaping was averaged over 4 weeks. 7 functionally defined regions of interest (ROIs) were identified using clusters of significant neural response (p<.005, size>156mm^3) during either PSA type relative to a scrambled image baseline and then combined across type using disjunctive ("or") logic. ROI responses to each PSA type were then confirmed using one-sample t-tests and predictive utility was assessed using OLS. **Results:** The right lingual gyrus (RLG), left fusiform gyrus, left hippocampus (LH), supplementary motor area (SMA), and left inferior premotor cortex exhibited significant activation responses, while the right anterior cingulate cortex and rostral right middle frontal gyrus exhibited significant relative deactivation responses to both PSA types (ps<.01). OLS results indicated stronger activation response in the RLG and LH were associated with fewer critical thoughts against cognitive ($Beta_{RLG}$=-.41, p<.01; $Beta_{LH}$=-.36, p=.02) and emotional PSAs ($Beta_{RLG}$=-.44, p<.01; $Beta_{LH}$=-.39, p=.03). Except for the SMA, greater response in each ROI to cognitive PSAs was significantly associated with lower one-month vaping frequency ($Betas$>-.36, ps<.04). Responses to emotional PSAs were not. **Conclusion:** Stronger PSA response in the primary visual (RLG) and declarative memory (LH) regions predicted less self-reported critical thinking, while stronger response to cognitive, but not emotional PSAs, predicted lower one-month vaping frequency. Findings demonstrate the potential of fMRI to identify neuromarkers of message receptiveness and guide efficacious anti-vaping campaign efforts targeting resistant audiences.

PP-112

INTERNALIZING AND EXTERNALIZING PROBLEMS ON THE AGE OF E-CIGARETTE INITIATION IN THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) USA YOUTH (2013-2017)

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Objective Internalizing and externalizing problems have been shown to be associated with e-cigarette initiation in youth. Yet, it is unknown if internalizing and externalizing problems increase the risk of an earlier age of initiation of e-cigarette use in youth. **Methods** Secondary analyses of PATH youth (12-17) waves 1-4 (2013-2017) were conducted. Among never e-cigarette users at the first wave of PATH participation (n=16,143; N=29,349,76), the age of initiation of ever and past 30-day e-cigarette use was estimated using follow-up surveys in 2014-2017. The GAIN-SS is a validated measure for internalizing and externalizing problems in youth. Youth were classified as having none/low (0-1 symptoms), moderate (2-3 symptoms), and high (≥4 symptoms) internalizing and externalizing problems in the past year measured at the wave prior to e-cigarette initiation for youth who become users and at the latest wave of participation for youth who remained non-users. Four weighted interval-censored Cox proportional hazard models were fitted to estimate the relationship between internalizing and externalizing

problems and the age of initiation of each e-cigarette use outcome while adjusting for sex, race/ethnicity, previous use of other tobacco products (cigarettes, any cigar product, hookah, and smokeless tobacco), and psychoactive substances (alcohol, marijuana, prescription opioid drugs, and any other substance). Weighted interval-censored survival analyses were used to estimate the hazard function for the age of initiation of each outcome stratified by internalizing and externalizing scores. **Results** Youth with high internalizing problems had increased risk of initiating ever (AHR=1.87;95%CI=1.69-2.05) and past 30-day (AHR=1.88;95%CI=1.58-2.18) e-cigarette use at earlier ages compared to youth with none/low internalizing problems. Youth with high externalizing problems had increased risk of initiating ever (AHR=2.48;95%CI=2.22-2.76) and past 30-day (AHR=2.46;95%CI=2.05-2.98) e-cigarette use at earlier ages compared to youth with none/low externalizing problems. **Conclusion** E-cigarette prevention efforts should target youth with high internalizing or externalizing problems.

PP-113

REAL-TIME EXPOSURE TO ANTI-TOBACCO MESSAGING AMONG A DIVERSE POPULATION OF YOUNG ADULTS

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The tobacco industry is adept at targeting young adults (YAs) engaged in activities at high-risk for advertising exposure (e.g., on social media), or are in high-risk locations (e.g., near a tobacco retail outlet) and in minority neighborhoods. Little is known about whether anti-tobacco marketing is reaching YAs who are at high risk for exposure to pro-tobacco marketing. This study used ecological momentary assessment (EMA) to assess demographic and real-time correlates of anti-tobacco marketing exposure among a largely Black and Hispanic population of YAs. This study used EMA data to assess context (e.g., location, activity) of anti-tobacco marketing exposure using 4 mini-surveys per day over 2 weeks. YA non-current tobacco users living in Washington D.C. (n=145; ages 18–24) recorded 5,219 surveys, including 19 participants (13.1%) in neighborhoods with high proportions of racial/ethnic minority residents, and high smoking rates. Adjusted multilevel regression models assessed the association between exposure to anti-tobacco marketing, demographics and real-time contextual variables. A total of 61 respondents reported at least one exposure to anti-tobacco marketing, for 141 exposures over the EMA period. In adjusted analyses, odds of exposure were higher for those living in a minority neighborhood (aOR=4.3, all p's<.05), in the presence of someone using tobacco products (aOR=1.7), at work/school (aOR=2.3), outside/in transit (aOR=2.1) and online/social media (aOR=1.9) vs. home. There were no significant differences in anti-tobacco exposure by age, sex, race/ethnicity or education, or for other locations and activities (e.g., at a bar/restaurant, clubs, or in a retail store) vs. at home. Almost 43% of YA non-current tobacco users were exposed to anti-tobacco messaging in their daily lives. Findings suggest anti-tobacco marketing is reaching Black and Latinx YAs, YAs in minority neighborhoods and during some high-risk activities such as on social media. Yet improved targeting is needed to reach this population with messages to counter industry marketing when in high-risk environments such as at bars/restaurants and retail stores.

PP-114

CONNECTING ANTI-TOBACCO MESSAGES WITH AT-RISK LATINX YOUNG ADULTS

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Objective: The Latinx community is more likely to be exposed to tobacco product marketing than non-Latinx groups and has high rates of susceptibility to use. Mass media campaigns are an effective tool to reduce health disparities, but many campaigns fail to resonate with at-risk groups. We assessed response to messages from a national campaign among Latinx youth. Methods: Participants in two studies were exposed to anti-tobacco ads that were part of a national campaign. These ads focused on Big Tobacco targeting the Black community and those suffering from mental health disorders and were not specifically designed for the Latinx community. Study 1 (N=1,003; 168 Latinx) utilized pre-market testing data which was conducted before advertisements aired. A

cross-sectional online sample of 15-24-year-olds were randomly assigned to 1 of 2 ads in December 2016-January 2017. Study 2 included facilitated qualitative discussion boards conducted among 92 Latinx participants ages 15-21 years in October 2020 in which youth were exposed to the same 2 ads. Results: The majority of the participants in Study 2 responded positively to the messages and understood the main messages about racial profiling communities of color and other vulnerable populations as market priorities. Most felt that they should take action by talking to family/friends about it, posting on social media, writing to tobacco companies and/or starting a petition. The pre-market data from Study 1 indicated that among the general population, the ads were likeable (72-78% like it a lot/somewhat) the message was easy to understand (85-92%), recall of the main idea was high (69-76%) and the ads resonated with the audience ("for people like me" = 66-69%). Conclusions: Campaigners strive to balance reaching at-risk groups with remaining relevant to the general population. These findings demonstrate that Latinx participants were able to relate the targeting of market priorities to the targeting of minority groups like themselves. Mass media social marketing campaigns will not dilute their messages by allocating portions of their resources to reach at-risk groups.

PP-115

IDENTIFYING NOVEL MOTIVATION PHASE-SPECIFIC CESSATION TARGETS FOR YOUTH EXPERIENCING HOMELESSNESS

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Significance: 70%+ of youth experiencing homelessness smoke combustible tobacco. Population specific barriers restrict their ability to engage in supported cessation. Using Baker et al.'s Phase-Based Approach to Cessation and guided by the Capability-Opportunity-Motivation-Behavior system (COM-B) framework for intervention development, the aim of this study was to identify challenges associated with "Motivation" phase-specific cessation mechanisms (i.e., nicotine dependence) and treatment targets (i.e., # of past-year quit attempts, 30-day quit interest) for youth experiencing homelessness—with the intent of identifying novel targets and intervention components to be tested in a future optimization trial. Methods: 96 youth (14-24 years old) attending an Ohio drop-in center who used ≥1 combustible tobacco products in the past week and were not currently making a quit attempt completed interview-administered surveys (early 2020). Multivariable regression models were fit to assess psychosocial correlates of # of past-year quit attempts, interest in quitting smoking in the next 30 days, and nicotine dependence (Hooked on Nicotine Checklist). Results: 67.1% of participants attempted to quit in the past year. 45.8% expressed 30-day quit interest. Moderate nicotine dependence was noted (mean HONC = 5.8). Dimensions of coping with housing were associated with both quit attempts and quit interest. Whereas higher nicotine dependence and working were associated with increased numbers of quit attempts, endorsing smoking to socialize and to keep hands busy were associated with decreased rates. 30-day quit interest was associated with less endorsement of smoking to regulate affect and more endorsement of smoking to avoid getting out of danger. Nicotine dependence was associated with habitual and social smoking, smoking to keep one's hands busy, replacing food with tobacco, accidental oxygen deprivation events, and less confidence in quitting. Conclusions: Addressing housing, food security, violence, affect regulation, social context, and accommodating hypoxic-anoxic brain injury may benefit homeless youth's ability to engage cessation.

PP-116

A SURVIVAL ANALYSIS APPROACH TO UNDERSTANDING DIRECTIONALITY IN THE RELATIONSHIP BETWEEN CIGARETTE USE AND DEPRESSION DURING YOUNG ADULTHOOD

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Significance. Cigarette use and depression are among the leading causes of morbidity and mortality, worldwide. Young adulthood is an important period for establishing lifespan mental health and tobacco use trajectories. Research has demonstrated positive associations between smoking and depression; however, the literature is mixed regarding their temporal directionality. The purpose of this study is to investigate the directional effects of cigarette smoking and depression during young adulthood using a survival analysis approach. **Methods.** In this study of 5,073 young adults (wave 1 mean age = 20, 64% female, 65% non-white, 12% LGBTQ+) from 24 colleges in Texas collected

over 9 waves between 2014 and 2019, we used two survival analysis models. Multiple Cox regression models were specified with age as the time variable and controlled for wave, sex, race/ethnicity, and LGBTQ+ identities. Model 1 tested the effect of depressive symptoms on smoking initiation, defined as the transition from being a never smoker to an ever smoker. Model 2 tested the effect of current cigarette use on new-onset depressive symptoms, defined as a score of $\geq$10 on the Center for Epidemiological Studies Depression Scale for the first time during the study period. **Results.** Through the end of the study, 34% of the sample initiated smoking and 65% developed new-onset depressive symptoms. Results for model 1 showed that depressive symptoms increased the hazard of smoking initiation (HR=1.20, 95% CI= 1.08-1.32). However, results from model 2 found that smoking did not significantly increase the hazard of new-onset depressive symptoms (HR=1.11, 95% CI= 0.99-1.25). **Conclusion**. This study provides evidence that elevated depressive symptoms increase the hazard of smoking initiation during young adulthood. Smoking did not increase the hazard for new-onset depressive symptoms, suggesting that during young adulthood, the association between smoking and depression is one-directional. Future work is needed to examine these relationships in younger samples. Mental health clinics serving young adults should provide smoking prevention resources to their patients, especially never-smokers who are receiving treatment for depression.

PP-117

ESTIMATING OWN AND CROSS ELASTICITY OF CIGARETTE BY PRICE TIERS IN BANGLADESH

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Background: Bangladesh's tiered tax structure encourages brand-switching, i.e., switching from higher-price cigarette brands to lower-price ones, which can be a significant barrier to reducing cigarette consumption. However, research evidence on brand switching behavior in response to tax and price increases are not available for Bangladesh. Methodology: Using four waves of International Tobacco Control (ITC) survey data for Bangladesh collected over 2009-2015, this study examines the determinants of tobacco usages, the choice of cigarette brand, and brand switching behavior of consumers and measure corresponding price sensitivity/elasticity. To estimate elasticities, the study applies various econometric tools such as panel probit models, seemingly unrelated regression models, and instrumental variable-based probit models. In addition, a robustness check has also been performed. Findings: The primary result of the study suggests that there is a negative own-price and positive cross-price elasticity indicating price increase of own brand decreases demand while price increase in the high and premium brand cigarettes induces people to switch to lower prices cigarettes. In addition, some socio-demographic factors are found to be significant in determining prevalence and elasticities. For instance, from the probit model, we find that 1% increase in the price of high-priced cigarettes increases by more than 1% increase in the demand of low-priced cigarettes, i.e., brand switching is evident. In addition, it is found that an increase in the price of lower-priced cigarettes decreases the prevalence of cigarettes consumption, while the price of the high or premium brands has no impact on the prevalence. Higher-income and higher educated people tend to consume more lower-tiered cigarettes while older aged people tend to use more lower-priced cigarettes. The results remain fairly consistent among various estimation techniques and specifications. Conclusion and policy implications: The study concludes that the presence of tiered tax system induces people to switch brands with changes in prices. Hence, the government should increase the prices of low-tiered cigarettes to thwart the chance of switching.

PP-118

PERCEIVED PARENTAL KNOWLEDGE REDUCES RISK FOR INITIATION OF NICOTINE AND CANNABIS VAPING: A LONGITUDINAL STUDY OF ADOLESCENTS

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Background: E-cigarettes are the most commonly used nicotine product and the fastest growing method of cannabis use among adolescents in the US. Exposure to nicotine and cannabis during adolescence has been linked to impaired brain development and increased risk for use disorder in adulthood. Adolescents who self-report that their parents/guardians know their location, activities, and peer groups (i.e., Parental Knowledge) have significantly lower risk for using combustible forms of nicotine (e.g., cigarettes; cigars) and cannabis. This study examines the longitudinal relationship between Perceived Parental Knowledge and initiation of nicotine and cannabis vaping among a diverse cohort of adolescents in Texas. **Methods:** Data were from Waves 4-6 of the Texas Adolescent Tobacco and Marketing Surveillance (TATAMS) system, a population-based study of youth in urban areas of Texas. Participants were adolescents who self-reported never using e-cigarette to vape nicotine (n=1,907) or vape cannabis (n=2,212) at baseline (Spring 2016). Initiation of nicotine vaping and cannabis vaping were examined as independent outcomes, each assessed at 6-month (Fall 2016) and 12-month (Spring 2017) follow-up. Weighted multivariate logistic regression models controlled for age, sex, race/ethnicity, and other tobacco use. **Results:** Initiation rates were 5.9% for nicotine vaping and 8.6% for cannabis vaping, at 12-month follow-up overall. Higher perceived parental knowledge was associated with lower odds of nicotine vaping initiation at 6-months (adjOR: 0.67; 95%CI: 0.48-0.92) and 12-months (adjOR: 0.71; 95%CI: 0.55-0.93). Similarly, higher perceived parental knowledge was associated with lower odds of cannabis vaping initiation at 6-months (adjOR: 0.58; 95%CI: 0.37-0.89) and 12-months (adjOR: 0.56; 95%CI: 0.41-0.76). **Conclusions**: Studying findings reveal parental knowledge may be an important factor in preventing adolescent nicotine and cannabis vaping. E-cigarette prevention efforts directed at adolescents should incorporate parent engagement strategies as a method of increasing actual and perceived parental knowledge of their child's location, activities and peer groups.

PP-119

ASSESSING THE IMPACT OF DIFFERENT PHARMACY TOBACCO RETAIL DISPLAYS ON SMOKERS' AWARENESS AND PERCEPTIONS OF TOBACCO PRODUCTS AND SMOKING CESSATION MEDICATIONS--A MOBILE EYETRACKING STUDY

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Background: Tobacco retail displays and promotions constitute a majority of U.S. tobacco industry marketing expenditures. Retail displays are associated with youth smoking initiation, increases in craving and relapse, unplanned purchases, and influences on social norms, perceived access, and brand switching. Pharmacies play a significant role in healthcare. Although CVS voluntarily ending tobacco sales, replacing the retail displays with tobacco cessation messages and medications, was associated with greater odds of quit attempts among smokers, Walgreens and Rite Aid continued to sell. In January 2019, Erie County, NY implemented a ban on all tobacco sales in pharmacies. This study was designed to better understand consumer perceptions of differences in retail advertising for using and quitting tobacco. **Methods:** Tobacco users ages 18-65 (n=27) were recruited between 2017-2019 from Buffalo, NY and randomized to visit a pharmacy (Walgreens, Rite Aid, or CVS) for a one-time mobile eye-tracking session. Each participant completed a demographic and tobacco use survey and a researcher calibrated the mobile eye-tracking headset before leading them to the assigned pharmacy nearby for a shopping task. Participants were provided $25, asked to purchase at least one food item, one beverage, and one other item of their choosing, and then completed a brief post-task survey measuring cravings, intention to quit, impulse purchases, and recall of ads. **Results:** Among the 17 participants recruited prior to the Erie County ban, significant differences existed in mean dwell times on the retail display between CVS (5.6 sec) and Rite Aid (26.7 sec) and Walgreens (20.1 sec). After the ban, mean dwell times on the displays decreased for all three pharmacies (CVS 3.8 sec, Rite Aid 6.3 sec, Walgreens 1.7 sec). Although not expressly asked to refrain, no participants chose to purchase tobacco products during the study session. **Conclusions:** Findings from this study suggest that removing tobacco retail displays significantly decreases attention paid and tobacco purchases among users. Replacing these displays with tobacco cessation messages and medications may increase quitting among smokers.

PP-120

FLAVORED TOBACCO AND ELECTRONIC NICOTINE PRODUCT USE AMONG ADULTS IN NEW YORK STATE FOLLOWING IMPLEMENTATION OF A STATEWIDE RESTRICTION ON FLAVORS

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Background: The study was completed during the COVID-19 pandemic and was launched after implementation of restrictions on both retail sale (except tobacco flavor and unflavored) electronic nicotine delivery systems (ENDS; May 20, 2020) and online sales of flavored ENDS (July 1, 2020) in New York. The two main aims for the study included 1) assessing and describing health behaviors, including tobacco use, and 2) support for a policy restricting the sale of flavored ENDS in a representative sample of NY adults. **Methods:** A Web-based survey was conducted among a sample of 946 NY adults (18 years+) from July 13-October 15, 2020, shortly after the flavored ENDS restriction policy took effect. Participants were recruited with a letter mailed to an address-based sample of 30,000 randomly selected NY residents; data are weighted to represent the state. Survey questions assessed health beliefs and behaviors related to tobacco and ENDS use, particularly flavored ENDS after the restrictions, and knowledge, attitudes, and support for current and hypothetical tobacco control policies. **Results:** Among respondents, 7.8% smoked only cigarettes, 5.3% used only ENDS, 3.4% reported both smoking cigarettes and using ENDS, and 83.5% reported noncurrent tobacco product use. Flavors remained popular among ENDS users. When current ENDS/ENDS+cigarette users (n=81) were asked about ENDS use after the restriction on flavors, 39.5% reported continuing to purchase flavored e-liquids, 21% reported vaping tobacco-flavored e-liquids, 7.4% reported quitting vaping and not smoking cigarettes, 4.9% of dual users reported quitting vaping and continuing to smoke cigarettes, and 27.7% reported something else (e.g., out of state, stocked up); none of the current ENDS users reported new smoking initiation. Among those who continued to purchase flavored e-liquids, 68.7% reported purchasing from a retail outlet or online. Results also found support among users and nonusers for policies restricting flavors, access, and availability of tobacco and ENDS products. **Conclusions:** Additional efforts to improve compliance of current restrictions on flavored vaping products and continued evaluation of the impact of restrictions on retail and online sales of these products are critical in understanding the long-term impact on use patterns and behaviors.

PP-121

THE IMPACTS OF INCLUDING INFORMATION ABOUT THE NUMBER OF CARCINOGENS IN TOBACCO SMOKE ON STANDARDISED CIGARETTE PACKS IN THE UNITED KINGDOM

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Background: Since May 2017, after a twelve-month transition period, standardised packaging has been mandatory in the UK. Aside from being drab brown with large pictorial warnings on the primary display areas, standardised packs must also have an 'information message' explaining that there are more than 70 carcinogens in tobacco smoke on one of the secondary display areas. Methods: Three waves of a longitudinal online survey in the UK with smokers pre-standardised packaging (Wave 1: April-May 2016) and followed up post-standardised packaging (Wave 2: September-November 2017, Wave 3: May-July 2019). Of the 6233 smokers at Wave 1, 4293 responded at Wave 2 and 3175 at Wave 3. We explored knowledge of the number of carcinogens in smoke, and whether knowing that smoke contains more than 70 carcinogens mediated change in the belief that the dangers of smoking are exaggerated (risk perception), stubbing out cigarettes, quit intentions, and quitting. As the information message is larger on roll-your-own packs than on cigarette packs, as the packs are larger, we also explored whether there was any difference in knowing that smoke contains more than 70 carcinogens between exclusive cigarette smokers and exclusive roll-your-own smokers. Results: Knowledge that there are over 70 carcinogens in tobacco smoke increased among smokers across waves, with the increase from Waves 1 to 3 greater for exclusive roll-your-own smokers than exclusive cigarette smokers (adjusted Odds Ratio=1.44; 95% CI 1.03-2.03). Knowledge that there are over 70 carcinogens in tobacco smoke mediated higher risk perception but not stubbing cigarettes out, quit intentions or quitting. Conclusions: The information message improved knowledge of how many carcinogens are in smoke, particularly among exclusive roll-your-own smokers, and this was linked to higher risk perception.

PP-122

STRENGTHENING CONNECTIVITY: LEVERAGING GAME-PLAY AND SOCIAL NETWORKS TO PREVENT ADOLESCENT TOBACCO USE

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Background: Negative influence from peers is a potent predictor of adolescent tobacco initiation, yet little has been done to leverage positive influence and social support to prevent tobacco use. We propose two strategies to promote positive influence: game-play and social network analysis. We present qualitative findings that informed the development of a game-based social intervention for tobacco prevention through a participatory design (PD) approach.Methods: First, we implemented a series of focus groups and paired interviews with 40 adolescents to capture adolescent preferences for intervention features and contents. We also conducted a series of design activities with 15 adolescent members of a youth participatory team and an expert advisory board composed of a game designer, a senior researcher in adolescent tobacco prevention, and an expert in health communication. Based on social exposure principles, we developed a social network algorithm to strategically group adolescents based on their friendships as they engage in the social intervention. Results: This approach led to the design of an intervention in the form of a board game called STORM HEROES. We first obtained 367 unique anti-tobacco messages based on the transtheoretical model. The messages addressed tobacco content, tobacco consequences, social norms, environmental outcomes, and advocacy against tobacco. By applying a game design principle of data merging, our messages were then embedded within the board game. During the PD approach, adolescents developed empathetic content that addresses perceived social norms, self-efficacy to resisting tobacco use, and advocacy against tobacco. Supporting the experiential learning theory, adolescents preferred a combination of cooperative and competitive game play. In STORM HEROES, adolescents work in groups to save an island from a storm that carries tobacco products and their contents. Conclusion: Our PD approach revealed key design and tobacco content preferences among adolescents. This research yielded a promising game-based intervention that strategically engages adolescents based on their friendships, age, culture, and risk level.