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Patterns of cigarette, e-cigarette, and cannabis use among adult smokers in primary care 2014-2015

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Abstract

Background: Poly-use of tobacco, cannabis, and electronic cigarettes (e-cigarettes) is an emerging problem in the general population. The current study investigated poly-use of these products and receipt of smoking cessation counseling in a primary care setting.

Methods: We conducted a cross-sectional secondary data analysis from a trial of a tablet intervention to increase provider delivery of the 5As (Ask, Advise, Assess, Assist, Arrange follow-up), a brief counseling intervention for smoking cessation, in 3 diverse primary care clinics in San Francisco, CA from 2014 to 2015. Participants were currently smoking cigarettes (N=601; mean age = 50.8; 38.1% female) and reported information on past 30-day cigarette and e-cigarette use and past 3-month cannabis use. We classified participants into 4 groups: (1) cigarette-only, (2) dual-use of cigarettes and e-cigarettes, (3) dual-use of cigarettes and cannabis, (4) poly-use of cigarettes, e-cigarettes, and cannabis, and examined correlates of use.

Results: Only cigarette smoking was reported by 48.6% of participants, 30.4% reported use of cigarettes and cannabis, 10.5% reported use of cigarettes and e-cigarettes, and 10.5% reported use of cigarettes, e-cigarettes, and cannabis. Cigarette-only smokers did not differ from other groups by cigarette smoking behavior and motivation to quit. Patients reporting dual-use of cigarettes and e-cigarettes had a higher likelihood of receiving the Arrange step and all 5As compared to cigarette-only smokers.

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Contributions

J.T. conceptualized the study, conducted the analysis, and led the writing. M.V. and S.K. helped conceptualize the study and contributed to the writing and editing. J.M.S. oversaw the project; wrote the original grant for the project; helped to conceptualize the study; and contributed to writing, and editing. All authors approved the final manuscript.

Declaration of interests

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Conclusions: Providers should screen for co-use of cigarettes and other nicotine/cannabis products and consider co-use when delivering smoking cessation treatment and evaluating treatment outcomes. Development of guidelines to help facilitate provider training is needed.

Keywords

Smoking cessation; substance abuse; primary care

1. Introduction

Tobacco use is the leading cause of morbidity and mortality in the USA (USDHHS, 2014). While smoking prevalence nationally is on a downward trajectory (T. W. Wang et al., 2018), the use of emerging nicotine products, including electronic cigarettes (e-cigarettes) has increased in recent years (Agaku et al., 2014; Kasza et al., 2017; King, Patel, Nguyen, & Dube, 2015; Phillips, 2017). Coinciding with a more diversified tobacco product landscape are changes in cannabis legislation in many US states (Carliner, Brown, Sarvet, & Hasin, 2017), which have been associated with increased cannabis use on the population level (Carliner et al., 2017). There is also increased attention to the intersection of tobacco, cannabis, and e-cigarettes (TRDRP, 2016; McDonald, Popova, & Ling, 2016), and more research on poly-use and use patterns of these substances and products is needed.

Concurrent use of tobacco and cannabis is of increasing concern in the general population (Agrawal, Budney, & Lynskey, 2012; Lemyre, Poliakova, & Bélanger, 2019). In the general US population, 5.1% report current use of both cigarettes and cannabis (J. B. Wang, Ramo, Lisha, & Cataldo, 2016), and a recent study from California found a 2.7% prevalence of current tobacco and cannabis use (Apollonio et al., 2019). Between 25% and 52% of tobacco smokers use cannabis (Peters, Budney, & Carroll, 2012), and the prevalence of cannabis use among tobacco smokers has increased recently (Goodwin et al., 2018; Schauer, Berg, Kegler, Donovan, & Windle, 2015). Due to the shared route of administration, most co-use of tobacco and cannabis occurs in the form of smoking (Agrawal et al., 2012; Schauer et al., 2016). Dual-use of tobacco cigarettes with e-cigarettes is also common (Kasza et al., 2017), with 16% of cigarette smokers also currently using e-cigarettes (Schoenborn & Gindi, 2015). In a recent study, over half of smokers in a primary care setting reported lifetime e-cigarette use and one-fifth reported using them currently (Kalkhoran et al., 2017). Among cigarette smokers, those who currently use e-cigarettes are more likely to attempt to quit smoking and to intend to quit in the next 6 months (Rutten et al., 2015), but also report greater nicotine dependence and poly-tobacco use (Pulvers et al., 2015).

There are various reasons for cannabis use among current cigarette smokers. Social norms around cannabis are changing and the perceived harm from cannabis use is decreasing (Carliner et al., 2017), despite known negative consequences of chronic cannabis use, including cognitive impairment, and cardiovascular and respiratory effects (Hall & Degenhardt, 2014; Volkow, Baler, Compton, & Weiss, 2014). Moreover, co-use of cigarettes and cannabis is associated with psychosocial problems (Peters et al., 2012) and may interfere with successful smoking cessation (Agrawal et al., 2012; Ford, Vu, & Anthony, 2002; Peters et al., 2012).

The most common reasons smokers try e-cigarettes are for cessation/health, reduced harm to others, and to circumvent smoking restrictions (Coleman et al., 2017; Patel et al., 2016). While e-cigarette use is likely less harmful than combusted tobacco use (National Academies of Sciences, Engineering, and Medicine, 2018), there remain potential negative health consequences, including cardiovascular effects and increased nicotine dependence associated with the co-use of cigarettes and e-cigarettes (Benowitz & Fraiman, 2017; Pisinger & Døssing, 2014; Qasim, Karim, Rivera, Khasawneh, & Alshbool, 2017). There is also conflicting evidence on the efficacy of e-cigarettes for smoking cessation (Hajek et al., 2019; Hartmann-Boyce et al., 2016; Kalkhoran & Glantz, 2016).

US Clinical Practice Guidelines recommend the 5As for brief smoking cessation counseling in primary care. The 5As include: Asking about smoking; Advising cessation; Assessing level of readiness to quit; Assisting with motivation enhancement or a plan to quit (including use of medication and counseling); and Arranging a follow-up appointment to review progress and adjust the plan (Fiore et al., 2008). Most primary care physicians screen for cigarette smoking, with screening rates as high as 72% for primary care visits (Jamal, Dube, & King, 2015; Jamal et al., 2012), however, smoking cessation counseling is implemented less frequently (Williams et al., 2014). Moreover, many providers do not know how or lack the confidence to screen for other forms of tobacco and emerging nicotine product and cannabis use (Bascombe et al., 2016; Nickels, Warner, Jenkins, Tilburt, & Hays, 2017). The use of medical cannabis further complicates the picture as providers may be asking patients about medical cannabis use, but not counseling them about the harms of use in the context of concurrent tobacco use. Examining patterns of dual- and poly-use among primary care patients is necessary to inform the discussion between patients and providers around these topics. Furthermore, data are needed on how dual- and poly-use among patients may impact provider delivery of smoking cessation interventions, such as through the 5As. Since smoking is increasingly clustered among groups with low socioeconomic status (SES) and these smokers face greater difficulties quitting (Hiscock, Bauld, Amos, Fidler, & Munafò, 2012), such analyses should also account for SES.

The current study aimed at describing patterns of cannabis and e-cigarette use among cigarette smokers in 3 diverse primary care clinics in San Francisco, CA. Moreover, we investigate correlates of dual- and poly-use of cannabis/e-cigarettes and cigarettes and receipt of 5As brief smoking counseling intervention by group.

2. Methods

2.1 Procedure & Participants

This study is based on cross-sectional data collected from current cigarette smokers enrolled in a cluster randomized controlled trial (RCT) of a computer tablet intervention to improve provider delivery of the 5As for smoking cessation in adult primary care clinics. The 5As are a brief smoking cessation counseling intervention developed with time restrictions of the primary care setting in mind and are recommended by the Clinical Practice Guidelines for Smoking Cessation (Fiore et al., 2008). Providers were cluster randomized to a computer tablet-facilitated 5As condition or usual care and patients were assigned based on their provider. Outcomes included provider adherence to each of the 5As as determined by patient

report. Patients used a computer tablet to complete the 5As immediately before a primary care appointment. A tailored, patient handout and a structured clinician guide were generated and delivered to the patient and provider in the clinic room prior to the visit. Patients could participate in the RCT up to three times, however, only data from the first provider visit were included in the present study. All patient participants were given a $20 gift card after completing a post-visit interview. Additional details on the trial and primary outcomes are presented elsewhere (Satterfield et al., 2018).

Patients were recruited from 3 clinics in San Francisco, California from October 2014 to September 2015 (Kalkhoran et al., 2016): (1) Zuckerberg San Francisco General Hospital Richard H. Fine People's Clinic (ZSFG-RFPC), located at a public safety-net hospital, (2) the UCSF Positive Health Program at ZSFG (ZSFG-PHP), an HIV primary care practice at the same public safety-net hospital, and (3) University of California San Francisco General Internal Medicine Clinic (UCSF). To be included in the trial, participants had to meet the following criteria: age 18 years or older, English- or Spanish-speaking, having smoked at least 100 cigarettes in their lifetime, and cigarette use in the past 7 days.

2.2 Measures

Participants completed an enrollment questionnaire on a computer tablet prior to an office visit at one of the 3 study sites. Participants self-reported information on sociodemographics (age, gender, race/ethnicity, and education) and study eligibility during this assessment.

Within 72 hours of their office visit, participants had a telephone or in-person interview during which they were asked about their provider visit, smoking behavior, motivation to quit, and e-cigarette and cannabis use. Participants reported the number of days that they had smoked in the past week, cigarettes smoked per day, time to first cigarette in the morning (30 minutes or less or more than 30 minutes; a measure of nicotine dependence) (Baker et al., 2007), and their interest in quitting cigarettes (categorized as: not ready, may quit in next 6 months, planning to quit in the next month, and already quit). Participants reported whether they received each of the 5As from their primary care provider (PCP) during their visit (Ask, Advise, Assess, Assist, Arrange), and we created a variable for receipt of all 5As based on participant responses (yes/no). Participants self-reported on how many of the past 30 days they used an e-cigarette. Participants indicated how frequently in the past 3 months they used cannabis (categorized as never or once or twice, monthly, weekly, daily or almost daily).

We determined patient comorbidities from electronic heath records over a full year prior to the patient study visit using ICD9 codes: mental disorders (295.xx, 296.xx, 300.xx, 309.81, 311), alcohol dependence (303.xx), drug dependence (304.xx), HIV/AIDS (V08, 042), cardiovascular disease (401.xx-405.xx, 410.xx-414.xx), cancer excluding non-melanoma skin cancer (140.xx-172.xx, 174.xx-195.8, 200.xx-208.xx, 238.6), pulmonary disease (493.xx, 491.xx, 492.xx, 496.xx), and cerebrovascular disease (362.34, 430.xx-438.xx). Comorbidity data were missing for N=230 participants on all measures except for HIV/AIDS and cardiovascular disease (N missing = 310).

2.3 Statistical analyses

We categorized cigarette smokers into 4 groups based on their self-reported use behavior (any past 30-day use for cigarettes and e-cigarettes; regular cannabis use in past 3 months defined as monthly, weekly, daily or almost daily use): (1) cigarette-only, (2) dual-use of cigarettes and e-cigarettes, (3) dual-use of cigarettes and cannabis, and (4) poly-use of cigarettes, e-cigarettes, and cannabis. Groups were compared on sociodemographics, comorbidities, cigarette, e-cigarette, cannabis use, and self-reported receipt of 5As for smoking cessation using Chi-squared tests and ANOVAs. We did not adjust for multiple comparisons in bivariate analyses. Multivariable generalized estimating equation (GEE) analyses (to account for clustering of participants within providers) tested whether group was associated with receipt of 5As adjusted for variables with significant between-group differences from bivariate analyses, as well as intervention vs. control group assignment. Because of the large number of missing data, we did not include comorbidities in multivariate analyses.

3. Results

3.1 Participant sociodemographic and medical characteristics

Of the 601 participants, who were all currently smoking cigarettes, almost half were cigarette-only smokers (48.6%), 30.4% reported dual-use of cigarettes and cannabis, 10.5% reported dual-use of cigarettes and e-cigarettes, and 10.5% reported poly-use of cigarettes, e-cigarettes, and cannabis. Sample characteristics are displayed in Table 1. Participants were on average 50.8 years old, predominantly male, non-white, approximately 50% had some college education or more, and most were recruited from the two ZSFG clinic sites.

Compared to other groups, cigarette-only smokers were older and more were female. Patients reporting poly-use of cigarettes, e-cigarettes, and cannabis were younger than other groups. Patients reporting dual-use of cigarettes and cannabis and poly-use of cigarettes, e-cigarettes, and cannabis were less likely to be female, fewer had a college degree, more were recruited from ZSFG-PHP and fewer recruited from UCSF.

In terms of comorbidities, significant between group differences were observed for HIV/AIDS and drug dependence: Patients reporting dual-use of cigarettes and cannabis and poly-use of cigarettes, e-cigarettes, and cannabis had the highest proportion of HIV/AIDS and drug dependence diagnoses.

3.2 Participant tobacco and cannabis use behavior

The groups did not differ significantly in number of smoking days per week, cigarettes per day, time to first cigarette, and readiness to quit (Table 2). Most e-cigarette use was non-daily, with use on 6.9 days out of the past 30 days for patients reporting dual-use of cigarettes and e-cigarettes, and 8.6 days for those reporting poly-use. Most cannabis use was daily or almost daily with a prevalence of about 60% in both cannabis-using groups.

3.3 Self-reported receipt of 5As for smoking cessation

The overall prevalence of self-reported receipt of each of the 5As was 57.2% for Ask, 55.9% for Advise, 51.8% for Assess, 55.2% for Assist, 21.3% for Arrange follow-up, and 14.1% for all 5As. Groups significantly differed from each other on receipt of Arrange follow-up, with patients reporting dual-use of cigarette and e-cigarettes having the highest likelihood and patients reporting dual-use of cigarette and cannabis and poly-use of cigarettes, e-cigarettes, and cannabis having the lowest likelihoods. There were also significant differences in receipt of all 5As: The highest likelihood of receiving all 5As was reported by patients with dual-use of cigarettes and e-cigarettes (23.8%), followed by cigarette-only smokers (16.8%), patients with dual-use of cigarettes and cannabis (8.7%), and patients with poly-use of cigarettes, e-cigarettes, and cannabis (7.9%). In multivariate GEE analyses adjusting for age, gender, education, clinic site, and intervention vs. control group, receipt of Arrange follow-up from their PCP was higher among patients reporting dual-use of cigarettes and e-cigarettes compared to cigarette-only smokers (adjusted odds ratio = 2.11; 95% CI 1.13-3.96; Table 3). Older patients and men were significantly more likely to be advised to quit smoking. Patients at ZSFG-PHP reported a lower likelihood to receive any and all of the 5As with the exception of Arrange follow-up, and participants in the intervention group consistently reported a higher likelihood of receiving 5As.

4. Discussion

Among 601 cigarette smokers in primary care participating in a cluster RCT of a tablet intervention to increase provider delivery of the 5As for smoking cessation, one-third reported current use of cannabis and about one-fifth currently used e-cigarettes or all three products concurrently. Cigarette-only smokers did not differ from patients reporting dual- and poly-use by cigarette smoking behavior and motivation to quit. In multivariate GEE models, patients reporting dual-use of cigarettes and e-cigarettes had a higher likelihood of receiving the Arrange follow-up 5 A.

We found that patients reporting cannabis use were less likely to be female and less likely to have a college degree. These results underline previous findings that individuals reporting co-use of tobacco and cannabis were more likely to be male and of lower socioeconomic status than individuals reporting only tobacco use (Schauer et al., 2015). The prevalence estimates of 41% current cannabis use in our sample of smokers in primary care is consistent with prevalence estimates of 25%-52% reported in previous studies of clinic and community-based samples (Peters et al., 2012).

We did not find between-group differences in cigarette smoking behavior and quit motivation. This runs counter to a study that found more quit attempts and greater intentions to quit smoking among individuals reporting dual-use of cigarettes and e-cigarettes (Rutten et al., 2015). A previous study found that quitting or cutting down on smoking were the most frequently endorsed reasons for e-cigarette use in our study population (Kalkhoran et al., 2017). One reason that we found no differences in smoking behavior across groups, despite participants' intention to use e-cigarettes for quitting smoking, could be the study's eligibility criteria: Participants had to be current smokers, which excludes people who may have successfully quit smoking by using e-cigarettes. Thus, study participants may represent

smokers who were unsuccessful quitting smoking using e-cigarettes. Another reason for these findings may be related to participants' e-cigarette use patterns. Both groups with current e-cigarette use reported using these devices on fewer than 10 of the past 30 days, which is likely not frequent enough to aid in smoking cessation (Biener & Hargraves, 2015; Hitchman, Brose, Brown, Robson, & McNeill, 2015; Kalkhoran, Chang, & Rigotti, 2019). However, it should be noted that compared to other groups, those reporting dual-use of cigarettes and e-cigarettes had the highest proportion of patients intending to quit in the next 30 days (36.5%), though between-group differences were not significant.

Previous studies have found that co-use of tobacco and cannabis may interfere with successful cessation (Agrawal et al., 2012; Ford et al., 2002; Peters et al., 2012). Our bivariate analyses suggested patients reporting cannabis use in our sample had a lower likelihood of having smoking cessation follow-up arranged and receiving all 5As for smoking cessation. However, when controlling for other between group differences, these findings did not remain significant. In fact, multivariate results suggest lower 5As delivery rates in the ZSFG-PHP clinic, which predominantly cares for patients with HIV/AIDS. One potential explanation for these findings could be that higher rates of comorbidities at this clinic, including HIV/AIDS and drug dependence, may lead providers to de-prioritize smoking cessation compared to other health issues (Vijayaraghavan et al., 2014). Despite evidence for positive substance use outcomes after smoking cessation (McKelvey, Thrul, & Ramo, 2017; Prochaska, Delucchi, & Hall, 2004), many providers are still reluctant to discuss tobacco in light of other substance use disorders.

Given high rates of e-cigarette and cannabis use in the general population (Goodwin et al., 2018; Kasza et al., 2017) and in our sample, PCPs should screen for these different products in routine practice. Since many providers lack the confidence or know how to screen for emerging nicotine and tobacco products and/or cannabis use (Bascombe et al., 2016; Nickels et al., 2017), additional efforts should be undertaken to develop PCP training for smoking cessation counseling with patients who use multiple products. PCPs need to be aware of cannabis and e-cigarette use among their patients. While e-cigarette use is likely less harmful than tobacco cigarettes, there remains uncertainty about their health effects and efficacy for smoking cessation. Thus, clinicians should always recommend FDA-approved medications for smoking cessation first, and for smokers unwilling to try these first line medications, PCPs might suggest completely switching from tobacco to e-cigarettes (Rigotti & Kalkhoran, 2019). For patients interested in quitting e-cigarette use, there are currently no evidence-based interventions available, although new technology-based interventions have shown promise among young e-cigarette users (Graham, Jacobs, & Amato, 2019). At this time, PCPs have to base their recommendations on the best evidence developed for smoking cessation, including FDA-approved medications and behavioral counseling (Fiore et al., 2008). With regards to treatment of cannabis use, there is little evidence for the effectiveness of pharmacological interventions (Nielsen, Gowing, Sabioni, & Le Foll, 2019), but cognitive behavioral and motivational interventions have proven more successful (Gates, Sabioni, Copeland, Le Foll, & Gowing, 2016). Though recent studies on co-use of cigarettes and cannabis also showed that patients' readiness to completely quit cannabis use may be low, suggesting the need for interventions that encourage reduction of use (McClure et al., 2019). Finally, it is important for providers to screen patients for all types of nicotine use, including

e-cigarettes. Participants who are taking in other forms of nicotine in addition to cigarettes may be more dependent (Sung, Wang, Yao, Lightwood, & Max, 2018) and thus have more trouble quitting cigarettes. This may require closer follow-up to ensure adequate support and possible alterations in dosing of smoking cessation pharmacotherapy.

4.1 Limitations

Several study limitations should be noted. First, most participants were recruited at safety net clinics in San Francisco, CA. We do not have detailed information about the characteristics of smokers in these clinics, enrollment rates among those eligible, and the sampling design of the parent cluster RCT was not probability-based; therefore, the participants may not be representative of smokers at these clinic sites or in the general population. California was the first US state to legalize medical cannabis use, thus our findings may not be representative for other US states. Further, data were collected in 2014-2015 before the emergence of pod-vapes, including JUUL (Huang et al., 2018). The recall time windows for tobacco (past 30 days) and cannabis use (past 3 months) did not align in our survey instrument and use was assessed via self-report, which could lead to misclassification bias. However, self-report has been shown to be a reliable measure of smoking status among diverse patient populations (Bryant, Bonevski, Paul, & Lecathelinais, 2011; Studts et al., 2006). Moreover, our outcome, 5As receipt from the provider, was only assessed by patient report rather than through direct observation. Intentions to quit the use of e-cigarettes was not assessed in the survey instrument. We did not adjust for multiple comparisons in bivariate analyses, but opted to conduct multivariable comparisons of receipt of 5As using GEE models to determine the unique contribution of use group when accounting for covariates. Finally, data on comorbidities were missing on 40% of participants.

4.2 Conclusions

Among smokers in primary care in San Francisco, CA, dual-use of cigarettes and cannabis is more common than dual-use of cigarettes and e-cigarettes and poly-use of cigarettes, e-cigarettes, and cannabis. PCPs should screen for these use patterns and consider the co-use of cigarettes and other nicotine/cannabis products when delivering smoking cessation counseling. Because of these high rates of co-use, tobacco treatment guidelines should be updated to reflect these changing patterns of product use and additional efforts should be undertaken to develop PCP training for smoking cessation counseling with patients who use multiple nicotine products and cannabis.

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Highlights

- We examined cigarette, cannabis, and e-cigarette use among smokers in primary care
- Only cigarette smoking was reported by 48.6% of participants
- 30.4% used cigarettes and cannabis, 10.5% cigarettes and e-cigarettes, 10.5% all three
- Patients using cigarettes and e-cigarettes had the highest odds of receiving all 5As
- Guidelines to screen for and address these use patterns in primary care are needed

Table 1:

Description of study sample (N=601), current cigarette smokers enrolled in a smoking cessation trial at 3 diverse primary care clinics in San Francisco, CA from 2014 to 2015

	Full sample (N=601)	**Cigarette-only smokers (N=292, 48.6%)**	**Dual-use of cigarettes and e-cigarettes (N=63, 10.5%)**	**Dual-use of cigarettes and cannabis (N=183, 30.4%)**	**Poly-use of cigarettes, e-cigarettes, and cannabis (N=63, 10.5%)**	**Significance (df)**
Age (M, SD)	50.8 (11.4)	53.2 (11.2)	49.4 (10.6)	49.3 (11.3)	45.5 (10.8)	$F(3, 596)=10.7^{***}$
Gender female (%, N)	38.1% (229)	45.2% (132)	36.5% (23)	30.6% (56)	28.6% (18)	$\chi^2(3)=13.1^{**}$
Race/ethnicity (%, N)						$\chi^2(9)=8.5$
NH White	31.5% (189)	30.8% (90)	30.2% (19)	31.2% (57)	36.5% (23)	
NH Black	36.9% (222)	36.3% (106)	36.5% (23)	41.5% (76)	27.0% (17)	
Hispanic	17.1% (103)	18.5% (54)	14.3% (9)	13.7% (25)	23.8% (15)	
Other	13.8% (83)	13.4% (39)	19.0% (12)	13.7% (25)	11.1% (7)	
Education (%, N)						$\chi^2(9)= 22.8^{**}$
Less than high school degree	21.1% (127)	24.0% (70)	15.9% (10)	19.1% (35)	19.0% (12)	
High school degree	26.3% (158)	23.6% (69)	23.8% (15)	31.7% (58)	25.4% (16)	
Some college	36.9% (222)	31.8% (93)	39.7% (25)	39.9% (73)	49.2% (31)	
College degree	14.6% (88)	19.2% (56)	19.0% (12)	8.7% (16)	6.3% (4)	
Clinic site (%, N)						$\chi^2(6)= 30.3^{***}$
ZSFG – RFPC	29.3% (176)	33.2% (97)	27.0% (17)	25.1% (46)	25.4% (16)	
ZSFG – PHP	41.9% (252)	32.5% (95)	36.5% (23)	53.0% (97)	58.7% (37)	
UCSF	28.8% (173)	34.2% (100)	36.5% (23)	21.9% (40)	15.9% (10)	
Comorbidities[1] (%, N)						
HIV/AIDS	26.3% (158)	19.5% (57)	23.8% (15)	36.1% (66)	31.8% (20)	$\chi^2(3)=25.4^{***}$
Cancer	9.7% (58)	11.3% (33)	6.4% (4)	9.8% (18)	4.8% (3)	$\chi^2(3)=2.8$
Mental disorder[2]	39.1% (235)	38.0% (111)	38.1% (24)	39.3% (72)	44.4% (28)	$\chi^2(3)=4.8$
Alcohol dependence	10.7% (64)	11.6% (34)	11.1% (7)	8.7% (16)	11.1% (7)	$\chi^2(3)=1.3$
Drug dependence	23.8% (143)	19.9% (58)	22.2% (14)	28.4% (52)	30.2% (19)	$X^2(3)=9.5^{*}$
Cerebrovascular disease	7.8% (47)	7.5% (22)	7.9% (5)	7.7% (14)	9.5% (6)	$\chi^2(3)=0.7$
Pulmonary disease	25.5% (153)	23.3% (68)	30.2% (19)	29.0% (53)	20.6% (13)	$\chi^2(3)=3.8$

	Full sample (N=601)	Cigarette-only smokers (N=292, 48.6%)	Dual-use of cigarettes and e-cigarettes (N=63, 10.5%)	Dual-use of cigarettes and cannabis (N=183, 30.4%)	Poly-use of cigarettes, e-cigarettes, and cannabis (N=63, 10.5%)	Significance (df)
Cardiovascular disease	33.6% (202)	36.0% (105)	36.5% (23)	32.8% (60)	22.2% (14)	$\chi^2(3)=6.0$

Note:

1 comorbidity data from medical records was missing for N=230 participants on all measures except for HIV/AIDS and cardiovascular disease (N missing = 310)

2 includes schizophrenic disorders, episodic mood disorders, anxiety, dissociative and somatoform disorders, posttraumatic stress disorder, and depressive disorder, not elsewhere classified

df = degrees of freedom; NH = Non-Hispanic; ZSFG – RFPC = Zuckerberg San Francisco General Hospital Richard H. Fine People's Clinic, ZSFG – PHP = UCSF Positive Health Clinic at Zuckerberg San Francisco General Hospital; UCSF = University of California San Francisco General Internal Medicine Clinic;

*
p<.05;

**
p<.01;

***
p<.001.

Table 2:

Cigarette, e-cigarette, and cannabis use patterns and attitudes (N=601), current cigarette smokers enrolled in a smoking cessation trial at 3 diverse primary care clinics in San Francisco, CA from 2014 to 2015

	Full sample (N=601)	**Cigarette-only smokers (N=292, 48.6%)**	**Dual-use of cigarettes and e-cigarettes (N=63, 10.5%)**	**Dual-use of cigarettes and cannabis (N=183, 30.4%)**	**Poly-use of cigarettes, e-cigarettes, and cannabis (N=63, 10.5%)**	**Significance (df)**
Cigarette use						
Smoking days/week (M, SD)	6.3 (1.5)	6.4 (1.4)	6.1 (1.7)	6.4 (1.5)	6.1 (1.8)	F(3, 597)=0.8
Cigarettes/day (M, SD)	10.3 (8.4)	10.3 (8.5)	10.8 (8.9)	10.3 (8.5)	9.6 (6.9)	F(3, 597)=0.2
Time to first cigarette 30 mins or less (%, N)	59.2% (356)	56.8% (166)	63.5% (40)	61.7% (113)	58.7% (37)	$\chi^2(3)=1.6$
Readiness to quit smoking (%, N)						$\chi^2(9)=7.8$
Not ready	15.8% (95)	16.4% (48)	12.7% (8)	14.8% (27)	19.0% (12)	
Next 6 months	44.4% (267)	45.2% (132)	36.5% (23)	45.9% (84)	44.4% (28)	
Next 30 days	28.0% (168)	25.7% (75)	36.5% (23)	28.4% (52)	28.6% (18)	
Already quit	5.3% (32)	6.8% (20)	6.3% (4)	2.7% (5)	4.8% (3)	
E-cigarette use						
Number of days used in past 30 days (M, SD)	1.6 (5.5)	-	6.9 (9.6)	-	8.6 (10.0)	$t(124)=1.0^{1}$
Cannabis use in past 3 months (%, N)						$\chi^2(2)= 0.3^{1}$
Monthly	5.2% (31)			12.6% (23)	12.7% (8)	
Weekly	10.0% (60)	-	-	23.5% (43)	27.0% (17)	
Daily or almost daily	25.8% (155)	-	-	63.9% (117)	60.3% (38)	
Self-reported receipt of 5As for smoking cessation (%, N)						
Ask	57.2% (344)	58.9% (172)	61.9% (39)	54.1% (99)	54.0% (34)	$\chi^2(3)=1.9$
Advise	55.9% (336)	58.9% (172)	60.3% (38)	53.6% (98)	44.4% (28)	$\chi^2(3)=5.3$
Assess	51.8% (311)	53.1% (155)	49.2% (31)	51.4% (94)	49.2% (31)	$\chi^2(3)=0.5$
Assist	55.2% (332)	58.9% (172)	57.1% (36)	50.8% (93)	49.2% (31)	$\chi^2(3)=4.1$
Arrange	21.3% (128)	23.6% (69)	34.9% (22)	16.4% (30)	11.1% (7)	$\chi^2(3)=14.4^{**}$
Receipt of all 5As	14.1% (85)	16.8% (49)	23.8% (15)	8.7% (16)	7.9% (5)	$\chi^2(3)=12.9^{**}$

Note:

[1] Only comparing groups with data;

df = degrees of freedom;

* $p<.05$

** $p<.01$

*** $p<.001$.

Table 3:

Multivariate Generalized Estimating Equation (GEE) analyses to account for clustering of patients within providers predicting receipt of 5As from group and controlling for significant between-group differences from bivariate analyses (N=601), among current cigarette smokers enrolled in a smoking cessation trial at 3 diverse primary care clinics in San Francisco, CA from 2014 to 2015

	Ask		Advise		Assess		Assist		Arrange		All 5As	
Predictor	**aOR**	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**
Group (ref. Cig-only smokers)												
Dual-use of Cigarettes and e-cigarettes	1.30	[0.63,2.68]	1.15	[0.63,2.10]	0.96	[0.48,1.92]	1.07	[0.59,1.95]	2.07*	[1.11,3.88]	1.79	[0.90,3.57]
Dual-use of cigarettes and cannabis	0.97	[0.64,1.48]	0.94	[0.64,1.38]	1.16	[0.78,1.71]	0.83	[0.56,1.22]	0.82	[0.45,1.47]	0.62	[0.32,1.21]
Poly-use of cigarettes, e-cigarettes, and cannabis	1.05	[0.54,2.03]	0.72	[0.40,1.28]	1.17	[0.63,2.20]	0.81	[0.47,1.39]	0.57	[0.23,1.40]	0.60	[0.22,1.66]
Age	1.00	[0.99,1.02]	1.02*	[1.00,1.03]	1.01	[0.99,1.02]	1.00	[0.98,1.01]	1.00	[0.98,1.02]	1.00	[0.98,1.01]
Gender	1.20	[0.86,1.67]	1.50*	[1.01,2.21]	1.20	[0.78,1.83]	1.32	[0.85,2.07]	0.94	[0.61,1.45]	1.29	[0.76,2.18]
Education (ref. <HS)												
HS or some college	0.65	[0.37,1.15]	0.91	[0.58,1.44]	0.71	[0.45,1.13]	0.66	[0.43,1.00]	0.76	[0.47,1.24]	0.71	[0.39,1.32]
College degree or more	0.56	[0.27,1.13]	0.70	[0.38,1.29]	0.77	[0.43,1.37]	0.52*	[0.29,0.95]	0.62	[0.30,1.27]	0.81	[0.36,1.82]
Clinic site (ref. ZSFG-RFPC)												
ZSFG-PHP	0.34***	[0.24,0.48]	0.63*	[0.42,0.94]	0.51**	[0.33,0.80]	0.46***	[0.29,0.73]	0.74	[0.41,1.35]	0.46*	[0.25,0.87]
UCSF	0.84	[0.56,1.27]	1.21	[0.78,1.87]	0.90	[0.59,1.37]	0.80	[0.51,1.26]	2.11*	[1.13,3.96]	1.56	[0.79,3.09]
Intervention group	1.45*	[1.08,1.95]	1.66**	[1.20,2.28]	1.64**	[1.17,2.30]	1.53*	[1.06,2.19]	2.07**	[1.31,3.27]	2.60***	[1.52,4.45]

Note: ZSFG – RFPC = Zuckerberg San Francisco General Hospital Richard H. Fine People's Clinic, ZSFG – PHP = UCSF Positive Health Clinic at Zuckerberg San Francisco General Hospital; UCSF = University of California San Francisco General Internal Medicine Clinic;

* p<.05

** p<.01

*** p<.001.