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Smoking and Cessation Behaviors in Patients at Federally Funded Health Centers – United States, 2014

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Abstract

Background: Federally funded health centers (HCs) provide care to the most vulnerable populations in the U.S., including populations with disproportionately higher smoking prevalence such as those with lower incomes.

Methods: This study compared characteristics of adult HC patients, by cigarette smoking status, and assessed smoking cessation-related behaviors using 2014 Health Center Patient Survey data; analysis was restricted to adults with data on cigarette smoking status (n=5,583). Chi-square and logistic regression analyses were conducted.

Results: Overall, 28.1% were current smokers and 19.2% were former smokers. Current smokers were more likely to report fair/poor health (48.2%) and a high burden of behavioral health conditions (e.g., severe psychological distress 23.9%) versus former and never smokers. Most

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Contributors

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Declaration of Competing Interest

No conflict declared.

current smokers reported wanting to quit in the past 12 months (79.0%) and receiving advice to quit from a healthcare professional (78.7%). In a multivariable model, age <45, non-white race, COPD diagnosis, and past 3-month marijuana use were significantly associated with desire to quit. Few former smokers (15.2%) reported using cessation treatment, though use was higher among those who quit within the previous year (30.6%).

Conclusions: Although most current smokers reported a desire to quit, low uptake of evidence-based treatment may reduce the number who attempt to quit and succeed. Given the burden of tobacco use, future efforts could focus on identifying and overcoming unique personal, healthcare professional, or health system barriers to connecting them with cessation treatments. Increasing access to cessation treatments within HCs could reduce smoking-related disparities and improve population health.

Keywords

tobacco; smoking; cessation; federally qualified health centers; community health centers; counseling

1. INTRODUCTION

Cigarette smoking is responsible for nearly half a million deaths (US Department of Health and Human Services, 2014) and approximately $170B in annual direct medical costs in the US per year (Xu et al., 2015). In 2018, 13.7% of US adults smoked cigarettes (Creamer et al., 2019). While this prevalence was the lowest recorded since 1965, low-income populations continue to smoke cigarettes at a higher rate than those with higher incomes; 21.3% of adults living with an annual household income <$35,000 currently smoke, three times the prevalence (7.3%) among those with an annual household income >$100,000 (Creamer et al., 2019).

Smoking cessation has multiple health benefits, regardless of age or duration of smoking (US Department of Health and Human Serivces et al., 2020). Most adults who smoke report wanting to quit, but fewer than 1 in 10 are successful doing so in a given year (Babb et al., 2017). While evidence-based treatments, including counseling and FDA-approved cessation medications, increase the odds of success (Fiore et al., 2008), fewer than 1 in 3 adults who try to quit report using these treatments (Babb et al., 2017). Healthcare professionals play a key role in helping people quit smoking; 70% of adults who smoke see a physician each year (Fiore et al., 2008). Even brief advice from a healthcare professional can increase the odds that a patient will try to quit and quit successfully (Fiore et al., 2008). Integrating smoking cessation treatment into routine clinical care could help increase utilization of evidence-based treatments and increase successful cessation (Centers for Disease Control and Prevention, 2014; Fiore et al., 2008; US Department of Health and Human Serivces et al., 2020).

The federally funded health center program provides healthcare to patients regardless of ability to pay (Health Resources Services Administration, 2019). Federally funded health centers (HCs) are located in underserved areas and provide care to some of the most vulnerable populations in the U.S., including populations with disproportionately higher

smoking prevalence such as those with lower incomes. A study using 2009 Heath Center Patient Survey (HCPS) data noted that smoking prevalence among patients at HCs was higher than the national average (31% versus 21%) based on 2009 National Health Interview Survey data (Lebrun-Harris et al., 2015). Data from 2013 show that 26% of adult HC patients currently used any tobacco product (Flocke et al., 2017). Few studies have examined patterns of smoking cessation behavior among HC patients; desire to quit and receipt of tobacco counseling were examined among adult HC patients using 2009 HCPS data, with a large majority (83%) indicating a desire to quit (Lebrun-Harris et al., 2015).

Since the 2009 HCPS survey, the role of HCs, and the characteristics of their patients, have shifted. For example, implementation of the Patient Protection and Affordable Care Act (ACA) contributed to the expanded role of HCs, resulting in additional resources being invested in improving center infrastructure, capacity, and patient coverage (Nath et al., 2016; Rosenbaum et al., 2017). Reporting requirements for HCs have also changed; in 2011, the Health Resources and Services Administration (HRSA) started requiring HCs to report clinical quality measures related to tobacco use screening and delivery of cessation interventions (Health Resources Services Administration, 2011). Health centers have also seen recent shifts in the demographics of their patient populations. For example, between 2005 and 2014, federally qualified health centers, a type of HC, experienced more rapid growth in the proportion of patients served who are young, low-income, uninsured or enrolled in Medicaid, and members of racial and ethnic minorities, compared to other demographic populations (Nath et al., 2016). Given these changes, behaviors of HC patients and providers related to smoking, smoking cessation, and delivery of treatment may have changed since the 2009 HCPS survey.

Despite the shifts in the HC landscape, no study has recently assessed tobacco use prevalence, cessation-related behaviors, and utilization of cessation treatments among patients at HCs. Therefore, this study updates and expands on previous findings by using data from the most recent HCPS, administered in 2014, to compare the descriptive characteristics of adult patients at HCs by smoking status, and to explore their cessation-related behaviors, including treatment utilization.

2. METHODS

2.1 Study Sample

The HRSA's Heath Center Patient Survey (HCPS) is an in-person, patient-level survey administered every five years in health centers that receive funding under Section 330 of the Public Health Service Act (Health Resources Services Administration, 2014). Data collection for the 2014 HCPS survey was completed between October 2014 and April 2015. Conducted in five languages, the survey included questions on health conditions and behaviors and sociodemographics (Health Resources Services Administration, 2014).

Detailed methods for the 2014 HCPS are provided elsewhere (Health Resources Services Administration, 2014). Briefly, a three-stage sampling procedure was used to select a nationally representative sample of patients from HRSA-funded health center patients of all ages. First-stage sampling units were grantees, second-stage units were eligible health

center sites within grantees, and third-stage units were patients. Patients who received services from a HRSA-supported health center in the past 12 months before the current visit were eligible to participate. A total of 7,002 of 7,659 eligible patients participated (91.4% response rate). Data became publicly available in 2018.

Our analysis excluded all participants under 18 years (n=1,410) and participants with missing data for cigarette smoking status (n=9), yielding a final sample of 5,583 respondents. This study was determined to be exempt by the Institutional Review Board at Case Western Reserve University.

2.2. MEASURES

2.2.1. Cigarette Smoking Status—Smoking status was determined by two questions: "Have you smoked at least 100 cigarettes in your entire life?" and "Do you now smoke cigarettes every day, some days, or not at all?" Respondents were classified as follows: never smokers reported smoking <100 cigarettes in their lifetime; current smokers reported smoking ≥100 cigarettes in their lifetime and currently smoked every day or some days; former smokers reported smoking ≥100 cigarettes in their lifetime and currently did not smoke. Former smokers were further divided into three groups: quit within the past year, 1-5 years ago, or more than 5 years ago.

2.2.2. Socio-Demographic Characteristics—Demographic variables known to be associated with smoking were selected for analysis, including gender, age, race, and ethnicity (Creamer et al., 2019). Urban or rural status of the respondent's HC was also recorded. Socioeconomic indicators included education, current employment status (employed, not employed, or not currently in workforce), and income relative to the federal poverty level. Health insurance status was coded as: uninsured; enrolled in any Medicaid or State Children's Health Insurance Program (SCHIP), including dual Medicaid-Medicare enrollment; enrolled in Medicare exclusively; and other insurance coverage (including employer or union, state health insurance exchange, private, and unspecified).

2.2.3. Health Characteristics—Health-related variables included self-described general health status (poor/fair vs. good/excellent) and physician diagnosis of hypertension, current asthma, diabetes, cardiovascular disease, cancer, or chronic obstructive pulmonary disease (COPD). Cardiovascular disease diagnosis included congestive heart failure, coronary heart disease, angina, heart attack, and stroke.

2.2.4. Behavioral Health—The Kessler Psychological Distress Scale was used to screen for mental distress in the past month (Prochaska et al., 2012). Kessler scores were classified as follows: ≥13 as severe psychological distress; 5-12 as moderate psychological distress; and <5 as no or low psychological distress. Self-reported mental health diagnoses were limited to physician-diagnosed general anxiety, panic disorder, schizophrenia, or bipolar disorder. For this analysis, the number of self-reported mental health diagnoses was categorized as none, 1, or ≥2. Information on past-year visit(s) for mental health care (yes/no) was also included.

Use of illicit substances in the past 3 months was defined as any non-medical use of the following: cocaine; amphetamine-type stimulants; inhalants; sedatives or sleeping pills; hallucinogens; opioids; and any other unspecified substances (excluding marijuana). Past-year alcohol consumption was derived from numeric responses to the survey item, "In the past 12 months, on how many days did you have 5 or more drinks of any alcoholic beverage?" Responses were categorized as 0-11 days, ≥12 days, or none in the past 12 months. Marijuana use in the past 3 months was coded as never, not in the past 3 months, and ≥ 1 time in the past 3 months.

2.2.5. Smoking Cessation Behaviors—Desire to quit smoking was assessed among current smokers using the survey question, "During the past 12 months, have you wanted to stop smoking?" (yes/no). The following covariates were also examined among current smokers: quit attempts in the past 12 months (yes/no); future plans to quit smoking for good (yes/no); receipt of advice to quit from any healthcare professional in the past 12 months (yes/no); and receipt of advice to quit from a healthcare professional at the HC in the past 12 months (yes/no).

Among former smokers, we examined use of smoking cessation treatments during the last quit attempt: counseling (use of a telephone quitline, smoking cessation program, and/or one-on-one counseling) and pharmacotherapy (use of nicotine replacement therapy, bupropion, and/or varenicline). Use of any cessation treatment was defined as use of any counseling modality or pharmacotherapy.

2.3. ANALYSIS

All analyses were conducted with R 3.5.1 (R Core Team, 2017) using the package "survey" for analysis of complex survey samples (Lumley, 2019). We examined the weighted distributions of sociodemographic, health, and behavioral health variables stratified by smoking status. We used chi-square tests to examine associations with smoking status; p-values <.05 were considered statistically significant. Post-hoc pairwise comparisons were performed with adjusted standardized residuals and Bonferroni adjustment for multiple comparisons. Chi-square tests were used to examine associations between cessation variables and desire to quit among current smokers. Among former smokers, associations between use of cessation treatments and time since quit were examined using chi-square tests. Per HRSA guidelines, unweighted cell sizes <30 were suppressed (Dept. of Health and Human Serivces and Health Resources and Services Administration, 2019).

We conducted a logistic regression model of predictor variables (including sociodemographic, health, and behavioral health characteristics and advice to quit) for desire to quit smoking among current smokers. Unadjusted odds ratios were calculated from bivariate logistic regression models of the outcome and each candidate predictor. A multivariable logistic regression model was then run with all candidate predictors to calculate adjusted odds ratios (Stoltzfus, 2011). Influential outliers were checked by examining residuals and Cook's distance. The effect of outliers in the model was not dramatic, and all observations in the sample were retained.

3. RESULTS

Table 1 summarizes the demographic, socioeconomic, and health characteristics for current smokers (28.1%), former smokers (19.2%), and never smokers (52.7%). Smoking status varied by sex, age, race/ethnicity, and education. Compared to former smokers, a greater proportion of current smokers were female (62.5%), aged 18-44 years (51.5%) and non-Hispanic white (68.0%), while a smaller proportion had received higher education past high school (29.0%).

Smoking status also varied by health characteristics. Compared to former or never smokers, current smokers were significantly more likely to report having fair or poor health. Current smokers were also significantly more likely to report ever having cardiovascular disease, COPD, or current asthma compared to never smokers. Behavioral health characteristics also varied by smoking status. Compared to former and never smokers, a greater proportion of current smokers reported severe psychological distress (23.9%) and multiple mental health diagnoses (46.3%). Smoking status varied by substance use. A greater proportion of current smokers reported: past 3 month use of illicit substances (8.7%); past 3-month marijuana use (28.3%); and ≥12 days in the last year drinking ≥5 alcoholic beverages (9.5%). Additionally, current smokers were significantly more likely to have sought mental health care in the past year (32.6%) than former (27.3%) and never smokers (14.2%).

Overall, 78.7% of adult HC patients who currently smoked reported a desire to quit in the past year (data not shown), 55.1% reported a past-year quit attempt, and 79.8% reported having future plans to quit for good (Figure 1). Additionally, 78.7% of patients who currently smoked reported receiving advice to quit from a healthcare professional in the last 12 months; a majority of these individuals (90.2%) reported receiving this advice at their HC. Desire to quit in the past year was associated with increased prevalence of making a past-year quit attempt ($p<0.001$) and future plans to quit ($p<0.001$). Among current smokers who wanted to quit (n=1417), 21.6% had plans to quit within the next 30 days, and 48.3% intended to quit within the next year (data not shown).

Among former smokers, 15.2% used any cessation treatment (counseling and/or pharmacotherapy) during their last quit attempt, 11.6% reported using any pharmacotherapy, and 9.6% reported using any counseling (Table 2). Only 6.0% of former smokers used both counseling and medication in their last quit attempt. Compared to those who had quit more than 1 year prior to the survey, a greater proportion of those who quit in the last year reported use of any treatment (30.6%) and use of pharmacotherapy (27.5%).

Table 3 shows modeling results for desire to quit smoking in the 12 months prior to the survey. In the fully adjusted model, non-Hispanic black and Hispanic identity, COPD diagnosis, ≥2 mental health diagnoses, and past 3-month marijuana use were significantly associated with an increased odds of desire to quit; age 45-64 years was significantly associated with a decreased odds of desire to quit relative to those aged 18-44.

4. DISCUSSION

Overall, data from the 2014 HCPS indicate that 28.1% of adult patients at federally funded health centers reported current cigarette smoking, slightly less than what was reported in the 2009 HCPS (30.9%) (Lebrun-Harris et al., 2015) and more than the overall 2014 U.S. adult smoking prevalence of 16.8% (Jamal et al., 2015). This estimate also exceeds 2013 estimates of any current tobacco use among patients at federally funded health centers (25.8%), though this estimate was based on health records rather than self-report (Flocke et al., 2017). Most adult HC patients who smoked reported a desire to quit (78.7%, 95%CI: 73.7%, 83.5%), which is similar to 2009 HCPS of 82.9% (Lebrun-Harris et al., 2015) and significantly higher than the 2015 national estimate of 68% (95%CI: 65.9%, 70.0%) reporting interest in quitting (Babb et al., 2017). Past 12-month desire to quit was associated with increased odds of having made a quit attempt and having a future plan to quit. Over half (55.1%) of patients who smoked reported a quit attempt in the last year, which is comparable to the national estimate of 55.4% in 2015 (Babb et al., 2017). A large majority (78.7%) of patients also reported having received advice to quit from a healthcare professional in the last year, and most reported receiving this advice at their HC, similar to what was reported in the 2009 HCPS (Lebrun-Harris et al., 2015). Nationally, only 57.2% of adults who smoke and visited a health care professional in the past year report receiving advice to quit from a healthcare professional in 2015 (Babb et al., 2017). Taken together, these findings suggest federally funded health centers may be engaging more patients in brief tobacco cessation interventions than health systems in general. This may be, in part, due to the requirement of HCs to annually report tobacco-related clinical quality measures to HRSA; linkage of clinical quality measures to payment is known to increase the rate of delivery of clinical cessation treatment (US Department of Health and Human Serivces et al., 2020).

Despite high levels of desire to quit smoking and receipt of advice to quit, adult HC patients who were former smokers reported low utilization of evidence-based cessation treatment, with fewer than 1 in 6 reporting use of any treatment (counseling or pharmacotherapy) and only 1 in 16 reporting using a combination of counseling and pharmacotherapy, which offers the best chance at successful cessation (Fiore et al., 2008; US Department of Health and Human Serivces et al., 2020). In this current study, smokers who attempted to quit in the past 12 months but were still smoking at the time of the survey were not asked to report what evidence-based cessation treatments they had used in their quit attempt, limiting the broader understanding of uptake and potential barriers to use. A recent study noted one in four federally qualified health centers with high patient tobacco-use prevalence (more than the median of 26%) reported not having access to clinical cessation supports which met patient needs (e.g., individual or group counseling or classes, fax or e-referral to state quitlines); other barriers to providing cessation support at federally qualified health centers included lack of insurance coverage, limited patient transportation, and variance in cessation coverage by insurance type (Flocke et al., 2019). In the current study, use of treatment was significantly higher among those who quit within 1 year prior to the survey compared to those who had quit more than 1 year prior. Evidence-based treatment was used by 30.6% of former smokers who had quit in the past year, close to the 2015 national estimate of 31.2%

(Babb et al., 2017), though these estimates may not be directly comparable as the national estimate includes treatment-supported quit attempts among both former (quit in last 2 years) and current (last year quit attempt) smokers.

The higher prevalence of treatment use seen among patients who had quit in the last year might be an indicator of increased treatment access. Such increased access could be due in part to improved insurance coverage of these treatments as set forth in several provisions of the Affordable Care Act (ACA) implemented shortly before and concurrent with the study period. For example, the ACA requires that preventive services receiving an A or B recommendation from the U.S. Preventive Services Task Force, including tobacco cessation (US Preventive Services Task Force, 2015), be covered by many insurance plans (Fox and Shaw, 2015). This requirement took effect for applicable private plans in September 2010; it also applies to expanded Medicaid which became available to states under the ACA beginning in January 2014 (Fox and Shaw, 2015). The ACA also required separate improvements in cessation coverage for enrollees in traditional Medicaid effective January 2014 (McAfee et al., 2015). Further increased access to cessation treatment could help increase treatment uptake, quit attempts, and overall quit success (Fiore et al., 2008; US Department of Health and Human Serivces et al., 2020).

Within the HC patient population, adults who currently smoke report worse overall health and higher prevalence of COPD and asthma than former or never smokers. Former smokers had higher prevalence of diabetes and cardiovascular disease than current or never smokers. This may be due to the older age of former smokers; in addition, these conditions may have prompted smoking cessation. This study suggests multiple opportunities for cessation intervention. For example, multivariable modeling demonstrated an increased desire to quit among those with a COPD diagnosis. As smoking cessation is critical to the treatment and management of COPD (Anthonisen, 2004), HCs could leverage this increased desire to quit to support utilization of evidence-based cessation treatments in this population. In contrast, we found a decreased desire to quit with increasing age. This is similar to national findings showing both a decreased desire to quit among older smokers compared to younger counterparts (Babb et al., 2017) and lower use of cessation treatment among older adults living below the federal poverty line compared to older adults living at or above the federal poverty line (Henley et al., 2019). Smoking cessation has health benefits for individuals at any age (US Department of Health and Human Serivces et al., 2020); there may be opportunities in healthcare encounters to reinforce this message and to support treatment access and use. Individuals in this study who had no desire to quit in the last year were less likely to report receipt of advice, quit attempts, and future plans to quit. This may point to a population that would benefit from more intensive support and reflects the importance of consistent intervention due to the variable nature of motivation to quit. Further research could better characterize the needs and barriers these individuals face to aid in developing optimal interventions to help them to quit.

The high prevalence of current smoking among individuals with mental health and substance use disorders (behavioral health conditions) is well-documented (Center for Behavioral Health Statistics, 2018; Jamal et al., 2015; Kalkhoran et al., 2019); our finding among HC patients that a greater proportion of adults who currently smoke reported psychological

distress, mental health diagnoses, and substance use is consistent with this previous research. This suggests opportunities for tobacco treatment for individuals with mental health and substance use disorders. Additionally, approximately one in three adult HC patients who smoked reported seeking mental health care in the last year, suggesting another opportunity for intervention. Approximately 93% of federally funded health centers provide mental health counseling and treatment and 67% provide substance use disorder services (Health Resources Services Administration, 2019); integration of tobacco dependence treatment into behavioral health care at these centers could provide additional access to cessation interventions. While addressing smoking cessation in individuals with co-occurring behavioral health conditions involves some special considerations (Baca and Yahne, 2009; Williams and Ziedonis, 2004), and behavioral health staffing and capacity remain a challenge nationwide (Substance Abuse and Mental Health Services Administration, 2013), patients with behavioral health conditions want to quit, are able to quit, and benefit from evidence-based treatments (Gfroerer et al., 2013; Schroeder and Morris, 2010). Addressing tobacco use and dependence in this context remains critical (Compton, 2018; Prochaska et al., 2017), and cessation approaches for HC patients can leverage the opportunities for intervention suggested by this study's findings.

There are some limitations to the current study. First, assessment of tobacco use in the 2014 HCPS does not cover the full spectrum of tobacco products, including cigarillos, cigars, water pipes, or e-cigarettes. As a result, this study likely underestimates the prevalence of tobacco product use and interest in tobacco cessation among patients at health centers. Second, comparisons to national estimates are likely an underestimation of differences as individuals seeking care at HCs are a subset of the national population. Third, this is a cross-sectional survey, limiting interpretation to associations only, not causal inferences. Fourth, the survey relies on self-report of current and past behavior and health status; responses could be influenced by recall bias. Finally, selection of participants in the HCPS was limited to those who had visited the HC in the prior 12 months, potentially limiting the generalizability of the results. However, this methodology is consistent with previous iterations of the HCPS and is more likely to produce estimates of persons who regularly seek care at HCs.

In light of the tobacco use burden among patients at federally funded health centers, future efforts could focus on understanding how best to support these patients in their desire to quit and how to increase their use of evidence-based cessation treatments. Future efforts could additionally focus on identifying and overcoming unique personal, provider, or health system barriers to connecting these populations with cessation treatments. Potential strategies to enhance treatment access and use might include: comprehensive, barrier-free insurance coverage of all evidence-based therapies; health systems change to integrate tobacco dependence treatment into routine clinical care; and targeted and tailored treatment supports for specific subpopulations (US Department of Health and Human Serivces et al., 2020). Increasing access to and use of cessation support within HCs may help reduce disparities in smoking prevalence and smoking-related health consequences, thus leading to reductions in smoking-related financial costs and improvement in population health (U.S. National Cancer Institute, 2017; US Department of Health and Human Serivces et al., 2020).

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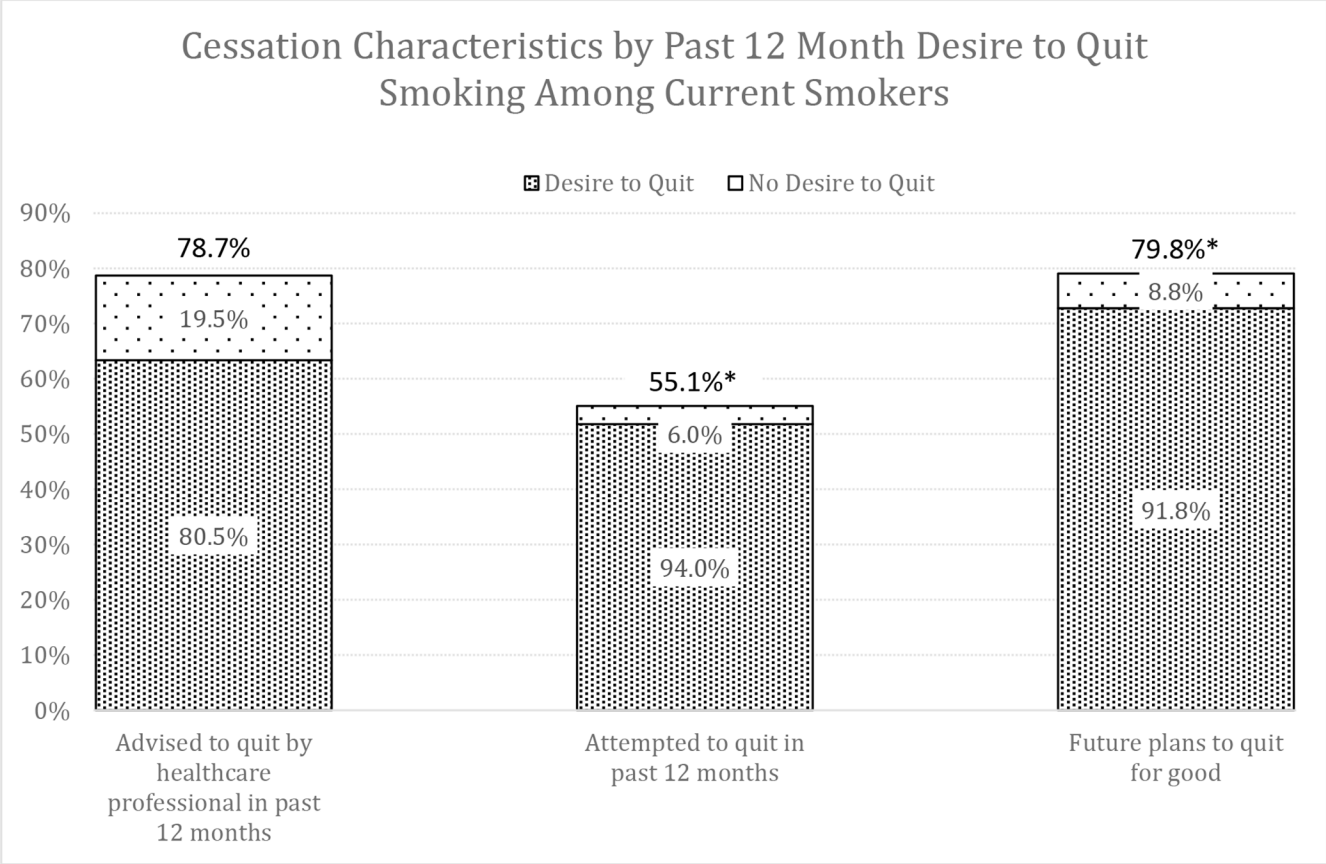

Fig 1.

Cessation Characteristics by Desire to Quit Smoking in past 12 months among adult health center patients who currently smoke (n=1735), Health Center Patient Survey, 2014.

* Indicates a significant difference (p<.001) in distribution of responses

Table 1.

Sample Characteristics of Respondents at Health Centers: Overall and by Smoking Status, Health Center Patient Survey, 2014

Variable	All Adult Patients Weighted % (n)	Current Smokers[a] Weighted % (n)	Former Smokers[b] Weighted % (n)	Never Smokers[c] Weighted % (n)	*p* [1]	Pairwise[2]
	n = 5583	**28.1% (1735)**	**19.2% (976)**	**52.7% (2872)**		
Sociodemographic Characteristics						
Female	64.1 (3513)	62.5 (884)	49.4 (491)	70.2 (2138)	<0.001	ab bc ac
Age					<0.001	
18-44	53.4 (2293)	51.5 (652)	31.7 (260)	62.2 (1381)		ab bc ac
45-64	35.8 (2739)	45.1 (1010)	45.1 (537)	27.4 (1192)		
65+	10.9 (551)	3.4 (73)	23.2 (179)	10.4 (299)		
Race/ethnicity					<0.001	ab bc ac
Non-Hispanic white	50.5 (1373)	68.0 (629)	60.9 (296)	37.5 (448)		
Non-Hispanic black	19.2 (1301)	17.9 (544)	15.5 (194)	21.1 (563)		
Hispanic	242 (1900)	9.7 (284)	18.9(307)	33.9 (1309)		
Non-Hispanic other	6.1 (1009)	4.4 (278)	4.7 (179)	7.5 (552)		
Education					0.021	ab bc ac
< HS diploma	34.4 (2439)	35.4 (712)	33.6 (391)	36.1 (1336)		
HS diploma/GED	28.7 (1517)	35.6 (566)	29.8 (246)	25.3 (705)		
> HS diploma	36.9 (1611)	29.0 (454)	36.6 (336)	38.6 (821)		
Employment					0.055	
Employed	37.3 (1782)	34.3 (401)	35.0 (331)	39.8 (1050)		
Not in labor force	46.8 (2760)	46.5 (913)	55.5 (517)	43.9 (1330)		
Unemployed	15.8 (1041)	19.2 (421)	9.5 (128)	16.3 (492)		
Federal poverty level (FPL)					0.106	
≤ 100% FPL	55.5 (3618)	63.4 (1268)	51.6 (577)	52.7 (1773)		
101%-199% FPL	29.0 (1424)	22.9 (342)	32.1 (284)	31.1 (798)		
≥ 200% FPL	15.5 (539)	13.6 (124)	16.2 (115)	16.2 (300)		
Health Center Location[3]					0.398	
Rural	52.1 (1663)	52.9 (471)	57.3 (320)	49.8 (872)		
Urban	47.9 (3920)	47.1 (1264)	42.7 (656)	50.2 (2000)		
Insurance Status[4]					0.267	
Uninsured	26.1 (1350)	25.7 (364)	23.6 (204)	27.3 (782)		
Any Medicaid	51.9 (3036)	57.5 (1075)	50.0 (535)	49.6 (1426)		
Medicare Only	4.4 (314)	3.2 (87)	7.3 (77)	4.0 (150)		
Other	17.6 (846)	13.7 (197)	19.0 (156)	19.1 (493)		
Health Characteristics						
Fair/poor health[5]	41.6 (2747)	48.2 (924)	41.2 (495)	38.1 (1328)	0.031	ab bc ac
Hypertension	20.8 (1353)	20.7 (483)	25.5 (276)	19.2 (594)	0.126	

Variable	All Adult Patients Weighted % (n)	Current Smokers[a] Weighted % (n)	Former Smokers[b] Weighted % (n)	Never Smokers[c] Weighted % (n)	*p* [1]	Pairwise[2]
	n = 5583	**28.1% (1735)**	**19.2% (976)**	**52.7% (2872)**		
Current asthma	15.8 (914)	21.4 (393)	17.7 (192)	12.1 (329)	0.001	ab bc ac
Diabetes	21.4 (1196)	16.9 (320)	33.4 (288)	19.4 (588)	<0.001	ab bc ac
Cancer	6.0 (381)	5.9 (141)	7.9 (76)	5.3 (164)	0.435	
Cardiovascular disease[6]	14.9 (767)	17.7 (295)	22.4 (199)	10.6 (273)	0.004	ab bc ac
COPD	7.5 (477)	13.8 (285)	12.8 (122)	2.1 (70)	<0.001	ab bc ac
Behavioral Health						
Psychological distress					<0.001	ab bc ac
Severe (Kessler Score ≥ 13)	14.5 (902)	23.9 (420)	12.1 (147)	10.3 (335)		
Moderate (5 ≤ Kessler Score < 13)	39.9 (2133)	41.6 (744)	44.8 (395)	37.1 (994)		
No/low (Kessler Score < 5)	45.7 (2494)	34.5 (552)	43.1 (430)	52.6 (1512)		
Mental health diagnoses[7]					<0.001	ab bc ac
None	52.4 (3015)	34.0 (645)	43.2 (496)	65.6 (1874)		
1	18.2 (911)	19.7 (299)	23.3 (163)	15.5 (449)		
≥ 2	29.4 (1657)	46.3 (791)	33.5 (317)	18.9 (549)		
Sought mental health care in past year	21.9 (1233)	32.6 (615)	27.3 (232)	14.2 (386)	<0.001	ab bc ac
Use of illicit substances in past 3 months[8]	4.0 (328)	8.7 (237)	3.1 (38)	1.7 (53)	<0.001	ab bc ac
Days drinking ≥5 alcoholic beverages in past 12 months					<0.001	ab bc ac
No alcohol in past 12 months	44.6 (2681)	31.2 (547)	43.1 (461)	52.3 (1673)		
0-12 days	50.0 (2428)	59.4 (879)	49.1 (445)	45.5 (1104)		
≥12 days	5.3 (428)	9.5 (284)	7.8 (61)	2.2 (83)		
Marijuana use in past 3 months					<0.001	ab bc ac
Never	56.9 (3338)	26.8 (525)	39.6 (460)	79.1 (2353)		
Not in past 3 months	31.0 (1490)	44.8 (722)	54.4 (430)	15.1 (338)		
At least once in past 3 months	12.1 (738)	28.3 (482)	6.0 (81)	5.7 (175)		

1. P-values were calculated by chi-square tests.

2. Pairwise tests were conducted using adjusted standardized residuals and Bonferroni correction of the alpha level for multiple comparisons.

3. Oversampling for racial/ethnic minorities led to a larger n in urban settings. However, the post-stratification weighting adjusted for urban/rural location, yielding the perceived discrepancy between unweighted n and weighted percentage.

4. "Any Medicaid" includes individuals enrolled in Medicaid or State Children's Insurance Program and is not mutually exclusive from other insurance types. "Medicare Only" reflects that Medicare is the patient's only coverage. "Other" includes insurance provided through an employer or union (can be current employer, former employer, or spouse), state health insurance exchange, private insurer, or other types of health insurance (e.g., CHAMPUS, TRICARE, CHAMP-VA, VA). "Uninsured" have responded "no" to all insurance options.

5. Self-reported health status where "fair or poor health" includes responses of 2 or 1, respectively, on a 5 point scale.

6. Cardiovascular disease includes self-report of doctor or health provider telling patient they had one or more of the following conditions: congestive heart failure, coronary heart disease, angina (angina pectoris), heart attack (myocardial infarction), or stroke.

[7] Self-report of doctor or health provider telling patient they had any of the following diagnoses: general anxiety, panic disorder, schizophrenia, or bipolar disorder.

[8] Includes cocaine, amphetamines, inhalants, sedatives, hallucinogens, opioids, or other substance for non-medical purposes. Does not include tobacco, alcohol, or marijuana.

Table 2:

Use of Smoking Cessation Interventions by Former Smokers at Health Centers: Overall and by Years Since Quitting Smoking

Cessation Treatment Used	All Former Smokers Weighted % (n)	Quit within Last Year Weighted % (n)	Quit 1 to <5 Years Ago Weighted % (n)	Quit ≥5 Years Ago Weighted % (n)	*p* [4]
	N = 976	**N = 140**	**N = 251**	**N = 500**	
Any cessation treatment	15.2 (150)	30.6 (44)	9.6 (50)	12.4 (56)	0.016
Pharmacotherapy[1]	11.6 (109)	27.5 (34)	6.7 (37)	8.4 (38)	0.005
Counseling[2]	9.6 (89)	---[3]	---[3]	---[3]	
Counseling and Pharmacotherapy	6.0 (48)	---[3]	---[3]	---[3]	

[1] Pharmacotherapy includes use of any of the following cessation medications: nicotine patch, gum, lozenge, nasal spray, or inhaler, buproprion, or varenicline.

[2] Counseling includes use of a telephone quit line, smoking cessation program, and/or one-on-one counseling

[3] Value suppressed due to cell count < 30.

[4] p-values based on results of Chi-square tests

Table 3.

Odds Ratios for Full Adjusted[1] Model of Desire to Quit in Past Year Among Adult Health Center Patients Who Smoke, Health Center Patient Survey, 2014.

Variable	Full Adjusted Model Adjusted Odds Ratio (95% CI)
Sociodemographic Characteristics	
Female (vs. Male)	1.24 (0.71, 2.16)
Age (vs. 18-44)	
45-64	**0.31 (0.16, 0.62)**
65+	0.33 (0.10, 1.07)
Race/ethnicity (vs. Non-Hispanic white)	
Non-Hispanic black	**4.40 (1.97, 9.85)**
Hispanic	**2.47 (1.17, 5.19)**
Non-Hispanic other	1.51 (0.43, 5.35)
Education (vs. <High School)	
High School	1.24 (0.58, 2.64)
> High School	1.46 (0.65, 3.25)
Employment (vs. Employed)	
Not in labor force	1.68 (0.79, 3.58)
Unemployed	1.29 (0.51, 3.29)
Federal Poverty Level (FPL) (vs. ≤100% FPL)	
101-199% FPL	1.49 (0.73, 3.06)
≥ 200% FPL	2.07 (0.49, 8.77)
Health Center Location Rural (vs. Urban)	1.08 (0.52, 2.21)
Insurance Status (vs. Other)[2]	
Uninsured	0.51 (0.17, 1.50)
Any Medicaid	0.63 (0.24, 1.66)
Medicare only	0.41 (0.12, 1.38)
Health Characteristics	
Fair/poor health (vs. good/excellent)[3]	0.92 (0.50, 1.69)
Hypertension (vs. None)	1.14 (0.65, 2.01)
Current asthma (vs. None)	0.88 (0.40, 1.93)
Diabetes (vs. None)	1.27 (0.61, 2.66)
Cancer (vs. None)	1.95 (0.77, 4.94)
Cardiovascular Disease (vs. None)[4]	1.53 (0.69, 3.40)
COPD (vs. None)	**5.15 (1.91, 13.88)**
Behavioral Health	
Psychological distress (vs. < Moderate)	
Moderate	0.85 (0.46, 1.60)
Severe	0.65 (0.32, 1.33)

Variable	Full Adjusted Model Adjusted Odds Ratio (95% CI)
Mental health diagnoses[5] (vs None)	
One	1.38 (0.64, 2.99)
Two or more	**2.14 (0.99, 4.64)**
Use of illicit substances in last 3 months[6] (vs. None)	0.96 (0.36, 2.53)
Days drinking ≥5 alcoholic beverages in past 12 months (vs. No alcohol in past 12 months)	
0-11	1.32 (0.69, 2.54)
≥12	0.94 (0.38, 2.33)
Marijuana use in last 3 months (vs. Never)	
Not in past 3 months	1.42 (0.69, 2.92)
At least once in past 3 months	**3.82 (1.71, 8.49)**
Advised to quit by healthcare provider in past 12 months (vs. Not)	1.40 (0.64, 3.09)

1. Full Adjusted Model includes adjustment for all other co-variates listed in the table.

2. "Any Medicaid" includes individuals enrolled in Medicaid or State Children's Insurance Program or dually-enrolled in Medicare and Medicaid. "Medicare Only" reflects that Medicare is the patient's only coverage. "Other" includes insurance provided through an employer or union (can be current employer, former employer, or spouse), state health insurance exchange, private insurer, or other types of health insurance (e.g., CHAMPUS, TRICARE, CHAMP-VA, VA). "Uninsured" have responded "no" to all insurance options.

3. Self-reported health status where "fair or poor health" includes responses of 2 or 1, respectively, on a 5 point scale.

4. Cardiovascular disease includes self-report of doctor or health provider telling patient they had one or more of the following conditions: congestive heart failure, coronary heart disease, angina (angina pectoris), heart attack (myocardial infarction), or stroke.

5. Self-report of doctor or health provider telling patient they had any of the following diagnoses: general anxiety, panic disorder, schizophrenia, or bipolar disorder.

6. Includes cocaine, amphetamines, inhalants, sedatives, hallucinogens, opioids, or other substances for non-medical purposes. Does not include tobacco, alcohol, or marijuana.