Published in final edited form as:

Drug Alcohol Depend. 2018 October 01; 191: 355–360. doi:10.1016/j.drugalcdep.2018.01.040.

Among whom is cigarette smoking declining in the United States? The impact of cannabis use status, 2002–2015

Lauren R. Pacek¹, Jan Copeland², Lisa Dierker³, Chinazo O. Cunningham^{4,5,6}, Silvia S. Martins⁷, and Renee D. Goodwin^{7,8,9}

¹Department of Psychiatry and Behavioral Sciences, Duke University School of Medicine, Durham, NC, 27705, USA

²National Cannabis Prevention and Information Centre, UNSW Sydney, Sydney, Australia

³Department of Psychology, Wesleyan University, Middletown, CT, 06459, USA

⁴Department of Medicine, Montefiore Medical Center, Albert Einstein College of Medicine, Bronx, NY, 10461, USA

⁵Department of Family and Social Medicine, Montefiore Medical Center, Albert Einstein College of Medicine, Bronx, NY, 10461, USA

⁶Department of Psychiatry and Behavioral Sciences, Montefiore Medical Center, Albert Einstein College of Medicine, Bronx, NY, 10461, USA

⁷Department of Epidemiology, Mailman School of Public Health, Columbia University, New York, NY, 10032, USA

⁸Institute for Implementation Science in Population Health, The City University of New York, New York, NY, 10027, USA

⁹Department of Epidemiology and Biostatistics, Graduate School of Public Health and Health Policy, The City University of New York, New York, NY, 10027, USA

Abstract

Objectives: To 1) estimate changes in the prevalence of daily and non-daily cigarette smoking among current (past 30-day) daily, non-daily, and non-cannabis users in the United States (U.S.) population; 2) examine time trends in current (past 30-day) cigarette smoking in daily, non-daily, and non-cannabis users ages 12+ from 2002–2015.

Correspondence: Renee D. Goodwin, PhD, MPH, Department of Epidemiology and Biostatistics Graduate School of Public Health and Health Policy The City University of New York 55 West 125th Street, Rm 611, New York, NY, 10027, USA, Phone: 646-364-9611, renee.goodwin@sph.cuny.edu.

Contributors

Authors Goodwin and Pacek conceptualized the research question. Author Pacek conducted the analyses, and wrote the first draft of the manuscript. Authors Copeland, Dierker, Cunningham, Martins, and Goodwin have critically reviewed, revised, and approved of the final manuscript.

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Conflict of Interest

The authors have no conflicts of interest to declare.

Methods: Data collected annually from the 2002–2015 National Survey on Drug Use and Health (NSDUH) were employed. Linear time trends of daily and non-daily cigarette smoking were assessed using logistic regression with year as the predictor.

Results: In 2015, the prevalence of current (past 30-day) cigarette smoking was highest among daily (54.57%), followed by non-daily (40.17%) and non-cannabis users (15.06%). The prevalence of non-daily cigarette smoking increased among daily cannabis users from 2002 to 2015, whereas non-daily cigarette smoking declined among non-daily cannabis users and non-cannabis users from 2002 to 2015. Daily cigarette smoking declined among both cannabis users and non-users; the most rapid decline was observed among daily cannabis users, followed by non-daily and then by non-cannabis users. However, the relative magnitude of the change in prevalence of daily cigarette smoking was similar across the three cannabis groups.

Conclusions: Despite ongoing declines in cigarette smoking in the U.S., non-daily cigarette smoking is increasing among current cannabis users, a growing proportion of the U.S. population. Daily and non-daily cigarette smoking continue to decline among those who do not use cannabis. Efforts to further tobacco control should consider novel co-use-oriented intervention strategies and outreach for the increasing population of cannabis users.

Keywords

cannabis; marijuana; smoking; cigarettes; NSDUH

1. Introduction

Cigarette smoking remains the leading preventable cause of death and disease worldwide (GBD 2015 Tobacco Collaborators, 2017). Within the United States (U.S.), smoking is responsible for 480,000 deaths annually; this amounts to more deaths each year than from human immunodeficiency virus (HIV), alcohol and illegal substance use, motor vehicle injuries, and firearm-related incidents, combined (Centers for Disease Control and Prevention, 2016a). The prevalence of smoking has declined tremendously in the U.S. since the mid-1960s, though it is currently estimated at approximately 15% in the US population (Centers for Disease Control and Prevention, 2016a). While the prevalence of smoking has declined among the general population, this decline has not been as dramatic among certain vulnerable groups (e.g., individuals who use alcohol and illicit substances).

Cigarette smoking is common among adults who use cannabis; estimates of cigarette smoking among current cannabis users range from 41–94% (Peters et al., 2012). Moreover, based on epidemiological data, the prevalence of cannabis use has been increasing over the past decade; estimates indicate that, between 2002 and 2014, the prevalence of cannabis use has increased significantly from 10.4% to 13.3% (Compton et al., 2016). This pattern of co-use is troubling. A systematic review indicates that co-users of cannabis and tobacco are more likely to report cannabis use disorders and higher levels of psychosocial problems; as a result, comorbid users have greater difficulty quitting cannabis than do cannabis-only users (Peters et al., 2012). Further, co-users of cannabis and tobacco are at increased risk of toxicant exposure (Meier and Hatsukami, 2016)—including carbon monoxide, a contributor to cardiovascular and pulmonary disease (Cooper and Haney, 2009)—and are at risk for

numerous physical health morbidities, including respiratory distress (Moore et al., 2005; Taylor et al., 2000). Despite the observed decreases in the prevalence of cigarette smoking and increases in the prevalence of cannabis in recent years, it remains unknown whether and to what degree the prevalence of cigarette smoking has changed differentially among those who do and do not use cannabis over the same time period.

A number of prior studies have provided information on trends in tobacco use among cannabis users over time (Schauer et al., 2016, 2017). Yet, a number of unanswered questions remain. First, prior studies have examined multiple types of tobacco use combined—including cigarettes, cigars, pipe tobacco, blunts, and smokeless tobacco (Schauer et al., 2017), without separating out cigarette use from other tobacco use. Therefore, the trends in cigarette use vs. non-cigarette tobacco use has not been clear. This is especially relevant if the goal is to specifically understand trends in cigarette use given substantial co-use of cigarette use and alternative tobacco product use (e.g., blunt use; Fairman, 2015). Second, prior studies have examined *any* past month (Schauer et al., 2015, 2016, 2017) cigarette use among cannabis users, though the degree to which trends may differ by frequency of cigarette and/or cannabis use (i.e., daily versus non-daily) has not been examined. Taking into account the frequency of cigarette smoking, for instance, is particularly informative given that non-daily cigarette smokers appear to be quite distinct from daily smokers in several respects. Prior studies have suggested that—despite consistent evidence indicating the significant harms of non-daily cigarette use (Schane et al., 2010; U.S. Department of Health and Human Services, 2014)—non-daily cigarette smokers may not necessarily identify as “smokers” (Berg et al., 2009; Pulvers et al., 2014; Ridner et al., 2010), potentially reducing the likelihood that cessation messages will be perceived as salient, and therefore reducing effectiveness (Pulvers et al., 2014). Third, prior studies have not examined the potential impact of sociodemographic characteristics as potential moderators of these trends (Centers for Disease Control and Prevention, 2016a; Copeland and Swift, 2009; Guxens et al., 2007; Pacek et al., 2015). As a result, understanding the degree to which trends in cigarette smoking among individuals with various cannabis use status vary by demographic characteristics is critical to revealing whether various groups are differentially affected and may benefit from increased outreach and intervention.

In response to the above outlined gaps in the literature, the current study had three aims. The first was to investigate the relationship between current (past 30-day) cigarette smoking and current (past 30-day) cannabis use, stratified by demographic characteristics in 2015. The second aim was to estimate changes in the prevalence of past 30-day cigarette smoking among daily, non-daily, and non-users of cannabis from 2002–2015. The third aim was to estimate the prevalence of daily and non-daily cigarette smoking among daily and non-daily cannabis users, compared with non-users.

2. Methods

Data were obtained from the 2002–2015 National Survey on Drug Use and Health (NSDUH) public use data files, for a combined total sample size of 782,156 individuals. The NSDUH is sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA) and is designed to provide estimates of the prevalence of extra-medical use of

legal and illegal drugs in the household population of the U.S., age 12 and older. The survey employs a 50-state design with an independent multistage area probability sample for each of the 50 states and the District of Columbia. Response rates for completed surveys ranged from 73%–79%.

Informed consent was obtained before the start of every interview. Participants were given a description of the study, read a statement describing the legislation that assures the confidentiality of any information provided by participants, and assured that participation in the study was voluntary. Additional information on maintenance of data confidentiality is available elsewhere (Center for Behavioral Health Statistics and Quality, 2016). Surveys were administered by computer-assisted personal interviewing (CAPI) conducted by an interviewer and audio computer-assisted self-interviewing (ACASI). Respondents were offered a U.S. \$30 incentive payment for participation. The present analyses are based on de-identified data that are exempt from Institutional Review Board review.

Sampling weights for the NSDUH were computed to control for unit-level and individual-level non-response and were adjusted to ensure consistency with population estimates obtained from the U.S. Census Bureau. In order to use data from the 13 years of combined cross-sectional data, a new weight was created upon aggregating the seven datasets by dividing the original weight by the number of data sets combined. Further descriptions of the sampling methods and survey techniques for the NSDUH are found elsewhere (Center for Behavioral Health Statistics and Quality, 2016).

2.1 Measures

2.1.1 Sociodemographic variables.—Sociodemographic variables for this study included sex, race/ethnicity (Non-Hispanic White, Non-Hispanic Black, Hispanic, Other [i.e., Native American/Alaska Native; Native Hawaiian/Other Pacific Islander; Asian; more than 1 race]), age (12–17, 18–25, 26+), marital status (married, widowed/divorced/separated, never married), and total family annual income (<\$20,000, \$20,000–\$74,999, \$75,000+).

2.1.2 Cannabis use variables.—Participants who reported using cannabis “Within the past 30 days” were categorized as current users in a new dichotomous variable (any versus none). Participants indicating past year use reported the number of days they used cannabis in the past 30 days. Participants who reported using cannabis on 25 days or greater were classified as “daily users, while those reporting use on <25 days were classified as “non-daily users” (Budney et al., 2003, 2007; Moore and Budney, 2003; Pacek et al., 2015) which was reflected in a dichotomous variable.

2.1.3 Cigarette smoking variables.—Current cigarette smoking status was assessed using the following questions: 1) “Have you ever smoked part or all of a cigarette?” 2) “Have you smoked at least 100 cigarettes in your entire life?” and 3) “During the past 30 days, have you smoked part or all of a cigarette?” Individuals who reported smoking at least 100 cigarettes in their lifetime *and* at least 1 cigarette within the past 30 days were classified as past 30-day smokers. Past 30-day smokers were then subdivided based on frequency of smoking using the following question: “During the past 30 days, that is, since [DATEFILL], on how many days did you smoke part or all of a cigarette?” Those who smoked 1 to 29

days of past 30 days were classified as non-daily cigarette smokers and those who smoked all 30 of the past 30 days were classified as daily cigarette smokers. Individuals who had either 1) never smoked part or all of a cigarette; or 2) smoked fewer than 100 cigarettes in their lifetime were classified as non-smokers. Similar smoking status classifications have been used previously (Goodwin et al., 2018; Pacek et al., 2014).

2.2 Statistical analysis

Data were weighted to reflect the complex design of the NSDUH sample and were analyzed with STATA SE version 12.0 software (StataCorp, 2013). We used Taylor series estimation methods (STATA “svy” commands) to obtain proper standard error estimates for the cross-tabulations. First, we assessed the association between past 30-day cigarette use (any) with daily and non-daily cannabis use, by demographic characteristics. Next, we examined the prevalence of the three cannabis use statuses from 2002 to 2015. We then examined the prevalence of any past 30-day cigarette smoking, daily cigarette smoking and non-daily cigarette smoking among the 3 cannabis use statuses across time, from 2002 to 2015. Linear time trends of daily and non-daily cigarette smoking were assessed using logistic regression with year as the predictor. Within these analyses, odds ratios indicate the slope of the increase/decrease (i.e., rapidity of change) in cigarette smoking between 2002 and 2015. Furthermore, models with year-by-smoking status interaction terms, and F-tests to test the significance of these interactions, were used to assess differential time trends (i.e., differences in the rapidity of change between cannabis use statuses).

3. Results

3.1 Past 30-day cigarette smoking and daily, non-daily, and non-cannabis use, by demographics, 2015

Past 30-day cigarette smoking was common among over half of daily cannabis users (54.57%; OR=5.77, 95% CI=4.83, 6.90) and among 40.17% of non-daily cannabis users (OR=3.66, 95% CI=3.30, 4.05) relative to 15.06% of non-cannabis users (Table 1). The strength of these relationships differed significantly by age, income, and race/ethnicity. The associations between daily cannabis use and cigarette smoking were stronger among individuals aged 12–17 (aOR=41.80, 95% CI=23.88, 73.18) compared with individuals aged 18–25 (aOR=6.16, 95% CI=5.13, 7.40) and aged 26 and older (aOR=4.87, 95% CI=3.80, 6.26). A similar pattern was observed for associations between non-daily cannabis use and past 30-day cigarette smoking status the association was strongest among individuals aged 12–17 (aOR=9.90, 95% CI=6.78, 14.45) as compared to those aged 18–25 (aOR=2.90, 95% CI=2.46, 3.43) or aged 26 and older (aOR=3.79, 95% CI=3.25, 4.42). Associations between non-daily cannabis use and cigarette smoking were stronger among those with an annual family income of \$20,000–\$74,999 (aOR=3.64, 95% CI=3.06, 4.33) and \$75,000 (aOR=4.34, 95% CI=3.35, 5.62) income groups versus <\$20,000 (aOR=2.95, 95% CI=2.34, 3.74). Within race/ethnicity, associations between daily cannabis use and cigarette smoking were stronger among individuals of Other race/ethnicity (aOR=11.68, 95% CI=6.14, 22.21), relative to non-Hispanic White participants (aOR=5.92, 95% CI=4.72, 7.41).

3.2 Daily cigarette smoking among daily, non-daily and non-cannabis users from 2002–2015

Between 2002 and 2015, the prevalence of daily cigarette smoking decreased significantly among daily cannabis users (54.66% vs. 36.95%; $p<0.001$), non-daily cannabis users (32.86% vs. 23.14%; $p<0.001$), and non-cannabis users (14.89% vs. 9.70%; $p<0.001$; See Table 2). Moreover, the rate of change differed significantly between cannabis use statuses. The prevalence of daily cigarette smoking declined more rapidly among daily cannabis users than non-daily ($p=0.026$) or non-cannabis users ($p<0.001$); daily smoking also declined more rapidly among non-daily cannabis users than among non-users ($p<0.001$). The relative decrease in the prevalence of smoking was similar across daily, non-daily, and non-cannabis users (−32.40%, −29.58%, and −34.86%, respectively).

3.3 Non-daily cigarette smoking among daily, non-daily and non-cannabis users from 2002–2015

The prevalence of non-daily cigarette smoking declined significantly from 2002–2015 among non-daily cannabis users (21.02% vs. 17.03%; $p<0.001$) and non-cannabis users (6.58% vs. 5.36%; $p<0.001$); the rate of change did not differ between these two groups (Table 3). Conversely, the prevalence of non-daily cigarette smoking increased significantly between 2002 and 2015 (14.34% vs. 17.62%; $p=0.014$) among daily cannabis users, representing a 22.87% relative increase.

4. Discussion

To our knowledge, the present study is the first to examine trends in daily and non-daily cigarette smoking over time, stratified by frequency (daily, non-daily, no use) of current (past 30-day) cannabis use, in a nationally representative U.S. sample over the past decade. The study had several key findings. First, the prevalence of non-daily cigarette smoking has been increasing significantly among daily cannabis users over time (from 14.34% in 2002 to 17.86% in 2015). This is in contrast to the decline in non-daily cigarette smoking observed both in non-daily cannabis users and non-cannabis users. An increase in smoking in any group is unusual to observe given the ongoing decline in recent years, suggesting that this group may be uniquely vulnerable to cigarette use. Second, daily cigarette smoking is declining among both users and non-users of cannabis. Third, the prevalence of cigarette smoking remains persistently more than two to three times as common among cannabis users, compared to non-users, over the past decade.

Consistent with other data in the U.S. showing that cigarette and other tobacco use is on the decline among cannabis users (Centers for Disease Control and Prevention, 2016b; Schauer et al., 2016, 2017), our results indicated that the prevalence of daily cigarette smoking has declined between 2002 and 2015 among individuals of all cannabis use statuses. Despite these declines, as of 2015, the prevalence of past 30-day cigarette smoking remains many times higher among cannabis users (40.17% and 54.57% among non-daily and daily cannabis users, respectively) than among non-users (15.06%). Additionally, though *daily* cigarette smoking has declined significantly among cannabis users and non-users alike, the prevalence of daily smoking remains nearly four times higher among daily cannabis users

than non-users (36.95% vs. 9.70%). Findings regarding the dose-dependent increase in the prevalence of any past 30-day, and daily, cigarette smoking as the pattern of cannabis use increases are consistent with the limited reports in the extant literature (Badiani et al., 2015). These findings indicate that traditional tobacco control measures may have a limited reach among cannabis users. This is troubling given that cannabis users represent a vulnerable group that is increasing in size (Compton et al., 2016). It is especially troubling that this relationship is strongest amongst the youngest age group of 12–17 years, where prevention and early intervention regarding any smoking behavior should be most urgently focused.

The prevalence of non-daily cigarette smoking also appeared to decrease over time among non-daily and non-cannabis users. However, among *daily* cannabis users, the prevalence of non-daily cigarette smoking increased from 2002 to 2015 (14.34% versus 17.62%). Considering the detrimental health effects that it imparts (e.g., low energy levels, sleep and memory issues; Gruber et al., 2003; Stephens et al., 2002), it is alarming that cigarette smoking—of any frequency—has been on the rise. Findings add to the extant literature suggesting that cannabis users are uniquely vulnerable to cigarette smoking (Castañé et al., 2002; Chen et al., 2008; Cooper and Haney, 2009; Koob and Volkow, 2016; Le Foll et al., 2008) and suggest that daily cannabis users may be even more so (Badiani et al., 2015). However, it should be acknowledged that it is also possible that this increase in non-daily cigarette smoking among daily cannabis users—accompanied by observed decreases in daily cigarette smoking in this group—may be reflective of daily smokers making the transition to less regular smoking. Given the cross-sectional nature of the NSDUH data, we are not able to definitively comment on participants' transitions between cigarette smoking statuses. Additional longitudinal, prospective research is needed to more fully assess these associations.

The present study has several limitations that should be noted. First, all data were collected via self-report, which carries with it the possibility for recall and social desirability biases. To mitigate the likelihood of social desirability bias, the NSDUH utilizes ACASI, which was designed to provide respondents with a private and confidential means of responding to questions and to increase honest reporting of illegal drug use and other sensitive behaviors (Macalino et al., 2002). Additionally, given that the present paper focused on daily and non-daily cigarette smoking, it is unknown how the increasing popularity of alternative tobacco products, such as e-cigarettes (Glasser et al., 2017), may potentially play a role in the decline in daily cigarette smoking. Moreover, though the present study examined *frequency* of cigarette smoking, we did not examine associations between the number of cigarettes smoked per day and cannabis use status. Future work should investigate whether trends in the quantity of cigarettes smoked are associated with cannabis use frequency status. Additionally, though based on prior literature and analyses, it is possible that our definition of “daily” cigarette smoking (i.e., smoking every day during the past month) may be unnecessarily narrow. In terms of cannabis use characteristics, participants' levels of cannabis use on a given day is not known, and may vary considerably. Additionally, neither the route of administration nor reasons for using cannabis are fully detailed. In future work, understanding whether the relations between cigarette smoking and cannabis use is related to route of administration of cannabis or reasons for use (i.e., medicinal use versus recreational) would be helpful in terms of understanding the mechanisms of this

relationship. The present work was unable to take into account how the rapidly evolving status of cannabis medicalization and legalization in the U.S. may play a role in the association between cigarette smoking and cannabis use. The analyses in this paper were based on NSDUH public use data files, and restricted access data files are not currently available; therefore, it was not possible to assess cannabis legality as a possible covariate. Future work that takes into account how cannabis legalization impacts associations between cigarette smoking and cannabis use is needed.

The present work builds upon research that has examined trends in tobacco product use among cannabis users and non-users over time (Schauer et al., 2016, 2017) and is strengthened through investigation of whether trends in the prevalence of various frequencies of cigarette smoking have changed differentially based on cannabis use status. Though the prevalence of cigarette smoking has, by and large, decreased between 2002 and 2015 in the U.S., we have identified one subgroup that does not conform to this trend: daily cannabis users. Primary health care providers and other front-line health workers, including school personnel/screening programs, should to ask about both cannabis and tobacco and also reasons/methods of use in order to ascertain information on how best to reduce cigarettes as well as cannabis-related risks.

Role of the Funding Source

Research reported in this publication was supported by the National Institute on Drug Abuse grants R01DA20892, K01DA043413, K24DA036955, and R01DA044171.

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Highlights

- Cigarette use is 2 to 3 times more common among cannabis users relative to non-users.
- Non-daily cigarette smoking declined among non-daily cannabis users over time.
- In contrast, non-daily cigarette smoking increased among daily cannabis users over time.
- Daily cigarette smoking declined among daily and non-daily cannabis users.
- Daily and non-daily cigarette use is declining among non-cannabis users in the US.

The association of current cigarette smoking with daily and non-daily cannabis use, by demographic characteristics, National Survey on Drug Use and Health 2015.

Table 1.

Characteristic	Unadjusted prevalence of current cigarette smoking			Non-daily cannabis user vs. no cannabis use			Daily cannabis use vs. no cannabis use		
	Non-cannabis user	Non-daily cannabis user	Daily cannabis user	wt% (s.e.)	aOR ^a (95% CI)	<i>b</i> P _{int}	wt% (s.e.)	aOR ^a (95% CI)	<i>b</i> P _{int}
Total sample	15.06 (0.27)	40.17 (1.11)	54.57 (1.94)		3.66 (3.30, 4.05)	<0.001		5.77 (4.83, 6.90)	<0.001
Sex									
Male	16.61 (0.34)	44.15 (1.47)	55.51 (2.29)		3.81 (3.30, 4.41)	Ref		5.34 (4.31, 6.60)	Ref
Female	13.67 (0.35)	34.56 (1.73)	52.69 (3.02)		3.43 (2.84, 4.14)	0.426		6.79 (5.20, 8.86)	0.138
Age									
12–17	0.90 (0.11)	13.27 (1.57)	36.58 (4.52)		9.90 (6.78, 14.45)	Ref		41.80 (23.88, 73.18)	Ref
18–25	15.13 (0.44)	34.36 (1.53)	53.18 (2.16)		2.90 (2.46, 3.43)	<0.001		6.16 (5.13, 7.40)	<0.001
26+	16.74 (0.32)	47.52 (1.80)	56.46 (2.87)		3.79 (3.25, 4.42)	<0.001		4.87 (3.80, 6.26)	<0.001
Marital status									
Married	12.55 (0.36)	38.52 (2.26)	45.95 (4.79)		4.16 (3.33, 5.20)	Ref		5.24 (3.50, 7.83)	Ref
Widowed/divorced/separated	23.17 (0.78)	54.76 (3.50)	59.50 (4.94)		3.73 (2.77, 5.03)	0.789		4.41 (2.86, 6.79)	0.865
Never married	16.84 (0.45)	37.54 (1.23)	56.88 (2.02)		3.40 (3.04, 3.82)	0.083		6.51 (5.33, 7.96)	0.386
Income									
<\$20,000	22.93 (0.74)	45.19 (2.24)	62.08 (3.30)		2.95 (2.34, 3.74)	Ref		5.51 (4.08, 7.43)	Ref
\$20–74,999	15.90 (0.33)	42.43 (1.96)	54.11 (2.37)		3.64 (3.06, 4.33)	0.038		5.28 (4.25, 6.56)	0.812
>\$75,000	10.31 (0.38)	33.01 (2.18)	47.50 (4.22)		4.34 (3.35, 5.62)	0.024		7.28 (5.07, 10.46)	0.166
Race									
White	16.79 (0.40)	43.35 (1.44)	58.32 (2.46)		3.57 (3.11, 4.08)	Ref		5.92 (4.72, 7.41)	Ref
Black	14.83 (0.69)	35.42 (2.36)	51.07 (4.56)		3.22 (2.37, 4.39)	0.357		5.22 (3.48, 7.83)	0.527
Hispanic	10.31 (0.44)	32.69 (2.89)	35.58 (4.07)		4.42 (3.27, 5.98)	0.189		4.75 (3.00, 7.52)	0.390

	Unadjusted prevalence of current cigarette smoking			Non-daily cannabis user vs. no cannabis use		Daily cannabis use vs. no cannabis use	
	Non-cannabis user	Non-daily cannabis user	Daily cannabis user				
	wt% (s.e.)	wt% (s.e.)	wt% (s.e.)	aOR ^a (95% CI)	p _{int} ^b	aOR ^a (95% CI)	p _{int} ^b
Characteristic							
Other ^c	11.53 (0.64)	36.63 (3.25)	64.13 (5.80)	4.40 (3.22, 6.01)	0.311	11.68 (6.14, 22.21)	0.047

^a Adjusted for all other variables listed in the table, and calendar year (categorical).

^b p_{int}: p-value from t-test for product term beta=0; test for multiplicative interaction.

^c Other includes Native American/Alaska Native; Native Hawaiian/Other Pacific Islander; Asian; more than 1 race

Prevalence of daily cigarette smoking over time from 2002 to 2015 and linear time trends, by cannabis use status (NSDUH)

Table 2.

Cannabis Use Status	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Trends		
	wt%														Absolute change	Relative change	aOR* (95% CI); p-value
Daily smoking among total sample	16.32	15.80	15.61	15.62	15.44	14.59	14.62	14.35	13.72	13.33	13.27	12.44	12.32	11.20	-5.12	-31.37	0.98 (0.97, 0.98) <0.001
Daily cannabis users	54.66	53.89	55.63	52.78	54.31	47.83	48.75	47.90	45.48	46.94	42.25	44.55	39.08	36.95	-17.71	-32.40	0.94 (0.93, 0.96) <0.001
Non-daily cannabis users	32.86	34.95	33.66	36.45	34.85	31.79	33.28	31.00	30.07	25.25	28.53	24.94	26.00	23.14	-9.72	-29.58	0.96 (0.95, 0.96) <0.001
Cannabis non-users	14.89	14.23	14.07	14.03	13.87	13.26	13.13	12.83	12.14	11.94	11.72	10.87	10.64	9.70	-5.19	-34.86	0.97 (0.97, 0.98) <0.001
Differential time trend: year as continuous × cannabis use (in 3 categories)																	
Differential time trend: year as continuous × cannabis use (daily use vs. no use)															F(2,169)=16.43 <0.001		
Differential time trend: year as continuous × cannabis use (non-daily use vs. no use)															F(1,170)=25.96 <0.001		
Differential time trend: year as continuous × cannabis use (daily use vs. non-daily use)															F(1,170)=12.58 <0.001		
															F(1,170)=5.05 0.026		

* adjusted for sex, age, race/ethnicity, and income

Prevalence of non-daily cigarette smoking over time from 2002 to 2015 and linear time trends, by cannabis use status (NSDUH)

Table 3.

Cannabis Use Status	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Trends		
	wt%														Absolute change	Relative change	aOR* (95% CI); p-value
Non-daily smoking among total sample	7.39	7.30	7.10	7.18	7.27	7.29	6.94	6.88	7.03	6.52	6.68	6.75	6.70	6.35	-1.04	-14.07	0.99 (0.98, 0.99) <0.001
Daily cannabis users	14.34	16.27	16.43	15.69	17.93	21.14	17.82	16.59	17.10	15.68	16.41	19.29	18.96	17.62	+3.28	+22.87	1.02 (1.01, 1.04) 0.014
Non-daily cannabis users	21.02	20.93	21.21	20.10	19.60	20.30	19.98	21.91	19.34	20.16	18.96	19.23	17.58	17.03	-3.99	-18.98	0.98 (0.97, 0.99) <0.001
Cannabis non-users	6.58	6.47	6.26	6.43	6.50	6.48	6.13	5.92	6.16	5.58	5.77	5.71	5.65	5.36	-1.22	-18.54	0.99 (0.98, 0.99) <0.001
Differential time trend: year as continuous × cannabis use (in 3 categories)															F(2,169)=3.21 0.043		
Differential time trend: year as continuous × cannabis use (daily use vs. no use)															F(1,170)=5.96 0.016		
Differential time trend: year as continuous × cannabis use (non-daily use vs. no use)															F(1,170)=0.12 0.731		
Differential time trend: year as continuous × cannabis use (daily use vs. non-daily use)															F(1,170)=6.56 0.011		

* adjusted for sex, age, race/ethnicity, and income