



# Multiple tobacco product use among adults in the United States: Cigarettes, cigars, electronic cigarettes, hookah, smokeless tobacco, and snus



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## ABSTRACT

**Objective.** Nongigarette tobacco products are increasingly popular. Researchers need to understand multiple tobacco product use to assess the effects of these products on population health. We estimate national prevalence and examine risk factors for multiple product use.

**Method.** We calculated prevalence estimates of current use patterns involving cigarettes, cigars, electronic cigarettes, hookah, smokeless tobacco, and snus using data from the 2012 RTI National Adult Tobacco Survey (N = 3627), a random-digit-dial telephone survey of adults aged 18 and over. Associations between use patterns (exclusive single product and multiple products) and demographic characteristics were examined using Pearson chi-square tests and logistic regression.

**Results.** 32.1% of adults currently use 1 or more tobacco products; 14.9% use cigarettes exclusively, and 6.6% use one nongigarette product exclusively, 6.9% use cigarettes with another product (dual use), 1.3% use two nongigarette products, and 2.4% use three or more products (polytobacco use). Smokers who are young adult, male, never married, reside in the West, and made prior quit attempts were at risk for multiple product use.

**Conclusions.** Over 10% of U.S. adults use multiple tobacco products. A better understanding of multiple product use involving combustible products, like cigars and hookah, is needed. Multiple product use may be associated with past quit attempts.

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## Introduction

Although cigarettes are the most frequently used tobacco product among adults in the United States, other products are increasingly popular. In the U.S., 13.6% of adults and 25.1% of daily smokers report trying one or more other tobacco product (McMillen et al., 2012). Sales and advertising of smokeless tobacco products have increased in recent years (Delnevo et al., 2012; Federal Trade Commission, 2011). Similarly, sales of cigars, including little cigars and cigarillos, increased by approximately 140% between 1997 and 2009 (Maxwell, 2010). Hookah is also becoming more popular (Bover Manderski et al., 2012; Smith et al., 2011), with prevalence of ever use among adults in California increasing more than 40% between 2005 and 2008 (Smith et al., 2011).

New tobacco products have recently been introduced into the U.S. market. Snus, an oral low tobacco-specific nitrosamine moist snuff in packets, is associated with reduced cigarette smoking in Sweden

(Biener et al., 2011), though there are differences between Swedish products and U.S. products that may affect health differently (Foulds and Furberg, 2008). Electronic nicotine delivery systems, sometimes called “e-cigarettes” are new and widely available in the U.S. (Ayers et al., 2011). While e-cigarettes are not conventional tobacco products, U.S. courts have determined e-cigarettes to be tobacco products (Ashley and Backinger, 2012). Furthermore, the U.S. Food and Drug Administration (FDA) has also announced intent to assert jurisdiction over them as tobacco products (Ashley and Backinger, 2012). Researchers are beginning to study the use patterns associated with these products, sometimes collectively referred to as “other tobacco products” or OTPs (Freiberg, 2012), to understand their potential effects on individual and population health.

While no form of tobacco is safe, OTPs have different health risks (O'Connor, 2012), with combustible forms such as cigars and hookah posing risks that may be greater than cigarettes (Baker et al., 2000; Cobb et al., 2011; Delnevo, 2007). It is currently unknown whether any OTPs serve as “gateways” to cigarette uptake. To evaluate the potential population harm of OTPs, researchers must determine if they attract nonsmokers and if cigarette smokers use them in addition to traditional cigarettes (dual and polytobacco use), as substitutes for traditional cigarettes, or for cessation purposes. For example, studies show smokeless products are attractive to cigarette smokers wanting to quit (Popova and

*Abbreviations:* OTP, other tobacco product; aOR, adjusted odds ratio; ATS, Adult Tobacco Survey; CDC, Centers for Disease Control and Prevention; CASRO, Council of American Survey Research Organizations.

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Ling, 2013), and dual users of cigars and cigarettes are more likely to have tried quitting than exclusive cigarette users (Richardson et al., 2013).

Despite cigarette smokers' reports of multiple tobacco product use (Richardson et al., 2013), few studies have examined cigarette smokers' concurrent use of OTPs (McGrath et al., 2011). In 2001–2002, 1.19% of U.S. adults used cigarettes concurrently with another product (Backinger et al., 2008). Data from the Behavioral Risk Factor Surveillance System show the proportion of U.S. adults using more than one tobacco product varied from 2.5% in 2003 to 3.4% in 2008 (Bombard et al., 2007; CDC, 2010). Given the rapidly changing marketplace, these studies are outdated and do not account for newer products.

Our objectives were to (1) update prevalence estimates of multiple product use by including e-cigarettes, hookah, and snus to reflect the current marketplace; (2) identify demographic characteristics associated with multiple product use; and (3) examine whether quitting is associated with multiple product use.

## Methods

### Data

We use data from the 2012 RTI National Adult Tobacco Survey (N = 3627). The National ATS is a nationally representative sample collected annually since 2007. The 2012 collection of the National ATS dataset occurred from March 2012 to August 2012 and was funded by the Bureau of Tobacco Free Florida. The 2012 National ATS is a probability sample of the non-institutionalized, civilian United States (50 states and DC) adult population aged 18 years and over resulting from list-assisted random digit dialing (RDD) telephone sampling. The sample follows a stratified dual frame design, with the two frames consisting of a random digit dial (RDD) frame containing landline phones and a cell phone frame. The CASRO<sup>1</sup> response rates were 22.9% for cell phone respondents and 27.6% for landline respondents. Sampling weights were poststratified to population totals based on telephone usage (landline, cell, or both), age, race/ethnicity, sex, and geographical region.

Cigarette smoking status was determined by asking: "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?" Current cigarette smokers were defined as individuals who smoke now (every day or some days) and have smoked at least 100 cigarettes. Current use of OTPs was assessed by asking all respondents if they now use each OTP (cigars [cigars, cigarillos, or little cigars], e-cigarettes, hookah [hookah or water pipe], smokeless tobacco [chewing tobacco, snuff, or dip], and snus) every day, some days, rarely, or not at all. Similar to other studies (Adkison et al., 2013), the item asking respondents to report their current use of "electronic cigarettes" did not specify nicotine content. Respondents reporting every day, some days, or rarely were defined as current users.

Current cigarette smokers who did not report current use of any OTPs were categorized as *exclusive cigarette users*. Current OTP users who reported current use of only one product were categorized as *exclusive users* with respect to each OTP measured. Prevalence was also reported for subgroups of multiple product users, including *dual users* (current cigarette smokers who reported using one other product) and *polytobacco users* (respondents who reported using three or more other products). Some respondents did not report using cigarettes but did report using two OTPs. These cases were simply labeled as "two OTP use." Prevalence estimates reported here included noncigarette smoking multiple product users to be exhaustive; however, further analyses were restricted to cigarette smokers.

Demographic characteristics included age, sex, race/ethnicity, income, education, marital status, and U.S. Census region. Race/ethnicity was categorized as non-Hispanic white, non-Hispanic black, Hispanic, non-Hispanic other, and non-Hispanic multiracial. Income was categorized as less than \$25,000, \$25,000–\$49,999, and \$50,000 or above. Education was categorized as less than high school, high school, some college, and college degree or more. Marital status was categorized as married, separated/widowed/divorced, never married, and living with a partner. U.S. Census regions of residence were Northeast, Midwest, South, and West.

Individuals who stopped smoking cigarettes for 1 day or longer in the past 12 months because they were trying to quit smoking were categorized as having

made a recent quit attempt. Individuals also reported whether they plan to quit smoking cigarettes within the next 6 months or 30 days.

Weighted estimates of the prevalence of exclusive product use and multiple product use were calculated. Associations between multiple product use and other characteristics were examined using Pearson chi-square tests and logistic regression. All analyses were completed using Stata version 12 in 2013.

## Results

Among U.S. adults, 32.1% currently use one or more tobacco products; 14.9% currently use cigarettes exclusively, 6.6% currently use one OTP exclusively, and 10.6% use multiple tobacco products (Table 1).

In addition to the percentages of all U.S. adults reported in Table 1, we also calculated the percentages of dual users for each product measured (cigars, hookah, smokeless tobacco, snus, and e-cigarettes). Of the dual users in our sample, the largest group currently smokes cigarettes and cigars (37.0%). About one-quarter of dual users used e-cigarettes (28.1%), and another quarter reported hookah (25.5%) as their second product. Relatively few dual users smoked cigarettes and used smokeless tobacco (6.2%) or snus (3.1%). The majority of dual users reported using cigarettes with combustible products (cigars or hookah).

Weighted percentages of multiple product use among current smokers, including dual and polytobacco use, are reported in Table 2. Tobacco use patterns differed significantly for young adults, males, never married, and West census region residents. Multiple product use was least prevalent among the middle aged (21.9% for those aged 45 to 54) and most prevalent among young adults (62.4% for those aged 18 to 24). For categories of smokers aged 55 to 64 and aged 65 or older, the prevalence of multiple product use increased to 39.5% and 35.8%, respectively. Close to half (46.5%) of male smokers reported multiple product use, compared with 26.4% of females. Never married smokers used multiple products at higher rates (52.0%) than those who were currently married (26.9%). Smokers residing in the West census region reported using multiple products more frequently than those in any other region (54.4%). Differences in multiple product use rates across race/ethnicity, income, and education categories were not significant.

Adjusted odds ratios (aOR) calculated using logistic regression are reported in Table 3. The results for multiple product use are relative to exclusive cigarette use and adjusted for all demographic factors listed in the methods section. Smokers who made a quit attempt were at

**Table 1**

Current tobacco product use among adults in the United States, National Adult Tobacco Survey 2012 (N = 3507).

Current tobacco product use	N	Weighted %(95% CI)
<b>Exclusive single product use</b>	<b>749</b>	<b>21.5%(19.6%, 23.3%)</b>
<i>Tobacco</i>		
Cigarette	532	14.9%(13.3%, 16.5%)
Cigar	110	3.2%(2.5%, 4.0%)
Hookah	45	1.3%(0.9%, 1.7%)
Chew smokeless tobacco	43	1.6%(0.9%, 2.3%)
Snus	4	0.1%(0.0%, 0.2%)
<i>Non-tobacco</i>		
E-cigarette	15	0.4%(0.2%, 0.7%)
<b>Multiple product use</b>	<b>328</b>	<b>10.6%(8.5%, 12.7%)</b>
<i>Dual product use</i>		
Cigar and cigarettes	77	2.6%(1.7%, 3.4%)
Hookah and cigarettes	26	1.8%(0.0%, 3.6%)
Smokeless tobacco and cigarettes	15	0.4%(0.2%, 0.7%)
Snus and cigarettes	6	0.2%(0.0%, 0.4%)
E-cigarette and cigarettes	73	1.9%(1.3%, 2.6%)
<i>Two noncigarette product OTP use</i>		
Polytobacco use	85	2.4%(1.8%, 3.0%)
<b>No current tobacco use</b>	<b>2430</b>	<b>67.9%(65.6%, 70.3%)</b>

NOTE: Current cigarette users responded that they had smoked at least 100 cigarettes in their life and now smoke "some days" or "every day." Current users of other tobacco products responded that they now use a product "some days" or "every day." Polytobacco use was defined as current use of three or more tobacco products.

<sup>1</sup> CASRO response rates are calculated based on a standard formula developed by the Council of American Survey Research Organizations (CASRO, 1982).

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