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Prevalence and Correlates of Switching to Another Tobacco Product to Quit Smoking Cigarettes

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Abstract

Introduction: The extent to which adults use other tobacco products to quit cigarette smoking is unknown. Using nationally representative data, we assessed the prevalence and correlates of cigarette smokers who tried switching to smokeless tobacco (SLT) or to other combusted tobacco to quit.

Methods: Data came from 12,400 current or former adult smokers who made a quit attempt in the past year and responded to the 2010-2011 Tobacco Use Supplement to the Current Population Survey. Demographics and smoking characteristics were computed among those switching to SLT, switching to other combusted tobacco, or trying to quit without using either strategy. Bivariate and multivariable logistic regression models identified correlates of using each strategy.

Results: Overall, 3.1% of smokers tried switching to SLT to quit, 2.2% tried switching to other combusted tobacco, and 0.6% tried both strategies. Correlates of switching to SLT were being male, young or middle-aged, from a region other than the northeast, a current nondaily smoker, smoking within 30 minutes of waking, and using medication during the last quit attempt; those who were black or Hispanic had lower odds of switching to SLT to quit. Correlates of switching to other combusted products were being male, black, young adult, smoking within 30 minutes of waking, and using counseling or medication during the last quit attempt.

Conclusion: Specific demographic groups report switching to other tobacco products to quit; data can be used to strengthen tobacco cessation efforts and to further understand attempts by certain groups to minimize harm from cigarette smoking.

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COMPETING INTERESTS

None

INTRODUCTION

Cigarette smoking causes cancer, heart disease, stroke, and lung diseases, and is responsible for more than 440,000 deaths per year (CDC, 2008; USDHHS, 2010). Quitting smoking can significantly reduce a person's risk of morbidity and mortality (Fiore et al., 2008; USDHHS, 2010). While a majority of adult cigarette smokers tried to quit in the past year (52% in 2010), only 32% of these reported using an effective cessation treatment (i.e., counseling and/or medication) (CDC, 2011). Use of other cessation strategies that have not been determined to be efficacious is common, including gradually cutting back on the number of cigarettes smoked, switching to "light" cigarettes, and switching to other tobacco products (Schauer, Malarcher, & Babb, 2013). Currently, tobacco companies are promoting use of other tobacco products as alternatives to smoking cigarettes (Curry, Pederson, & Stryker, 2011; Kozlowski, 2007). The public may view these products as cigarette smoking cessation aids. However, little is known about who reports switching to other tobacco products to quit smoking cigarettes and which tobacco products people report switching to.

While tobacco companies have marketed smokeless tobacco (SLT) as substitutes for cigarettes in a settings where one cannot smoke (Curry et al., 2011), they have not explicitly marketed them as smoking-cessation aids, perhaps due in part to regulatory limitations (Kozlowski, 2007). Few studies have assessed how common or effective switching to SLT to quit smoking cigarettes may be; and many of the published studies on this topic were funded by unrestricted grants from SLT manufacturers (Heavner, Rosenberg, & Phillips, 2009; Rodu & Phillips, 2008; Rodu, Stegmayr, Nasic, & Asplund, 2002; Tilashalski, Rodu, & Cole, 2005). Data from impartial sources do not appear to support anecdotal claims that SLT helps people quit smoking (Tomar, 2007; Tonnesen, Mikkelsen, & Bremann, 2008). Nationally representative data suggest that few cigarette smokers switch entirely from cigarettes to SLT, with most remaining dual users of cigarettes and SLT (Zhu et al., 2009).

Much less is known about whether or not cigarette smokers switch to cigars, pipes, or other combusted tobacco products in an attempt to quit. While per capita cigarette consumption has decreased in the past decade, consumption of non-cigarette combustible tobacco products has increased significantly (CDC, 2012). At least among young adults, some recent data suggest that cigarette and polytobacco users perceive other combusted tobacco products like cigars, cigarillos, or hookah to be less harmful than cigarettes (Latimer, Batanova, & Loukas, 2013). To our knowledge, no studies have assessed whether or not people report switching to other combusted products to quit smoking cigarettes. Furthermore, little is known about the sociodemographic characteristics of those who switch to other tobacco products in an effort to quit smoking cigarettes.

Knowledge of the prevalence and socio-demographic characteristics of smokers who report trying to switch to other tobacco products as a cessation strategy is vital to ongoing research as use of these products increases; findings could also be used for targeted education interventions. Therefore, the purpose of this study is to use nationally representative data to assess the prevalence and correlates of adult cigarette smokers who report switching to SLT (chewing tobacco, snuff, or snus) or to other combusted products (cigars, cigarillos, little filtered cigars, or pipes filled with tobacco) as a cigarette smoking cessation strategy.

METHODS

Data Source and Sample

The sample for this study comes from the 2010-2011 Tobacco Use Supplement to the Current Population Survey (TUS-CPS), a supplemental survey about tobacco use behaviors sponsored by the National Cancer Institute and administered as part of the U.S. Census Bureau's Current Population Survey. TUS-CPS utilizes a multi-stage sampling design to reach the civilian, non-institutionalized adult (age 18 years and older) population in all 50 U.S. States and the District of Columbia. Three months of data were collected from households via telephone and in-person in May 2010, August 2010, and January 2011. Only self-respondents who were current or former smokers who made a quit attempt in the past year were included in these analyses (n=12,400). More details about the TUS-CPS methodology can be found elsewhere (CPS, 2011).

Measures and Definition of Concepts

Current smokers were defined as persons who smoked at least 100 cigarettes in their life and reported current daily or nondaily smoking; former smokers were persons who reported smoking 100 cigarettes in their life and reported that they did not currently smoke. Former smokers who quit >1 year ago were not included in these analyses.

Switching to SLT and switching to other combusted tobacco products were assessed by asking current and former smokers who tried to quit or who successfully quit in the past year, "The time/last time you tried to quit smoking in the past 12 months, did you do any of the following: Try to quit by switching to smokeless tobacco such as chewing tobacco, snuff, or snus? Try to quit by switching to regular cigars, cigarillos, little filtered cigars, or pipes filled with tobacco?" Time to first cigarette and whether or not cigarettes smoked were usually menthol were assessed for current and former cigarette smokers (for former smokers: when you last smoked or 12 months ago); past 30-day use of cigars/cigarillos/little cigars, pipe, hookah, and smokeless tobacco were also assessed.

Use of cessation medications was assessed by asking current smokers who tried to quit and former smokers who quit in the past year if they had used the nicotine patch, nicotine gum/lozenge, nicotine nasal spray, nicotine inhaler, varenicline, buroprion, or another prescription pill for cessation during their last quit attempt. These groups were also asked about their use of counseling resources during their last quit attempt (use of a telephone help line, one-on-one counseling, or a class, clinic, or support group). Sex, race/ethnicity, age, education, and region were also collected. Education was computed only among those aged 25 years and older.

Statistical Analysis

Weighted frequencies, means, standard errors (SE) and 95% confidence intervals were computed for demographics, smoking characteristics, and cessation behaviors among current and former smokers who reported: (1) switching to SLT to try to quit (n=449), (2) switching to other combusted tobacco products to try to quit (n=339), or (3) trying to quit without using either of these switching strategies (n=11,680). Sixty-eight people reported trying to

use both switching strategies and are included in these analyses. Bivariate and multivariable logistic regression models were computed to identify adjusted correlates of trying to quit by switching to SLT or other combusted products, versus trying to quit without using that approach.

Analyses were conducted using SAS-callable SUDAAN Version 9.2 (RTI International, Research Triangle Park, N.C.). Balanced repeated replication techniques were used to estimate sampling variability, and weights were divided by three to account for the three months of data collection. If the standard error was >30% of the value, data were determined to be statistically unreliable and were suppressed. Alpha levels for all analyses were set at 0.05.

RESULTS

Of the total sample of smokers and former smokers who made a quit attempt in the past year, 3.1% reported trying to switch to SLT to quit smoking cigarettes, 2.2% reported trying to switch to other combusted products to quit, and 0.6% (n=68) reported trying both switching strategies to quit. Compared with non-switchers, a higher percentage of those trying to switch to SLT were male (86.1% vs. 51.5%), white (80.3% vs. 72.2%), between ages 18-24 years (26.7% vs. 17.2%), and smoked ≤ 30 minutes after waking (55.2% vs. 57.8%); a lower percentage were black (6.4% vs. 12.1%), age 45 years or older, from the Northeastern region of the U.S., and usually smoked menthol cigarettes (Table 1). About 42.9% of current and former smokers who said they tried to switch to SLT to quit reported current SLT use; 53.0% reported other current tobacco use (Table 1).

Compared with non-switchers, a higher percentage of those switching to other combusted tobacco products were male (70.6% vs. 51.5%), black (20.6% vs. 12.1%), between ages 18-24 years (26.6% vs. 15.7%), smoked ≤ 30 minutes after waking (50.0% vs. 39.5%), reported using counseling resources during their last quit attempt (10.7% vs. 5.3%), and reported using medication during their last quit attempt (36.8% vs. 30.0%); a lower percentage were white (64.9% vs. 72.2%) and age 25-44 years (34.6% vs. 42.0%; Table 1). Differences in the percentage of former cigarette smokers who had quit less than a year ago was similar between non-switchers and those trying to switch to SLT or combusted tobacco.

In multivariable logistic regression models, significant correlates of trying to switch to SLT were being male (AOR=6.0, 95% CI: 4.1, 8.7), between 18-24 or 25-44 years of age (vs. ≥65 years; AOR for 18-24 years=3.9, 95% CI: 2.1, 7.1, AOR for 25-44 years=2.4, 95% CI: 1.4, 4.1), from a region other than the northeast, a current nondaily smoker (vs. current daily; AOR=1.6, 95% CI: 1.1, 2.2), smoking ≤30 minutes after waking (vs. >30 minutes; AOR=1.8, 95% CI: 1.4, 2.4), and using medication during the last quit attempt (AOR=1.4, 95% CI: 1.1, 1.8). Those who were black, non-Hispanic or Hispanic had a lower odds of reporting trying to switch to SLT compared to white, non-Hispanic participants (AOR=0.4, 95% CI: 0.2, 0.8, and AOR=0.6, 95% CI: 0.4, 0.9, respectively).

Correlates of trying to switch to other combusted products were being male (AOR=2.2, 95% CI: 1.6, 2.9), being black (vs. white; AOR=1.9, 95% CI: 1.2, 2.9), being age 18-24 years (vs. ≥65 years, AOR=2.4, 95% CI: 1.3, 4.5), smoking ≤30 minutes after waking (vs. >30 minutes; AOR=1.5, 95% CI: 1.2, 2.0), and using counseling and medication during the last quit attempt (AOR=2.0, 95% CI:1.3, 3.0, and AOR=1.4, 95% CI:1.1, 1.9, respectively).

DISCUSSION

This study is among the first to attempt to characterize adult smokers who report trying to switch to SLT or to other combusted products as a cessation strategy. Comparing these data to other national surveillance data, it appears that switching to other tobacco products may be as common as use of counseling for cessation [e.g., 5.9% prevalence for switching vs. 5.9% prevalence for counseling use (CDC, 2011)].

Findings suggest that those attempting to switch to other tobacco products to quit smoking cigarettes are predominately male. State and national use data indicate that men are more likely to use other tobacco products (CDC, 2010). While findings suggest that being white, non-Hispanic is a significant correlate of trying to quit by switching to SLT, being black, non-Hispanic was a significant correlate of trying to quit by switching to other combusted products. This may be due to targeted marketing and decreased pricing of cigars, cigarillos, and little cigars in predominately African-American neighborhoods (Cantrell et al., 2013). Being a young adult (age 18-24 years) was associated with switching to SLT and switching to other combusted products, and being a current nondaily smoker was associated with switching to SLT to try to quit. These groups may also be targeted by tobacco company marketing to try non-cigarette tobacco products (Dave & Saffer, 2013).

The percentage of former cigarette smokers quit <1 year was not significantly different across groups, and being a former smoker was not associated with using either switching strategy. A more robust sample size is needed to assess whether or not those who try to switch from cigarettes to other products are successful in quitting cigarettes or remain dual users. Longitudinal research is needed to better assess how switching to other tobacco products to attempt to quit cigarettes impacts dual and polytobacco use over time.

The finding that using counseling during the last quit attempt was significantly associated with trying to quit by switching to other combusted products is concerning in that recommended counseling strategies should provide education on effective strategies to quit (Fiore et al., 2008). More research is needed to determine if counseling preceded, followed, or occurred concurrently with an attempt to switch to another tobacco product to quit. Current evidence does not suggest that switching to either SLT or other combusted products is an effective approach (Tomar, 2007; Tonnesen et al., 2008; Zhu et al., 2009); health professionals should encourage those interested in quitting to use evidence-based strategies, as outlined by the U.S. Public Health Service Guidelines on *Treating Tobacco use and Dependence* (Fiore et al., 2008).

This study is subject to a number of limitations. First, data are cross-sectional, and therefore no causal inferences can be drawn between reported cessation approaches and patterns

of tobacco product use. Second, data are self-reported, and are subject to recall and social-desirability biases. Third, we were limited by the surveillance questions, and were unable to analyze data separately by specific SLT products or combusted products (e.g., by snus users, chewing tobacco users, etc.). Thus, we cannot attribute specific characteristics to use of specific products for cessation, nor can we tell which products people were using in their cigarette cessation attempt. Furthermore, this particular surveillance system did not yet include electronic cigarettes. Finally, we do not have data on the trajectory and sequence of dual or polytobacco use. Did individuals begin by using multiple tobacco products and subsequently try to quit cigarette use while continuing to use other products? Or did they shift from exclusively smoking cigarettes to initiating use of non-cigarette tobacco products in an attempt to quit? Future studies should seek to provide more granular descriptions of socio-demographic characteristics and types of tobacco products used in order to better inform development of health education campaigns and other interventions.

Despite these limitations, this study provides important information about the types of smokers who may be utilizing these two cessation strategies. These data can be used to strengthen tobacco education, cessation, and control efforts and to further understand attempts by certain demographic groups to minimize harm from cigarette smoking.

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REFERENCES

Cantrell J, Kreslake JM, Ganz O, Pearson JL, Vallone D, Anesetti-Rothermel A, … Kirchner TR. (2013). Marketing little cigars and cigarillos: advertising, price, and associations with neighborhood demographics. American Journal of Public Health, 103(10), 1902–1909. doi: 10.2105/AJPH.2013.301362 [PubMed: 23948008]

CDC. (2008). Smoking-attributable mortality, years of potential life lost, and productivity losses--United States, 2000-2004. Morbidity and Mortality Weekly Report (MMWR), 57, 1226–1228. [PubMed: 19008791]

CDC. (2010). Any Tobacco Use in 13 States --- Behavioral Risk Factor Surveillance System, 2008. Morbidity and Mortality Weekly Report (MMWR), 59(30), 946–950. [PubMed: 20689499]

CDC. (2011). Quitting Smoking Among Adults -- United States, 2001-2010. Morbidity and Mortality Weekly Report (MMWR,, 60(44), 1513–1519. [PubMed: 22071589]

CDC. (2012). Consumption of Cigarettes and Combustible Tobacco -- United States, 2000-2011. Morbidity and Mortality Weekly Report (MMWR), 61(30), 565–569. [PubMed: 22854624]

Current Population Survey (CPS), January 2011: Tobacco Use Supplement Technical Documentation. (2011) Retrieved September, 2013, from http://www.census.gov/cps/methodology/techdocs.html

Curry LE, Pederson LL, & Stryker JE (2011). The changing marketing of smokeless tobacco in magazine advertisements. Nicotine and Tobacco Research, 13(7), 540–547. doi: 10.1093/ntr/ntr038 [PubMed: 21436294]

Dave D, & Saffer H (2013). Demand for smokeless tobacco: role of advertising. Journal of Health Economics, 32(4), 682–697. doi: 10.1016/j.jhealeco.2013.03.007 [PubMed: 23660106]

Fiore MC, Jaén CR, Baker TB, Bailey WC, Benowitz NL, Curry SJ, … et al. (2008). Treating Tobacco Use and Dependence: 2008 Update. Clinical Practice Guideline. Rockville, MD: U.S. Department of Health and Human Services. Public Health Service.

Heavner KK, Rosenberg Z, & Phillips CV (2009). Survey of smokers' reasons for not switching to safer sources of nicotine and their willingness to do so in the future. Harm Reduction Journal, 6, 14. doi: 10.1186/1477-7517-6-14 [PubMed: 19573235]

Kozlowski LT (2007). Effect of smokeless tobacco product marketing and use on population harm from tobacco use policy perspective for tobacco-risk reduction. American Journal of Preventive Medicine, 33(6 Suppl), S379–386. doi: 10.1016/j.amepre.2007.09.015 [PubMed: 18021913]

Latimer LA, Batanova M, & Loukas A (2013). Prevalence and Harm Perceptions of Various Tobacco Products Among College Students. Nicotine and Tobacco Research. doi: 10.1093/ntr/ntt174

Rodu B, & Phillips CV (2008). Switching to smokeless tobacco as a smoking cessation method: evidence from the 2000 National Health Interview Survey. Harm Reduction Journal, 5, 18. doi: 10.1186/1477-7517-5-18 [PubMed: 18500993]

Rodu B, Stegmayr B, Nasic S, & Asplund K (2002). Impact of smokeless tobacco use on smoking in northern Sweden. Journal of Internal Medicine, 252(5), 398–404. [PubMed: 12528757]

Schauer GL, Malarcher AM, & Babb SD (2013). Cutting back as a cessation strategy: prevalence, correlates, and relationship with quitting. [unpublished data].

Tilashalski K, Rodu B, & Cole P (2005). Seven year follow-up of smoking cessation with smokeless tobacco. Journal of Psychoactive Drugs, 37(1), 105–108. [PubMed: 15916256]

Tomar SL (2007). Epidemiologic perspectives on smokeless tobacco marketing and population harm. American Journal of Preventive Medicine, 33(6 Suppl), S387–397. doi: 10.1016/j.amepre.2007.09.009 [PubMed: 18021914]

Tonnesen P, Mikkelsen K, & Bremann L (2008). Smoking cessation with smokeless tobacco and group therapy: an open, randomized, controlled trial. Nicotine and Tobacco Research, 10(8), 1365–1372. doi: 10.1080/14622200802238969 [PubMed: 18686184]

USDHHS. (2010). How tobacco smoke causes disease: the biology and behavioral basis for smoking-attributable disease: A report for the Surgeon General. Rockville, MD.

Zhu SH, Wang JB, Hartman A, Zhuang Y, Gamst A, Gibson JT, … Galanti MR. (2009). Quitting cigarettes completely or switching to smokeless tobacco: do US data replicate the Swedish results? Tobacco Control, 18(2), 82–87. doi: 10.1136/tc.2008.028209 [PubMed: 19168476]

Table 1:

Prevalence of demographic, smoking, and cessation characteristics, by switching to smokeless tobacco[a], switching to other combusted tobacco[b], or switching to neither[c], among current[d] and former smokers[e] who tried to quit in the past year

		Switched to smokeless as a cessation strategy[a] n=449 Wt % (95%CI)	Switched to other combusted tobacco as a cessation strategy[b] n=339 Wt % (95% CI)	Tried to quit, but did not switch to smokeless or cigars[c] n=11,680 Wt % (95% CI)
Male Sex		86.10 (81.26, 89.85)	70.61 (64.22, 76.27)	51.47 (50.42, 52.52)
Race	White, Non-Hispanic	80.32 (75.49, 84.39)	64.89 (57.95, 71.25)	72.16 (71.08, 73.22)
	Black, Non-Hispanic	6.39 (3.99, 10.07)	20.56 (15.00, 27.50)	12.05 (11.22, 12.93)
	Other, Non-Hispanic	5.99 (3.90, 9.10)	4.85 (2.92, 7.98)	5.56 (5.06, 6.10)
	Hispanic	7.30 (4.72, 11.13)	9.70 (6.27, 14.71)	10.23 (9.55, 10.95)
Education[f]	<High School	14.55 (10.67, 19.55)	15.76 (11.75, 20.80)	14.32 (13.51, 15.17)
	= to High School or GED	42.40 (36.56, 48.45)	38.91 (33.00, 45.17)	36.90 (35.80, 38.01)
	Some college	30.47 (25.22, 36.29)	33.14 (27.61, 39.18)	33.42 (32.26, 34.59)
	College or more	12.58 (9.04, 17.24)	12.19 (8.53, 17.12)	15.36 (14.56, 16.21)
Age (years)	18-24	26.68 (20.93, 33.33)	26.57 (20.05, 34.31)	15.67 (14.76, 16.63)
	25-44	45.42 (39.70, 51.26)	34.63 (29.03, 40.69)	41.98 (40.92, 43.06)
	45-64	24.81 (20.20, 30.07)	33.74 (28.38, 39.56)	35.40 (34.39, 36.43)
	65+	3.10 (1.88, 5.06)	5.05 (3.13, 8.06)	6.94 (6.44, 7.49)
Region	Northeast	9.43 (6.25, 13.98)	18.48 (13.69, 24.46)	17.22 (16.32, 18.15)
	Midwest	30.02 (24.79, 35.84)	23.41 (18.77, 28.78)	>25.82 (24.81, 26.85)
	South	37.87 (32.85, 43.16)	41.64 (35.31, 48.26)	36.56 (35.27, 37.87)
	West	22.68 (18.17, 27.91)	16.48 (12.31, 21.71)	20.41 (19.42, 21.43)
Cigarette Smoking Frequency				
	Current daily smoker	55.20 (49.09, 61.16)	53.91 (47.03, 60.65)	57.84 (56.86, 58.81)
	Current nondaily smoker	25.91 (20.94, 31.59)	25.71 (20.38, 31.87)	23.71 (22.79, 24.65)
	Former smoker (quit<1 year)	18.89 (14.75, 23.87)	20.38 (15.60, 26.18)	18.46 (17.59, 19.36)
Time to first cigarette[g]	≤30 minutes	50.82 (44.81, 56.81)	50.02 (43.61, 56.44)	39.48 (38.46, 40.51)
	>30 minutes	45.95 (40.43, 51.57)	48.20 (41.96, 54.50)	55.98 (54.95, 56.99)
	It varies	--[k]	--[k]	4.54 (4.10, 5.03)
Usually smokes menthol[h]	Yes	22.53 (17.77, 28.14)	35.70 (30.04, 41.80)	31.61 (30.54, 32.71)
	No	74.81 (68.89, 79.94)	60.07 (53.97, 65.86)	65.13 (63.96, 66.29)
	No usual type	--[k]	--[k]	3.26 (2.87, 3.69)
Other current tobacco use[h]				

	Switched to smokeless as a cessation strategy[a] n=449 Wt % (95%CI)	Switched to other combusted tobacco as a cessation strategy[b] n=339 Wt % (95% CI)	Tried to quit, but did not switch to smokeless or cigars[c] n=11,680 Wt % (95% CI)
Any	53.03 (46.87, 59.10)	44.77 (38.28, 51.43)	6.28 (5.72, 6.90)
Cigars/Cigarillos/Little cigars	17.76 (13.41, 23.14)	40.64 (34.42, 47.18)	4.16 (3.70, 4.68)
Smokeless	42.91 (37.37, 48.64)	5.07 (2.95, 8.57)	1.53 (1.28, 1.83)
Pipe	--[k]	2.12 (0.97, 4.54)	0.70 (0.52, 0.96)
Hookah	--[k]	--[k]	0.92 (0.67, 1.21)
Used Counseling[h, i]	6.91 (4.69, 10.06)	10.66 (7.56, 14.82)	5.28 (4.86, 5.74)
Used Medication (Meds)[h,j]	34.19 (28.70, 40.14)	36.79 (31.15, 42.80)	29.97 (28.91, 31.04)
Used Either Counseling or Meds[h]	35.72 (30.09, 41.77)	39.10 (33.39, 45.13)	31.20 (30.16, 32.26)
Used Both Counseling and Meds[h]	5.31 (3.47, 8.03)	8.31 (5.50, 12.36)	4.02 (3.64, 4.43)

[a] Assessed by asking those who reported attempting to quit for one day or more in the past year, “The last time you tried to quit smoking in the past 12 months, did you: try to quit by switching to smokeless tobacco such as chewing tobacco, snuff, or snus?”

[b] Assessed by asking those who reported attempting to quit for one day or more in the past year, “The last time you tried to quit smoking in the past 12 months, did you: try to quit by switching to regular cigars, cigarillos, little filtered cigars, or pipes filled with tobacco?”

[c] Defined as those who tried to quit in the past year, but did not report either switching to smokeless or switching to cigars/pipes.

[d] Current smokers are those who reported smoking 100 or more cigarettes in their life, and currently smoke nondaily or every day

[e] Former smokers are those who reported smoking 100 or more cigarettes in their entire life, and current do not smoke, but quit within the past 12 months

[f] Restricted to those ≥ age 25: n=365 for switching to smokeless, n=284 for switching to cigars/pipes, n=10,461 for not switching to smokeless/ cigars.

[g] Missing ≤2% data

[h] Missing ≤1% data

[i] Counseling includes calling a tobacco quitline, one-on-one counseling support, or participating in a class, clinic, or support group.

[j] Medication includes use of nicotine patch, nicotine gum or lozenge, nicotine spray or inhaler, varenicline, bupropion, or other prescription medication for cessation.

[k] Estimates suppressed due to unreliability (Relative Standard Error > 40%).

Table 2:

Bivariate and multivariable logistic regression models assessing switching to smokeless tobacco[a], switching to other combusted tobacco[b], or switching to neither[c], among current[d] and former smokers[e] who tried to quit in the past year

		Switching to smokeless tobacco		Switching to other combusted tobacco		Tried to quit, but not by switching	
		Bivariate Analyses n=12,400 OR (95% CI)	**Multivariable Model n=12,131[f] AOR (95% CI)**	**Bivariate Analyses n=12,400 OR (95% CI)**	**Multivariable Model n=12,131[f] AOR (95% CI)**	**Bivariate Analyses n=12,400 OR (95% CI)**	**Multivariable Model n=10,350[f] AOR (95% CI)**
Sex	Male	5.75 (3.99, 8.31) ***	5.99 (4.13, 8.68) ***	2.17 (1.61, 2.92) ***	2.23 (1.63, 3.04) ***	0.29 (0.23, 0.37) ***	0.28 (0.22, 0.36) ***
	Female	Ref	Ref	Ref	Ref	Ref	Ref
Race	White, NH	Ref	Ref	Ref	Ref	Ref	Ref
	Black, NH	0.46 (0.28, 0.78) **	0.44 (0.25, 0.76) **	1.94 (1.31, 2.88) **	1.92 (1.24, 2.96) **	0.95 (0.68, 1.32)	0.96 (0.67, 1.38)
	Other, NH	0.97 (0.61, 1.53)	0.89 (0.55, 1.44)	0.97 (0.56, 1.68)	1.07 (0.60, 1.89)	1.04 (0.71, 1.51)	1.05 (0.71, 1.56)
	Hispanic	0.64 (0.40, 1.03)	0.58 (0.36, 0.93) *	1.07 (0.65, 1.76)	1.14 (0.69, 1.90)	1.36 (0.94, 1.98)	1.44 (0.98, 2.12)
Age	18-24	3.74 (2.02, 6.91) ***	3.86 (2.09, 7.13) ***	2.25 (1.20, 4.19) *	2.39 (1.27, 4.48) **	0.35 (0.21, 0.57) ***	0.33 (0.20, 0.54) ***
	25-44	2.42 (1.44, 4.08) **	2.39 (1.40, 4.08) **	1.11 (0.66, 1.86)	1.09 (0.66, 1.89)	0.59 (0.40, 0.88) *	0.60 (0.40, 0.89) *
	45-64	1.56 (0.91, 2.68)	1.41 (0.81, 2.44)	1.30 (0.77, 2.19)	1.13 (0.67, 1.89)	0.70 (0.46, 1.06)	0.77 (0.51, 1.18)
	65+	Ref	Ref	Ref	Ref	Ref	Ref
Region	Northeast	Ref	Ref	Ref	Ref	Ref	Ref
	Midwest	2.13 (1.32, 3.44) **	2.05 (1.26, 3.32) **	0.82 (0.55, 1.23)	0.84 (0.56, 1.26)	0.71 (0.52, 0.96) *	0.72 (0.53, 0.97) *
	South	1.88 (1.18, 3.01) **	1.95 (1.21, 3.13) **	1.04 (0.69, 1.56)	0.97 (0.65, 1.45)	0.67 (0.50, 0.91) **	0.67 (0.50, 0.90) **
	West	2.04 (1.24, 3.35) **	1.90 (1.14, 3.19) *	0.73 (0.46, 1.16)	0.74 (0.46, 1.19)	0.74 (0.53, 1.04)	0.76 (0.54, 1.08)
Cigarette Smoking Frequency							
	Current everyday smoker	Ref	Ref	Ref	Ref	Ref	Ref
	Current someday smoker	1.14 (0.85, 1.52)	1.56 (1.11, 2.19) **	1.16 (0.84, 1.60)	1.41 (0.97, 2.05)	0.86 (0.69, 1.07)	0.66 (0.51, 0.86) **
	Former smoker (quit<1 year)	1.06 (0.77, 1.47)	1.15 (0.81, 1.62)	1.18 (0.83, 1.68)	1.31 (0.91, 1.88)	0.84 (0.64, 1.09)	0.76 (0.58, 1.00)

		Switching to smokeless tobacco		Switching to other combusted tobacco		Tried to quit, but not by switching	
		Bivariate Analyses n=12,400 OR (95% CI)	**Multivariable Model n=12,131[f] AOR (95% CI)**	**Bivariate Analyses n=12,400 OR (95% CI)**	**Multivariable Model n=12,131[f] AOR (95% CI)**	**Bivariate Analyses n=12,400 OR (95% CI)**	**Multivariable Model n=10,350[f] AOR (95% CI)**
Time to first cigarette[g]							
	≤30 minutes	1.56 (1.23, 1.97) **	1.80 (1.36, 2.39) ***	1.45 (1.12, 1.89) **	1.54 (1.16, 2.05) **	0.69 (0.57, 0.84) ***	0.63 (0.50, 0.79) ***
	>30 minutes	Ref	Ref	Ref	Ref	Ref	Ref
	It varies	0.87 (0.41, 1.87)	0.95 (0.44, 2.02)	0.45 (0.18, 1.14)	0.43 (0.17, 1.09)	1.38 (0.78, 2.47)	1.38 (0.77, 2.47)
Used Counseling[h, i]							
	Yes	1.30 (0.84, 2.00)	1.40 (0.87, 2.26)	2.13 (1.46, 3.12) ***	2.00 (1.33, 3.03) **	0.63 (0.47, 0.84) **	0.62 (0.45, 0.86) **
	No	Ref	Ref	Ref	Ref	Ref	Ref
Used Medication[h, j]							
	Yes	1.20 (0.93, 1.56)	1.38 (1.03, 1.84) *	1.35 (1.05, 1.74) *	1.41 (1.07, 1.86) *	0.79 (0.64, 0.97) *	0.71 (0.57, 0.88) **
	No	Ref	Ref	Ref	Ref	Ref	Ref

*p<0.05

**p<0.01

***p<0.0001 Ref=reference group OR=odds ratio AOR=adjusted odds ratio

[a]Assessed by asking those who reported attempting to quit for one day or more in the past year, “The last time you tried to quit smoking in the past 12 months, did you: try to quit by switching to smokeless tobacco such as chewing tobacco, snuff, or snus?”

[b]Assessed by asking those who reported attempting to quit for one day or more in the past year, “The last time you tried to quit smoking in the past 12 months, did you: try to quit by switching to regular cigars, cigarillos, little filtered cigars, or pipes filled with tobacco?”

[c]Defined as those who tried to quit in the past year, but did not report either switching to smokeless or switching to cigars/pipes.

[d]Current smokers are those who reported smoking 100 or more cigarettes in their entire life, and currently smoking some days or every day.

[e]Former smokers are those who reported smoking 100 or more cigarettes in their entire life, and current do not smoke, but quit within the past 12 months.

[f]Denominator includes only those respondents with complete data on all variables used in the model.

[g]Missing ≤2% data

[h] Missing ≤1% data

[i] Counseling includes calling a tobacco quitline, one-on-one counseling support, or participating in a class, clinic, or support group.

[j] Medication includes use of nicotine patch, nicotine gum or lozenge, nicotine spray or inhaler, varenicline, bupropion, or other prescription medication for cessation.