1.

Exenatide Once Weekly for Smoking Cessation: A Randomized Clinical Trial

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Background: Cigarette smoking is the greatest preventable cause of morbidity and premature mortality in the US. Approved pharmacological treatments for smoking cessation are only marginally effective, underscoring the need for improved pharmacotherapies. Glucagon-like peptide-1 (GLP-1) is produced in the intestinal L-cells and in the hindbrain nucleus solitarius. GLP-1 functions to maintain glucose homeostasis and to reduce food intake. Several GLP-1 agonists are used clinically for the treatment of type 2 diabetes and obesity. In addition to these actions, GLP-1 agonists have recently been shown in preclinical studies to attenuate consumption of alcohol and several drugs of abuse, including nicotine.
Aims: Our primary aims are 1) to examine the impact of treatment with weekly extended-release injectable exenatide on smoking abstinence and 2) to assess whether exenatide treatment is associated with the reduction in craving and withdrawal symptoms. This is the first clinical study of exenatide as a treatment for smoking cessation.
Methods: We are enrolling smokers (n=90) with pre-diabetes who desire to quit smoking and are willing to make a quit attempt during the course of the study. Participants will be randomized 1:1 to receive once weekly exenatide or placebo. All participants will receive transdermal nicotine replacement therapy (NRT) and behavioral counseling. Biochemically verified abstinence from smoking, craving for cigarettes, withdrawal symptoms, and fasting blood glucose levels will be assessed during and following 6 weeks of treatment.
Expected Outcomes: We hypothesize that: 1) exenatide treatment will increase the number of participants able to achieve complete smoking abstinence above that achieved via standard NRT and 2) exenatide will reduce craving and withdrawal symptoms. Craving and withdrawal symptoms predict long-term efficacy, which we hope to examine in a follow-up study.
Funding sources: The funding for this study is provided by the University of Texas Health Science Center at Houston CCTS Scholar Award and PARTNERS Research Awards (Dr. Luba Yammine)

2.

Changes in Nicotine and Tobacco Use among Adult Smokers after an Acute Cardiac Event

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Background: Continuing cigarette smoking after an acute cardiac event dramatically increases the risk of morbidity and mortality1. After hospitalization, smokers are sensitized to the health problems associated with persisting smoking and may try to modify their consumption or seek alternative sources of nicotine2. This ongoing multi-site study is aimed at exploring whether nicotine and tobacco product use changes among adult smokers after experiencing an acute cardiac event.
Methods: The sample consisted of cardiac patients recruited from three sites: the University of Vermont (UVM), the University of Texas, and the University of Kentucky. Inclusion criteria for participation were having experienced an acute coronary event and reported use of tobacco or non-therapeutic nicotine products in the 3 months prior to their hospitalization. Participants were asked about their tobacco and nicotine use as well as about certain sociodemographic characteristics, twice, once in-person while they were hospitalized and again 3 months later via phone. Of the 163 participants who completed the initial questionnaire while inpatient, this study focused on the UVM sample where 67 patients have completed their follow-up survey. 27 additional patients had reached the 3-month due date but were unable to be completed due to death or lack of contact.
Results: At the initial assessment, 86.2% of patients were current cigarette smokers who consumed on average 22.6 cigarettes per day (SD=11.5) while the percentage of smokers at three-month follow-up reduced significantly to 47.7% ($\chi^2 = 10.54$, $p = .032$). The percentage of participants reporting to have tried nicotine replacement products was 77.6% at initial assessment and 82.1% at three-month follow-up ($\chi^2 = 27.12$, $p < .001$). In both assessments, the nicotine product most commonly used was nicotine patch followed by nicotine gum and nicotine inhaler.
Conclusions: These preliminary results suggest that patients after a cardiac event may change their smoking behavior as well as increase the use of other nicotine products2. Given the hazardous effects of continuing smoking in cardiac patients and the less harmful impact of nicotine products3, these findings may have public health impact. Future studies with both larger samples and longer follow-ups are necessary to confirm the present findings.

3.

A randomized controlled trial of motivational and reduction interventions for smokers who are not ready to quit

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Most smokers are not ready to quit in the near future. Reduction in cigarettes per day (CPD) aided by medication increases quit attempts (QA) and cessation for smokers who were not ready to quit. Though about half of smokers are reluctant to use nicotine medications for a non-cessation reason, there is insufficient evidence to determine whether reduction without medication is effective. Also, the USPHS recommends a brief motivational treatment (5Rs) for smokers who are not ready to quit. Only two prior tests of the 5Rs have been published: Both found that it increases QA and cessation. The present RCT tests whether a brief 1) reduction based intervention without medication or 2) motivational intervention based on the 5Rs increases the likelihood of making a quit attempt or becoming abstinent compared to usual care.
560 adult smokers of ≥10 CPD who were planning to quit at some point but not in the next 30 days were randomized to receive one of three brief telephone based interventions: 1) reduce CPD, 2) increase motivation using the 5Rs, or 3) brief advice to quit (usual care). No medication was provided. All participants completed online surveys of intention to quit, CPD, QA and point prevalence abstinence at 6 monthly follow-ups.

Preliminary analyses found that, the reduction intervention had greater reductions in CPD (standardized beta=.21, *p*<.01) than usual care. However, participants in the motivational intervention did not have changes in their decisional balance. Further, neither motivational nor reduction based interventions increased the likelihood of making a QA. The reduction condition was not significantly different than brief advice at 6-months but had marginally significantly more abstinence at 12-months (9% vs 4% OR=2.60 95% CI=0.99 to 6.82).The motivational condition had marginally significantly more abstinence than brief advice at 6-months (11% vs 5% OR=2.16 95% CI=0.92 to 5.06) and significantly more abstinence at 12-months (10% vs 4% OR=2.81 95% CI=1.09 to 7.27).
Preliminary conclusions are that a brief motivational intervention without medication appears effective, but a reduction intervention without medication is not effective for smokers who are not ready to quit. Analyses to examine why the motivational intervention increased quit success but not quit attempts in comparison to usual care are ongoing.
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4.

Associations between Cigarette Price Sensitivity and Little Cigar Use in Adolescents

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Despite declines in cigarette smoking, rates of little cigar (LC) use remain elevated among U.S. adolescents. LC use may be a function of elevated cigarette price, as smokers may compensate for higher cigarette prices by switching to lower-priced alternative products. Associations between cigarette costs and LC use have not been investigated in adolescents, despite their high rates of LC use.
We recently conducted a study of very low nicotine cigarettes in adolescents (K01CA189300, PI R. Cassidy). Baseline measures included demographics, tobacco use and the Cigarette Purchase Task (CPT), which measures how hypothetical cigarette purchasing responds to changes in price. In this analysis, we compared LC users and non-users on income, cigarette preference (i.e., generic vs. premium), and intensity of usual-brand cigarette demand (consumption at zero price) among those screened for participation. Participants (n = 86) were on average 17.9 years old, 54.7% male and 65.1% white. Forty-one percent (n = 35) endorsed past-month LC use (M = 5.1 ± 5.5 per day). LC users and non-users did not differ on age, race, gender, ethnicity, cigarettes per day, nicotine dependence, or income. However, on the CPT, LC users showed increased intensity of demand for usual-brand cigarettes relative to non-users and were more likely to endorse purchasing a generic cigarette brand when unable to smoke their preferred brand (p's <.05).
These findings provide initial evidence of an association between LC use and cigarette costs among adolescent smokers, suggesting that increasing the price or response cost for LCs may reduce LC use in adolescents.
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5.

Development and initial validation of an e-cigarette purchase task

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Behavioral economic purchase tasks, which estimate the reinforcing efficacy of drugs by asking participants how much they would purchase of a drug in one day at increasing prices, have been successfully developed for cigarettes and widely used to predict real-world outcomes. However, a validated purchase task does not yet exist for e-cigarettes. Study 1 was undertaken to identify the relevant units, scale, and wording for an e-cigarette purchase task, focus groups (N= 7 groups, 2-7 participants per group, N=28 participants) consisting of current e-cigarette users were conducted. Participants completed an e-cigarette purchase task (e-CPT) which asked how many puffs of their e-cigarette they would purchase if they cost various amounts of money (ranging from free to US $5.00 per puff) and were asked to comment on how well the task reflect their purchasing behavior. The data indicated that the appropriate unit for an e-CPT varied across device type. Participants who used first-generation devices (i.e., disposables; FGDs) reported that the most relevant unit for them was the individual device or cartridge; however, they reported rarely buying more than one per day, and felt that puffs were an acceptable daily unit. Participants who primarily used advanced generation devices (AGDs; refillable pen-style devices and mods) and purchased nicotine liquid felt that units such as milliliters would more accurately reflect their daily use behavior. Study 2 examined two versions of the E-CPT, one which described use in terms of puffs and one which described use in terms of milliliters, and compared these versions within-subject in a sample of AGD users (N=25) who attended a single laboratory session during which they completed a battery of questionnaires, after which they were asked to vape their own device ad lib for 1 hour. Vaping sessions were videotaped and coded. Indices derived from these tasks were correlated with dependence, cigarettes per day, cotinine and vaping behavior. Preliminary results suggest that the milliliter version may be most appropriate for this group of users, but further adjustments, including a weekly vs. daily time frame, may be necessary. A validated e-CPT, tailored to device type, will be an important measure for future studies of the reinforcing efficacy of e-cigarettes.
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6.

Especially the lonely – Efficacy of online smoking cessation communities for smokers with low offline social support

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Background: Low social support is associated with higher smoking rates and difficulty quitting. Online smoking

cessation interventions are effective; engagement in online communities promotes abstinence.
Objective: Among smokers seeking help online, test whether low offline social support is associated with: (H1) higher engagement in the online community, and (H2) greater benefit from community engagement in terms of achieving abstinence.
Methods: A randomized trial recruited 5,290 smokers seeking treatment on BecomeAnEX.org, a free online smoking cessation program and community. At baseline, 2 subscales of the Interpersonal Support Evaluation List (ISEL; Appraisal, Belonging) measured offline social support. Abstinence was assessed at 3 months; website utilization metrics including "time on site" and "community pageviews" were obtained. Analyses used Mann-Whitney tests and logistic regression with log transformations.
Results-H1: Participants very low in Belonging support (subscore 0-2 out of 12 possible; 5% of participants) spent more time on the site (median=29.7 minutes) than others (23.0 minutes), W=590200, p=0.01, and viewed more community pages, t=2.3, p=0.02. Participants very low in Belonging support were more likely to visit the community (70% vs. 56%), RR=1.25, 95% CI=[1.13,1.38], p<0.001. No differences were observed for Appraisal.
Results-H2: Community pageviews were positively associated with abstinence, t=4.1, p<0.001. Participants very low in Belonging were marginally less likely to be abstinent overall, t=1.8, p=0.07, but the positive effect of community pageviews was significantly stronger for them, interaction t=2.0, p=0.04.
Conclusions: Online cessation interventions may be particularly efficacious for some smokers who feel little social belonging in their offline lives.

7.

Beyond education and income: identifying novel socioeconomic correlates of cigarette use in U.S. young adults

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Young adulthood is defined by transitions in family life, living situations, educational settings, and employment. As a result, education and income may not be appropriate measures of socioeconomic status (SES) in young people. Using a national sample of young adults aged 18-34 (n = 3,364; collected February 2016), we explored novel socioeconomic correlates of ever cigarette use, past 30-day cigarette use, and daily cigarette use, weighted to account for non-response. Measures of SES assessed current (education, subjective financial situation (SFS), employment status) and childhood SES (maternal and paternal education, SFS during childhood, parental divorce before age 18). The highest prevalence of ever cigarette use was in young adults whose parents divorced before age 18 (57% vs. 47% overall), as was daily smoking (69% vs. 59% among past 30-day smokers); those with less than a high school education reported the highest prevalence of past 30-day smoking (28% vs. 15% overall). The majority of SES measures were correlated with all three cigarette outcomes. In multivariable Poisson regression models controlling for age, gender, race/ethnicity, and other SES measures, lower education and poorer SFS were most strongly correlated with ever and past 30-day cigarette use. Lower maternal education emerged as the strongest correlate of daily smoking, conferring a 58-80% increase in prevalence of daily smoking compared to maternal education of a Bachelor's degree or greater. This study highlights that new approaches are needed to understand the impact of SES on health behaviors in young people, particularly the relative contributions of childhood and current SES.

8.

Dual Use of Cigarettes and Smokeless Tobacco: Product Use and Nicotine Exposure

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Introduction: Smokeless tobacco (SLT) products have been marketed to smokers as a means to reduce risk of tobacco-related diseases or to use in situations where smoking is prohibited. An (un)intended consequence of such marketing may be that smokers supplement rather than replace their cigarettes with SLT.
Purpose: To compare product use and nicotine exposure on days when only cigarettes are smoked (single use) versus when both cigarettes and SLT (dual use) are used.
Methods: Thirty dual users (≥ 5 cigarettes per day for ≥ 1 year, and ≥ 2 SLT uses per day on ≥ 4 days per week for ≥ 6 months) recorded their product use daily for two weeks via ecological momentary assessments using a mobile device. They also collected a saliva sample and butts from all cigarettes smoked each day during the two-week period.
Results: Participants reported use of both cigarettes and SLT on 80% of study days. The number of cigarettes recorded was significantly correlated ($p < .01$) with the number of cigarette butts collected. Levels of cotinine (nicotine metabolite) were significantly higher on dual versus single use days (mean±SEM = 357.5±12.3 ng/ml versus 289.4±18.1 ng/ml, respectively; $p < .05$), though the number of cigarettes recorded did not differ between these days (10.2±0.4 versus 10.0±0.8 cigarettes, respectively; $p > .05$).
Conclusions: Smokers used SLT to supplement rather than replace cigarettes, consequently exposing themselves to greater levels of nicotine. Study findings can inform policies surrounding harm reduction strategies and indoor smoking laws.
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9.

A Pilot Study on Pediatric Obesity Prevention by Maternal Smoking Cessation in pregnancy

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Objective: Prenatal tobacco exposure predicts childhood obesity. We aimed to develop an effective intervention program to prevent pediatric obesity by maternal smoking cessation during pregnancy.

Methods: In this single-case experiment with multiple baselines, 18 daily smokers in early pregnancy (mean 14 weeks; range 6-20 weeks) were recruited from Buffalo, NY in 2015 and 2016. After lab screening and pre-test visits, participants were assigned into one of the 3 groups with different length of repeated baseline: 1 (early intervention), 3 (delayed intervention) or 5 (late intervention) repeated baseline visits. They received the same multiple-component intervention: stage-tailored education, monitoring and feedback on quitting, contingent financial incentives along with financial planning, and family support.
Results: Among the 18 participants, mean age was 28.5 years; 30% were whites, 58% were African Americans, and 8% were Hispanics; they smoked a mean of 8.5 cigarettes/day. None of participants stopped smoking before intervention regardless waiting duration, but most started to quit smoking (verified by urine-cotinine) after intervention. Smoking cessation rate was 84.6% at 2 weeks of intervention, 76.9% at 8 weeks of intervention, and 70.0% by the end of pregnancy (35+ weeks). Infants of mothers who quit smoking in early pregnancy had 779.5 grams higher mean birth weight (p=0.023) than those infants of mother who continued smoking. Smoking cessation was also associated lower risk of rapid infancy weight gain.
Conclusions: Our multiple-component intervention could achieve and maintain high smoking cessation rate during pregnancy. Maternal smoking cessation could significantly improve birth weight and reduce rapid infancy weight gain.

10.

Comparing the Smoking Topography of Usual Brand Cigarettes in Pregnant and Non-Pregnant Smokers

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Aims: Most female smokers are unable to quit when they find out they are pregnant. Instead, most report reducing their cigarettes per day (CPD) by 50% and usually make this reduction rapidly upon learning of pregnancy. In the general population, reductions in CPD are associated with compensatory smoking (i.e., changes in smoking intensity to maintain a desired blood-nicotine level). If pregnant women engage in compensatory smoking, they may expose themselves and their offspring to the same level of toxicants despite reporting reductions in CPD. To our knowledge, no studies have examined whether pregnant smokers engage in compensatory smoking.
Method: Pregnant and non-pregnant female smokers provided samples for biochemical analyses of tobacco use and answered questions about their medical history and tobacco use at the screening session. Pregnant smokers reported reducing their smoking by 45% (21.1 to 11.7 CPD) after learning of pregnancy. All participants had to present to the experimental session with a >50% reduction in carbon monoxide. Participants then smoked one of their usual brand cigarettes ad lib through a Borgwaldt © CReSS Desktop Smoking Topography device.
Results: Preliminary analyses suggest that pregnant smokers (n = 14) and non-pregnant smokers (n = 91) do not differ in their smoking topography. However, pregnant smokers have significantly smaller increases in CO boost after smoking a cigarette compared to non-pregnant women.
Conclusions: Pregnant smokers appear to smoke cigarettes similarly or less intensely than non-pregnant smokers. It does not appear that pregnant smokers are smoking cigarettes in a way that may cause more toxicant exposure per cigarette compared to non-pregnant smokers.

11.

Contraceptive Choice and Rates of Use Among Female Smokers

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Women who smoke have higher rates of unintended pregnancy compared to nonsmokers, likely related to observations that smokers initiate sex at an earlier age and have more sexual partners. Little is known about the contraceptive method choice of female smokers, which may also contribute to higher rates of unintended pregnancy. The primary aim of the current study was to examine contraceptive choice and rates of use among female smokers and nonsmokers. Estimates from 2011-2013 National Survey on Family Growth were weighted to reflect the US household population of women 15-44 years old. Current contraceptive method choice was based on contraceptive use in the past 12 months. Overall, 26% of women of reproductive age smoked cigarettes. Women who smoked were more likely to be older, Caucasian, unmarried, and less educated compared to nonsmokers. Consistent with prior findings, smokers initiated sex at a younger age compared to nonsmokers (19.3 vs. 22.3 years old, $p < .0001$), had more heterosexual partners in their lifetime (10.0 vs. 5.2, $p < .0001$), had more pregnancies (2.2 vs. 1.8, $p < .01$) and were more likely to report that at least one of these pregnancies was unintended (59% vs. 37%, $p < .01$). Birth control pill use was more prevalent among nonsmokers compared to smokers (33% vs. 25%, $p < .05$), primarily due to lower rates of use among smokers > 35 years old when use becomes contraindicated. Use of very effective contraceptive methods was more prevalent among smokers than nonsmokers, with smokers reporting use of both sterilization and long acting reversible contraception (LARCs) more than nonsmokers (30% vs. 23%, $p < .05$ and 18% vs. 12%, $p < .01$, respectively). While smokers' patterns of sexual behavior may increase their opportunities to become pregnant, preliminary analyses do not suggest that contraceptive method choice is contributing significantly to higher rates of unintended pregnancy.

12.

The Cigarette Purchase Task: Examining Differences in the Reinforcing Value of Cigarettes in Pregnant Smokers With vs. Without Depressive Symptoms

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Significance: Research has documented strong relationships between depressive symptoms and peripartum smoking. Heavier smoking predicts greater likelihood of depressive symptoms and depressive symptoms predict greater likelihood of smoking during pregnancy. The Cigarette Purchase Task (CPT) is a behavioral economic task that assesses the relative reinforcing value of cigarettes, which, of course, influences the likelihood of quitting. The present study represents an initial assessment of whether the CPT provides insight into how demand for cigarette smoking varies in relation to depressive symptoms during pregnancy.

Methods: 86 pregnant cigarette smokers enrolled in an ongoing smoking-cessation trial completed the BDI-1A and the CPT at study intake. Relationships between levels of depressive symptoms (established BDI categories: minimal, mild, moderate, severe) and the five CPT indices (Intensity, Omax, Pmax, Breakpoint, Elasticity) were examined using Pearson correlations.
Results: Intensity (consumption levels when cigarettes are free) was the only CPT index that was significantly correlated with BDI scores (r=.26, p<.05). Examining that relation by BDI severity categories revealed that it was severe depressive symptoms (BDI score ≥ 30) that contributed the most to this relationship with Intensity (r=.34, p<.01).
Conclusions: The one discernible difference in the reinforcing value of cigarettes between pregnant smokers with varying levels of depressive symptoms was Intensity. These results are in agreement with previous findings from a study using the CPT to compare the relative reinforcing effects of cigarettes among smokers with schizophrenia versus smokers without mental illness where Intensity again was the one CPT index that differentiated between them. These results suggest that the reinforcing value of cigarettes in those with and without mental illness may differ mostly in Intensity of demand, a measure of unconstrained consumption and not in how these populations respond to constraints on smoking (e.g., taxes). Further research comparing smokers with versus without other psychiatric conditions will be important to assess the generality of this observation.

13.

Characterizing smokers who use American Indian reservation cigarettes

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Introduction: In an effort to reduce cigarette smoking, many states have increased cigarette taxes. As a result, some smokers travel to American Indian (AI) reservations to purchase untaxed cigarettes. In high tax areas for example, as many as 67% of smokers obtain their cigarettes from AI reservations. Despite this, there is a paucity of research on these smokers. In this project, we seek to learn more about the demographic and smoking characteristics of this smoker subgroup.
Methods: Participants were adult smokers participating in a laboratory study investigating reduced-nicotine cigarettes. Participants presented to the laboratory under conditions of acute abstinence and completed a demographic and smoking questionnaire, the Minnesota Nicotine Withdrawal Scale, and Fagerstrom Test for Nicotine Dependence immediately after smoking a usual brand cigarette. They also completed the Cigarette Purchase Task (CPT), a measure of cigarette reinforcing effects using sensitivity of demand across varying cigarette prices.
Results: Smokers who purchase their cigarettes from an AI reservation (n=12) smoked significantly more cigarettes per day than non-AI smokers (n=157) (21.3±7.2 *vs* 15.3±5.9, respectively; p<.01). They presented with higher levels of nicotine dependence (6.2±2.0 *vs* 4.5±2.1, respectively; p<.01) and withdrawal (2.8±0.9 *vs* 2.3±0.9, respectively; p=.04). A larger percentage of AI reservation cigarette smokers also were unemployed vs. non-AI smokers (p<.01). Finally, after controlling for baseline smoking rates, AI reservation cigarette smokers demonstrated a maximum expenditure on the CPT that was $5.64 lower than non-AI smokers (p<0.05).
Conclusions: Our preliminary data suggest that, relative to smokers who purchase their cigarettes from retail stores, those who obtain their cigarettes from AI reservations appear to smoke more cigarettes per day, have greater levels of nicotine dependence and withdrawal, and are more likely to be unemployed. AI reservation cigarette smokers may also exhibit purchasing behaviors unique from other smokers, including a lower maximum expenditure on cigarettes.
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14.

Examining differences in the subjective effects of cigarettes at varying doses of nicotine in menthol and non-menthol smokers.

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Introduction: Menthol, a flavoring additive to cigarettes, is the only flavoring not banned by the FDA. There are an estimated 20 million menthol smokers in the U.S. With the current regulatory climate, it is imperative to determine if menthol smokers function similarly to non-menthol smokers when exposed to cigarettes with reduced nicotine content. The purpose of the present investigation is to examine subjective effects on menthol and non-menthol smokers after exposure to cigarettes with varying nicotine content.
Methods: Participants were 26 adult current smokers from one of three populations (economically disadvantaged women, opioid dependent, individuals with affective disorders) and were dichotomized as menthol (n = 11) or non-menthol (n = 15) smokers. Across five sessions ≥ 48 hours apart, participants smoked four research cigarettes varying in nicotine content (0.4mg/g, 2.4 mg/g, 5.2 mg/g 15.8 mg/g) or their usual brand cigarette under acute abstinence (CO ≤ ½ baseline levels). After cigarette exposure, participants completed the modified Cigarette Evaluation Questionnaire (mCEQ) to assess subjective effects. Effects of dose and menthol status were examined using mixed model repeated measures ANOVA.
Results: There was a significant main effect of menthol (p < .05) on two of the mCEQ subscales and a significant menthol x dose interaction (p < .05) on three of the mCEQ subscales.
Conclusions: These results suggest menthol smokers may have a different subjective experience when smoking cigarettes with reduced nicotine content than non-menthol smokers and has implications regarding the effect of menthol status on acceptability of cigarettes with reduced nicotine content.

15.

Nicotine Metabolism in Pregnant Cigarette Smokers

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Studies suggest that pregnancy may increase the rate of nicotine metabolism (Dempsey et al., 2002; Bowker et al., 2015) potentially making it more difficult for women quit after learning of pregnancy. However, no studies to our knowledge have examined how individual differences in nicotine metabolism may differentially impact the time course of nicotine metabolism during and following pregnancy. To address this gap, we assessed the nicotine metabolite ratio

(3HC/Cotinine) among pregnant smokers participating in a randomized clinical trial for smoking cessation (Higgins et al., 2014).
Methods: Urine samples collected at approximately 10 weeks gestation, at a late pregnancy assessment (≥ 28 weeks EGA) and at six months postpartum were analyzed among women who reported smoking at each time point (N=46). Prior to analysis, data was log transformed prior. To classify participants as fast vs. slow metabolizers a median split of NMR assessed at six month postpartum was conducted.
Results: Repeated Measures ANOVA revealed significantly higher log NMR scores during pregnancy compared to postpartum (1.72, 2.01, 1.39, $p < .001$). A Multivariate ANOVA suggested that fast metabolizers (2.09, 2.31, 1.96) maintained significantly higher ($p < .001$) NMR scores across time points compared to slow metabolizers (1.33, 1.70, 0.83).
Conclusions: These results suggest that individual differences in NMR may not differentially alter the time course of NMR during and following pregnancy.

16.

Illicit drug use is associated with increased smoking among buprenorphine-maintained adults

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Introduction: Evidence from prior laboratory and naturalistic studies has demonstrated that cocaine use is associated with increases in cigarette smoking. We sought to extend these findings by examining whether cocaine use in a clinical population of opioid-dependent adult is associated with smoking increases. As a secondary exploratory question, we also examined whether use of other drugs (i.e., illicit opioids, cannabis) is also associated with increased smoking.
Methods: Participants were 24 opioid-dependent adult smokers receiving outpatient buprenorphine (BUP) maintenance. Cocaine users were identified as those who provided >1 cocaine-positive urine specimen during the 12-week study. We compared levels of urinary cotinine, a nicotine metabolite, on days when urinalysis testing indicated recent cocaine use with levels on days when urinalysis testing indicated no recent use. Similar analyses were conducted for illicit opioid and cannabis use.
Results: Cotinine levels were significantly higher on cocaine-positive days, indicating that cocaine use was associated with greater cigarette smoking ($p < 0.001$). Similarly, cotinine levels were significantly higher on oxycodone- and cannabis-positive days ($p = 0.007$ and $p = 0.004$, respectively).
Conclusions: These results provide evidence that cocaine, oxycodone, and cannabis use during BUP maintenance can increase cigarette smoking. These findings hold potentially serious implications as, in addition to the adverse consequences associated with use of tobacco and illicit drugs individually, their concurrent use may produce additive increases in risk for cardiovascular disease and other adverse health effects.

17.

Disparities in US healthcare provider screening and advice for cessation across tobacco products and chronic medical conditions: NSDUH 2013-2014

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Introduction: Disparities in tobacco use are worsening in the US, disproportionately affecting those with chronic medical conditions. One possible contributor is that physicians may not screen and advise cessation uniformly across patients and/or tobacco products. This study examined physician communications regarding cigarette and non-cigarette tobacco products among adults with chronic conditions.
Methods: Data were drawn from two waves (2013-2014) of the National Survey on Drug Use and Health. Adult (≥ 18 years) tobacco use included past year use of cigarettes, cigars, or smokeless tobacco. Chronic conditions included asthma, anxiety, coronary heart disease, depression, diabetes, hepatitis, HIV, hypertension, lung cancer, stroke, and substance abuse. Data were analyzed using logistic regression, controlling for basic socio-demographics and number of provider visits.
Results: Adults with anxiety, depression, and substance use disorders had the highest prevalence of past year cigarette (37.3-57.7%), cigar (9.1-25.5%), and smokeless tobacco (3.1-11.4%) use. Patients with all chronic conditions were more likely to receive advice to quit than those without a condition (OR 1.21-2.37, $p<.01$), although odds were lowest among adults with mental health and substance use disorders (OR 1.21-1.35, $p<.01$). Cigarette smokers were more likely to report being screened and advised to quit than non-cigarette tobacco users (OR 5.71, $p<.01$).
Conclusions: Results support the need for provider training to expand screening and cessation interventions to include the growing spectrum of tobacco products. Screening and referral to interventions are especially needed for those with mental health and substance use disorders to reduce the disparate burden of tobacco-related disease and death.

18.

Neural correlates of inhibitory control in abstinent vs. satiated smokers

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Rationale: Inhibitory control impairment, a neurobiological marker of nicotine dependence, differs between smokers and former smokers. It's still unclear whether brain activation characteristics during inhibitory control are more pronounced when the smokers are allowed to smoke freely (satiated) or are required to abstain from smoking prior to testing. It would be of high value to determine the optimal procedures with regard to smoking state (abstinent vs. satiated) for revealing these brain activation differences.
Methods: 10 smokers and 10 controls (non-smokers) were recruited on whom neuroimaging and behavior data were acquired. Participants were matched on age, gender and SES. Those with a history of psychiatric disorders were excluded. Smokers were scanned twice following ad lib access to their regular cigarettes (the last cigarette must be smoked 15 minutes prior to scanning) and an overnight abstinence (order counterbalanced). Smokers with a

cigarette use of less than 5 cigarettes per day were not included. CO levels were measured at baseline, abstinence and satiety. Brain activation maps of inhibitory control were generated from the Stop Signal task fMRI paradigm, measuring response inhibition, for successful inhibitions.
Results and conclusion: Abstinent and satiated smokers showed increased inhibitory control activity compared to non-smoker controls in the IFG (with a 91% overlap), a key region of the brain involved in response inhibition. Abstinent smokers were characterized by the highest levels of functioning in the IFG and are, thus, more sensitive probes than satiated smokers for elucidating differences between smokers and non-smokers in nicotine dependence studies assessing inhibitory control.

19.

Social media use and e-cigarette use expectancies and susceptibility among non-smoking young adult

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Objectives: We aimed to examine how currently non-smoking young adults' exposure to e-cigarette-related posts through social media affects their e-cigarette use expectancies and susceptibility.
Methods: Cross-sectional data were collected from 293 young adult (M age = 21.8; SD = 3.8; 64% Women) college students who did not smoke cigarettes currently and had never tried an e-cigarette. Data were collected on measures of social media (Facebook, Twitter, Instagram, Reddit, Pinterest, Tumblr, and Youtube) use, exposure to e-cigarette posts on social media, e-cigarette use expectancies, and openness to use e-cigarettes in the future.
Results: Youtube, Facebook, and Instagram were the most commonly used social media websites, with 72%, 65% and 58% of the participants reporting they used the medium "often" or "very often", respectively. Seventy percent, 50%, and 57% of the participants reported being exposed to e-cigarette posts on Facebook, Instagram, and Youtube, respectively. Exposure to e-cigarettes posts on Facebook [OR = 1.42; 95% CI = 1.09, 1.85] and Instagram [OR = 1.24; 95% CI = 1.003, 1.55] were significantly associated with increased openness to try e-cigarette in the future, even after adjusting for demographic variables, lifetime cigarette smoking status, and friends' and family members' e-cigarette use behavior. The association was not significant for exposure through Youtube. Exposure through Facebook was significantly associated with higher positive e-cigarette outcome expectancies related to affect regulation, social enhancement, and sensory experience.
Conclusions: Exposure to e-cigarette posts on certain social media may make currently non-smoking young adults susceptible to experimenting with e-cigarettes. Tobacco control communication interventions may benefit from utilizing Facebook and Instagram.
Regulatory significance: This research highlights the need to understand the extent of open source local or national online marketing through social media.

20.

Effect of varenicline alone, and in combination with nabilone, on cannabis withdrawal and relapse in tobacco-smoking cannabis users.

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Significance and aims: Comorbid use of cannabis and tobacco is common, and tobacco smoking predicts worse cannabis treatment outcomes. A recent human laboratory study demonstrated that cannabis users who smoked tobacco cigarettes were19 times more likely to relapse to cannabis self-administration than non-smokers. Given that cigarette smoking predicts a more intractable use of cannabis, and given our goal of decreasing relapse, the objective of this study was to assess whether the partial nicotinic agonist, varenicline, alone and in combination with the cannabinoid agonist, nabilone, decreases cannabis withdrawal and relapse relative to placebo.
Methods: Non-treatment-seeking cannabis and tobacco smokers (n = 77) were randomized to varenicline or placebo-varenicline, and then completed a 15-day outpatient phase. The purpose of the outpatient phase was to titrate the varenicline dose and to initiate tobacco abstinence prior to inpatient measures of cannabis withdrawal and relapse. Participants who met biochemical criteria for tobacco abstinence at the end of the outpatient phase then participated in a 16-day impatient phase. During the inpatient phase, participants received nabilone and placebo-nabilone, for 6 days each, in counter-balanced order. Participants were not permitted to use tobacco or nicotine during the inpatient period. During the first 3 days of each period, participants had the opportunity to self-administer inactive (0.0% THC) cannabis (withdrawal); on the second 3 days, the cannabis was active (5.6% THC; relapse). Repeated-measures ANOVA (with planned contrasts) and McNemar's tests were used to compare the effects of varenicline and placebo-varenicline on cannabis withdrawal and relapse during nabilone and placebo-nabilone phases.
Results: Forty-six participants completed the inpatient phase. Data analysis is ongoing and medication effects on cannabis withdrawal have not yet been analyzed. Preliminary results indicate that neither varenicline nor nabilone, alone, or in combination reduced the laboratory measure of cannabis relapse relative to placebo. Rates of relapse were much lower than those observed in prior studies. McNemar's test indicated a non-significant trend toward a time effect on our measure of relapse; participants were less likely (50% vs. 35%) to relapse on the first phase of active cannabis availability (after 13 days of confirmed nicotine abstinence) than on the second phase (after 5 days of confirmed nicotine abstinence).
Conclusions. Although neither medication significantly altered our laboratory measure of cannabis relapse, we hypothesize that this may reflect a floor effect, i.e., prolonged nicotine abstinence appears to have resulted in low rates of cannabis relapse, regardless of medication condition. The observation that participants may be less likely to relapse later in the inpatient phase suggests that longer durations of tobacco abstinence may reduce cannabis relapse.

21.

A growing geographic disparity: Recent urban and rural cigarette use trajectories in the United States

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Rural areas of the United States have higher smoking prevalence than urban areas. Dated research suggests that the cigarette use disparity is maintaining if not getting worse. No recent studies have rigorously examined changes in this disparity or whether the disparity can be explained by psychosocial or demographic characteristics associated with smoking. This study made use of yearly cross sectional data from the National Survey on Drug Use and Health (NSDUH) from 2007 through 2014 to compare recent cigarette smoking trends in urban versus rural areas of the United States. In total, the analytic sample included 303,311 respondents across all survey years. Two regression models were built: one to model raw covariate-unadjusted urban and rural trends in current smoking, and a second that included an extensive set of covariates for statistical control. Results of the covariate-unadjusted model showed disparate and diverging cigarette use trends. The covariate-adjusted model showed similarly diverging trends, but no evidence of a difference in covariate-adjusted prevalence in 2007, and yet there was a difference that was independently attributable to rural residence status by 2014. We conclude that differences reported in previous studies may be explained by demographic and psychosocial risk factors, and that a genuine unique contribution to the growing disparity only recently emerged. The difference is likely attributable to policy level tobacco control factors that may very across geography such as regulation, enforcement, and treatment availability. Strong federal policies may be important to expanding tobacco control benefits to vulnerable populations such as rural Americans.