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Patterns of tobacco use and tobacco-related psychiatric morbidity and substance use among middle-aged and older adults in the United States

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Abstract

Objectives—To examine prevalence of tobacco use and identify psychiatric symptoms and substance use correlates of tobacco use comparing adults 50–64 years of age with those 65+ years of age (N=10,891).

Methods—Data were from the 2008–2009 U.S. National Surveys on Drug Use and Health.

Results—Past-year tobacco use was one-half as frequent among adults aged 65+ years (14.1%) compared to adults aged 50–64 years (30.2%); the latter group surpassed the former in rates of cigarette smoking (24.8 % vs. 10.6%), daily cigarette smoking (16.5% vs. 7.1%), cigar smoking (7.4% vs. 2.3%), and smokeless tobacco use (2.5% vs. 1.7%). Increased odds of cigarette smoking were noted among men, whites, African Americans, and those who had less education, had lower income, were not currently married, or were binge drinkers or illicit/non-medical drug users. In controlled analyses, odds ratio in those 65+ years of age who had smoked during the past year was 2.2 for binge drinking and 3.5 for illicit or non-medical drug use. Odds ratio of binge drinking among those 65+ years of age for cigar smokers during the past year was 3.1. Past year cigarette smoking was not associated with reports of symptoms of depression or anxiety in the 65+ age group.

Conclusions—Tobacco use is less prevalent among adults 65+ years of age yet continues to be strongly associated with binge drinking and illicit or non-medical drug use. Preventive efforts to decrease these substance use problems should include programs to decrease tobacco use.

Keywords

Cigarette smoking; cigar smoking; older adults; smokeless tobacco use; epidemiology; binge drinking, substance use, depression, anxiety

Introduction

Like cigarette smoking, smokeless tobacco use, cigar, and pipe smoking all contribute to addiction, cancers, heart disease, and respiratory conditions (Henley et al., 2004; National Cancer Institute [NCI], 2011a; NCI, 2011b; Shapiro et al., 2000; Wipfli & Samet, 2009). Due to aging-related changes in health status (Gibson et al., 2010; Gooneratne et al., 2010;

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Kelly-Hayes, 2010), tobacco use affects older adults by exacerbating existing diseases, causing poorer physical functioning, prompting costly treatment use, and increasing mortality (Lacroix & Omenn, 1992; Tice et al., 2006). Tobacco use cessation is critical for older adults because it reduces functional impairments and mortality associated with respiratory and cardiovascular diseases (Lacroix & Omenn, 1992; U.S. Department of Health and Human Services [USDHHS], 2010; Wannamethee et al., 1995).

A less explored area is the impact of tobacco use, specifically use of different tobacco products, on mental health and substance use among older adults. In previous population studies, mental illness is associated with higher rates of smoking and higher levels of smoking among smokers though the association may be lower at higher ages (Lawrence et al., 2009). In one study, smoking was not associated with binge drinking in community subjects 50+ years of age (Chou et al., 2011). Yet the studies are limited, and we know little about comorbidities related to tobacco use, psychiatric symptoms, and substance use among older adults.

The benefit of decreasing the risk for stroke among older adults appears particularly evident among non-heavy smokers (Wannamethee et al., 1995). Unfortunately, research has suggested a low rate of smoking cessation among older adults. In a community sample of adults aged 65+ years, the annual cessation rate among smokers was 10% (Salive et al., 1992). In 1998, 35% of adults aged 65+ years reported a quitting attempt (stopping smoking 1+ day in an attempt to quit) compared with 42% of adults aged 25–44 years and 37% of those aged 45–64 years (USDHHS, 2000). In 2007, 25% of current smokers aged 65+ years reported a quitting attempt compared with 40% of current smokers aged 25–44 years and 38% of those aged 45–64 years (Center for Disease Control and Prevention [CDC], 2011). Furthermore, an estimated 22–43% of smokers aged 65+ years have received cessation advice from a healthcare provider in the past year (Doolan & Froelicher, 2008; USDHHS, 2010). These data reveal a need to identify subgroups at risk for tobacco use to inform prevention and to improve cessation efforts for older adults, especially those who may concurrently experience psychiatric symptoms or engage in potentially dangerous use of psychoactive substances.

In 1998, cigarette smoking, smokeless tobacco use, and cigar smoking among American adults aged 18+ years were 24%, 2.6%, and 2.5%, respectively; the corresponding rates among adults aged 65+ years were 11%, 1.8%, and 0.9% (USDHHS, 2000). One target of *Healthy People 2010* was to reduce these rates among adults aged 18+ years to 12%, 0.4%, and 1.2%, respectively, by 2010 (USDHHS, 2000). However, cigarette smoking among adults remains common. The 2009 U.S. National Health Interview Survey indicated that 21% of adults aged 18+ years were current cigarette smokers (CDC, 2010). State-level survey data from 2003–2007 have estimated that 3.5% of adults aged 18+ years used smokeless tobacco and 6.4% smoked cigars (McClave et al., 2010). In comparing these rates with the 1998 baseline rates in *Healthy People 2010*, it appears that smokeless tobacco use and cigar smoking have increased and this increase includes persons 65+ years of age. (USDHHS, 2000; USDHHS, 2001).

Despite older adults' heightened risk for tobacco's adverse effects, studies on correlates of tobacco use have focused mainly on adolescents or adults in general. Research data on demographic and mental health/substance correlates of various types of tobacco use among older adults are clearly needed given both the growing number of baby boomers (persons born between 1946–1964) who have an elevated risk for substance use (Blazer & Wu, 2009a; Blazer & Wu, 2009b; Wu & Blazer, 2011) and the low rates of smoking cessation among older cigarette smokers (Doolan & Froelicher, 2008; USDHHS, 2000). In light of these needs, we examined in this paper the prevalence and correlates of tobacco use

(cigarettes, cigars, smokeless tobacco, and pipe tobacco) among adults aged 50–64 years of age and 65+ years of age. Individuals aged 50–64 years (the baby boomers) are included because they represent a high-risk group for substance use and to help inform intervention needs as this group ages (Wu & Blazer, 2011). To improve the study findings' generalizability to population subgroups, the data were drawn from the 2008–2009 National Survey on Drug Use and Health (NSDUH). Given that anti-smoking campaigns have focused primarily on adolescents, we examined age of onset of tobacco use to guide secondary prevention of the use of tobacco. Furthermore, studies have found an association between tobacco use and other substance use, as well as depression/anxiety, but the latter association has been inconsistent or based on descriptive results in the older population (Janssen et al., 2010; Sachs-Ericsson et al., 2010). We determined whether tobacco use increases the odds of binge drinking, illicit/nonmedical drug use, anxiety, and depression.

Methods

Sample

This study sample is drawn from the public-use files of the 2008–2009 NSDUH (Substance Abuse and Mental Health Services Administration [SAMHSA], 2009, 2010), an annual survey that provides population estimates of substance use and health status of individuals aged 12 years in the United States. Its sampling frame covers approximately 98% of the total U.S. population aged 12 years and uses multistage area probability sampling methods to select a representative sample of the civilian non-institutionalized population. The target population includes residents of households from the 50 states (including shelters, rooming houses, and group homes; civilians residing on military base) plus the District of Columbia.

Respondents were interviewed privately at their places of residence. Data collection methods involved a combination of computer-assisted personal interviewing for demographic items and audio computer-assisted self-interviewing for sensitive items to increase the validity of responses (i.e., all questions related to substance use and health-related conditions). Audio computer-assisted self-interviewing provided respondents with a highly private and confidential setting in which to answer substance use and mental health questions. Questions were displayed on a computer screen and read through headphones to respondents, who then entered answers directly into the computer.

From 2008–2009, approximately 68,000 unique individuals aged 12 years completed the survey yearly; weighted response rates for household screening and for interviewing were 89% and 74–76%, respectively. This study focused on adults 50+ years. The analysis of pooled data used for this study is appropriate (SAMHSA, 2009).

Study variables

Sociodemographics—Age, sex, race/ethnicity, education, current employment status, current marital status, annual family income, and county type (large, small, and non-metropolitan) were examined. Age grouping in adults was defined by NSDUH; due to confidentiality considerations, individual age was not available from the public-use files so age could only be grouped as 50–64 years and 65+ years. Race was evaluated separately from ethnicity. Therefore, our categorization for race/ethnicity included: non-Hispanic white, non-Hispanic black (African American), Hispanic, and non-Hispanic others. Because of a small sample size in the 50+ population, multiple race was combined with Asian, Pacific Islander, and Native American.

Tobacco use—Tobacco use was defined as any use of cigarettes, chewing tobacco (coarsely shredded tobacco that is sold in pouches of loose tobacco leaves or in a “plug” or

“twist” form), snuff or dip (a finely ground form of tobacco that usually comes in a container called a tin), cigars (big or little cigars, cigarillos), and pipe tobacco (smoking tobacco in a pipe) in the past year. Respondents also were asked about their age of first use. For pipe tobacco use, past-year use and age of onset were not assessed; past-month use was analyzed. Therefore, past-year tobacco use does not include pipe tobacco use more than 30 days ago but within 12 months of the interview. Smokeless tobacco use included use of chewing tobacco or snuff/dip (SAMHSA, 2009). For the analyses, if a subject endorsed one type of product, they were included in that analyses (e.g. use of smokeless tobacco) even if they used only that product or multiple products.

Other substance use—Alcohol use was defined as consuming 1 drink of alcoholic beverage and excluded the use 1–2 sips of a drink during the past year. A “drink” was defined as a can or bottle of beer; a wine cooler or a glass of wine, champagne, or sherry; a shot of liquor; or a mixed drink containing liquor. Binge drinking was defined as drinking 5 drinks on the same occasion on at least 1 day within the past 30 days (Blazer & Wu, 2009a; SAMHSA, 2009).

The NSDUH assessments of non-medical use of prescription drugs included a detailed verbal description of the four drug classes (prescription pain relievers, sedatives, tranquilizers, and stimulants) and lists of qualifying drugs of each group. Non-medical was defined as any self-reported use of any of the four drug classes (prescription pain relievers, sedatives, tranquilizers, and stimulants) that was not prescribed for the respondent, or that the respondent took only for the experience or feeling they caused (see Blazer and Wu, *J Am Geriatr Soc.* 2009). Drug use included illicit or non-medical use of marijuana/hashish, cocaine/crack, hallucinogens, inhalants, heroin, opioid analgesics, sedatives, tranquilizers, or stimulants in the past year.

Mental health conditions—Past-year anxiety disorder and depression were assessed by a series of discrete questions: “Did a doctor or other medical professional tell you that you had [the specific condition] in the past 12 months?”

Validity and Reliability of the Data—To reduce biases associated with self-reports, NSDUH has used the combination of computer-assisted personal interviewing and audio computer-assisted self-interviewing to increase the accuracy of self-reports (e.g., through increasing privacy and providing assurances that responses will remain confidential) (Turner et al., 1998), and these practices have been found to improve the quality of the data (Chromy et al., 2009; Gfroerer et al., 2002). Results from a reliability study of 3136 individuals using an interview and reinterview method further show a very high level of response consistency for survey questions related to cigarette use (Kappa: 0.92–0.93), alcohol use (Kappa: 0.83–0.90), and marijuana use (Kappa: 0.82–0.93) (Chromy et al., 2009).

Data analysis

We examined the frequency of study variables and calculated prevalence rates of tobacco use by age, sex, and race/ethnicity using χ^2 tests. Sociodemographic profiles of cigarette smoking, cigar smoking, smokeless tobacco use, and daily cigarette smoking were determined using logistic regression analyses. We then examined whether tobacco use increased odds of binge drinking, drug use, anxiety disorder, and depression while holding constant the potentially confounding influences of sociodemographic variables. The potential interaction effects between tobacco use and other substance use were explored (Brick, 2004). All analyses were conducted with SUDAAN (Research Triangle Institute, 2005) to take into account NSDUH's complex survey features (clustering, weighting). All estimates presented here are weighted except for sample sizes (unweighted).

Results

Study sample

Adults aged 65+ years constituted 40% of the total sample (n=10,891). Of the total sample, 54% were women and 23% were non-white. There were no significant yearly differences in the distributions of all sociodemographic variables examined between the 2008 and 2009 samples. Sixty per cent of the sample fell into the 50-64 age range.

Prevalence of tobacco use (Table 1)

Overall, 24% of adults aged 50+ years (30% in men; 18% in women) reported tobacco use in the past year (cigarette smoking, 19.1%; cigar smoking, 5.4%; smokeless tobacco use, 2.2%); 12.7% were current daily cigarette smokers; 0.7% smoked tobacco in a pipe during the past month.

Adults aged 50–64 years, men, and African Americans had higher rates of cigarette smoking, cigar smoking, smokeless tobacco use, and daily cigarette smoking than adults aged 65+ years, women, and Hispanics. Smokeless tobacco use and daily cigarette smoking were more prevalent among whites than Hispanics.

Patterns of tobacco use among tobacco user

Among all past-year tobacco users (n=2,682), 14% reported use of 1 tobacco product. Adults aged 50–64 years were more likely than adults aged 65+ years to use 1 product (15.6% vs. 9.1%). While 69% of cigarette smokers started smoking before adulthood (<18 years), the majority of daily cigarette smokers (51%), past-year cigar users (77%), and past-year smokeless tobacco users (60%) initiated use in adulthood. Of note, 11.2% of past-year cigar users and 6.4% of past-year smokeless tobacco users initiated use at the age of 50+ years.

Adjusted odds ratios (AOR) of correlates of tobacco use (Tables 2 and 3)

Adjusted logistic regression analyses found the following among subjects who were 50-64 years of age: (a) those subjects who were male, white, African-American, less educated, not currently married, and considered “low income” had increased odds of past year cigarette smoking; (b) those who were male, African-American, and divorced/widowed/separated had increased odds of cigar smoking; (c) those who were male, white, African-American, of other race, less educated, and residents of small or non-metropolitan areas had increased odds of smokeless tobacco use; and (d) those who were male, white, African-American, of other race, less educated, and not currently married and whose yearly income was <\$75,000 had increased odds of daily cigarette smoking. The regression analysis found that subjects 65+ years of age followed the same pattern except the odds were much greater for males vs. females to use cigars and less to use smokeless tobacco. There was little difference across race/ethnicity for daily cigarette smoking in the 65+ age group compared to the 50-64 age group.

AOR of other psychiatric symptoms and substance use (Table 4)

The associations between tobacco use and psychiatric symptoms/substance use indicators were then examined by adjusted logistic regression analysis to control for the potentially confounding effects of sociodemographics (age, sex, race/ethnicity, education, marital status, family income, employment status, county type, survey year).

Table 4 shows that past-year cigarette smokers were about 2 to 3 times more likely than adults who did not smoke cigarettes to engage in binge drinking or illicit/nonmedical drug

use regardless of age group and to have an anxiety disorder in the 50–64 age group during the past year. Cigar use increased odds of binge drinking and illicit/nonmedical drug use in the 50–64 age group, and it also increased binge drinking in the 65+ age group.

Lastly, we examined whether binge drinking or drug use influenced associations between tobacco use and health conditions. Associations of cigarette smoking (any and daily) with anxiety disorder, remained significant (AOR: 1.53–2.31, $P<0.05$) after adjusting for binge drinking and drug use (data not shown). Additional analyses explored the interaction effect of cigarette smoking with binge drinking and drug use respectively; none were significant.

Discussion

One in 7 adults aged 65+ years used tobacco; close to one-third of adults aged 50–64 years did so. Adjusted analyses show that adults aged 50–64 years were 3 to 4 times more likely than those aged 65+ years to smoke cigarettes daily and smoke cigars. Thus, baby boomers not only have elevated rates of alcohol and drug use compared with adults aged 65+ years (Wu & Blazer, 2011), but are also vulnerable to tobacco-related adverse effects. It has been estimated that the number of American adults aged 50+ years with an alcohol/drug use disorder will double from 2.8 million in 2002–2006 to 5.7 million in 2020 due to the increased numbers of baby boomers (Han et al., 2009). Results from this study suggest that the societal burden and demands of substance abuse care for older adults will be larger than the projected size because tobacco use problems are not included in the prior projection, nor are the comorbidities of tobacco use and these drug related problems. Thus, continued efforts for improving tobacco use cessation and screening for early intervention, especially targeting 50–64-year-olds, are needed to reduce the burden of diseases associated with substance use as this population ages.

Other studies have documented little decrease in cigarette and smokeless tobacco use but an increase in cigar smoking among adults in the past decade (CDC, 2010; McClave et al., 2010; USDHHS, 2000). In this national sample, tobacco use was common among elders (14%) and prevalent among adults aged 50–64 years (30%). These rates are far higher than *Healthy People 2010*'s target rates for tobacco use among adults aged 18+ years in 2010 (12%, cigarette smoking; 0.4%, smokeless tobacco; 1.2%, cigar smoking) (USDHHS, 2000). Hence, intervention measures are required to increase older adults' tobacco-quitting rates and to increase routine tobacco use screenings and brief intervention in healthcare settings (Doolan & Froelicher, 2008). Results also call for additional educational efforts targeting reduction of tobacco use initiation, especially of cigar smoking and smokeless tobacco use, as onset of tobacco use in adulthood is not uncommon.

Further, given the high rate of cigarette smoking, prevention should target all racial/ethnic groups. Adults who are not currently married, have low income, and have less education may require more focused intervention due to their high rates of daily smoking. For cigar smoking, men and African Americans comprise an ideal prevention target, and non-Hispanic men who are residents of small or non-metropolitan areas can be targeted for reducing smokeless tobacco use.

In addition, this study documents the significant increased association of cigarette smoking with binge drinking and use of illicit substances as well as non-medical use of prescription medications. The association is also found for both age groups for an association between cigar smoking and binge drinking. Though these data cannot inform how reduction of one, such as cessation of smoking, might impact another, such as binge drinking, the data do suggest that these comorbidities should be explored more by primary care physicians, psychiatrists, and substance abuse counselors.

The analyses also identified an increased frequency of anxiety in middle aged tobacco users compared to non-users but not in older users versus non-users. The method for assessing depression and anxiety may lead to an underestimation of each condition, especially clinically significant symptoms. (Blazer, 1997, Cornoni-Huntley et al, 1990) No clear explanation for this finding emerges though other studies have documented this increase (Sachs-Ericson et al, 2010, Jansson, et al, 2010). One possibility is that the anxiety reflects more craving for cigarettes among middle-aged compared to elderly subjects. Another is that persons who smoke are simply inherently more anxious, yet this anxiety level drops with aging. (Blazer, 1997)

This study has limitations. First, the data are cross-sectional and based on self-reports, which are subject to memory errors and under-reporting (SAMHSA, 2009). Second, institutionalized or homeless individuals are not covered by the NSDUH sampling; these findings do not apply to them. Individuals who suffer from severe substance use-related health problems also are unlikely to participate in a household survey.

NSDUH also has noteworthy strengths. It is one of the major sources used by *Healthy People* reports to track health statistics of the U.S. population. It includes a representative sample of the non-institutionalized population, provides detailed assessments of tobacco and other substance use, and is designed to serve as the primary source of substance use statistics for the U.S. population (SAMHSA, 2009). These results thus have a higher level of generalizability for population subgroups than findings from a regional or convenience sample, and they help to evaluate changes in tobacco use. The large sample also allows our analyses of understudied types of tobacco use among older adults (cigar, smokeless tobacco, pipe tobacco), which often cannot be accomplished in a smaller sample size. These results make a unique contribution by focusing on a growing population at risk for the burdens resulting from substance use (Wu & Blazer, 2011).

In conclusion, tobacco use is prevalent among older adults nationally, and it correlates with binge drinking, illicit drug use, and self-reported anxiety (in the 50-64 age group). Tobacco use disproportionately affects subgroups with fewer resources, including less educated and lower-income older adults, and it may increase the likelihood of binge drinking, illicit drug use, or non-medical use of prescription medication. More progressive prevention efforts are warranted to reduce tobacco use.

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Table 1

Prevalence of tobacco use among adults aged 50 years or older in 2008–2009 (N=10,891)

Tobacco use	Past-year use			Past-month use			
	Sample size N	Any tobacco ^a % (SE)	Cigarette % (SE)	Cigar % (SE)	Smokeless tobacco ^b % (SE)	Daily cigarette ^c % (SE)	Pipe tobacco ^c % (SE)
Overall use	10,891	23.7 (0.54)	19.1 (0.49)	5.4 (0.28)	2.2 (0.20)	12.7 (0.45)	0.7 (1.10)
Age in years		$\chi^2=283(1) <0.001$	$\chi^2=234(1) <0.001$	$\chi^2=83(1) <0.001$	$\chi^2=5(1) 0.034$	$\chi^2=111(1) <0.001$	$\chi^2=1(1) 0.297$
50–64	6,778	30.2 (0.72)	24.8 (0.68)	7.4 (0.41)	2.5 (0.29)	16.5 (0.66)	0.6 (0.11)
65 or older	4,113	14.1 (0.66)	10.6 (0.62)	2.3 (0.33)	1.7 (0.23)	7.1 (0.54)	0.8 (0.18)
Sex		$\chi^2=150(1) <0.001$	$\chi^2=22(1) <0.001$	$\chi^2=284(1) <0.001$	$\chi^2=93(1) <0.001$	$\chi^2=12(1) 0.001$	$\chi^2=32(1) <0.001$
Male	4,912	30.1 (0.80)	21.0 (0.64)	10.2 (5.1)	4.2 (0.39)	14.1 (0.63)	1.3 (0.21)
Female	5,979	18.2 (0.60)	17.4 (0.60)	1.3 (1.17)	0.5 (0.31)	11.5 (0.54)	0.1 (0.04)
Race/ethnicity		$\chi^2=22(3) <0.001$	$\chi^2=15(3) 0.003$	$\chi^2=20(3) 0.001$	$\chi^2=57(3) <0.001$	$\chi^2=13(3) 0.007$	$\chi^2=13(3) 0.008$
White	8,297	24.0 (0.60)	18.8 (0.56)	5.6 (3.1)	2.4 (0.25)	13.2 (0.52)	0.7 (0.12)
African-American	1,045	29.5 (1.77)	25.3 (1.80)	6.3 (0.86)	2.2 (0.47)	13.0 (1.16)	1.0 (0.38)
Hispanic	909	17.4 (2.12)	15.9 (2.11)	3.7 (0.72)	0.1 (0.14)	8.2 (1.28)	0.4 (0.30)
Other	640	19.1 (2.09)	15.6 (2.03)	3.1 (0.90)	3.0 (0.97)	11.5 (1.18)	0.1 (0.13)
Survey year		$\chi^2=0.6(1) 0.429$	$\chi^2=0.01(1) 0.924$	$\chi^2=0.02(1) 0.899$	$\chi^2=4(1) 0.054$	$\chi^2=0.15(1) 0.670$	$\chi^2=1(1) 0.297$
2008	5,325	24.1 (0.85)	19.1 (0.79)	5.3 (0.36)	2.6 (0.33)	12.7 (0.1)	0.6 (0.13)
2009	5,566	23.3 (0.68)	19.0 (0.57)	5.4 (0.40)	1.8 (0.24)	12.9 (0.17)	0.7 (0.15)

Sample sizes are unweighted; percentages are weighted.

SE: standard error.

^a Any tobacco use included use of cigarettes, cigar, chewing tobacco, snuff, or pipe tobacco in the past year; pipe tobacco included past-month use only.^b Smokeless tobacco use included chewing tobacco and snuff.^c Past-year data are not available.

Table 2

Adjusted odds ratios (AOR) of tobacco use among adults aged 50 or older by age group. (N=10891)

	Adjusted logistic regression / Past-year cigarette smoking AOR 95% CI				Past-year cigar use AOR 95% CI			
	Aged	50-64 years	Aged	65+ years	Aged	50-64 years	Aged	65+ years
Sex								
Male	1.48	1.32-1.66 ^c	1.41	1.12-1.78 ^b	7.86	5.69-10.85 ^c	19.32	8.65-43.11 ^c
Female	1.00		1.00		1.00		1.00	
Race/ethnicity								
White	2.47	1.72-3.55 ^c	1.03	0.55-1.93	1.78	1.08-2.94 ^a	0.81	0.29-2.25
African-American	2.27	1.42-3.61 ^c	1.20	0.60-2.41	1.75	0.98-3.12	1.86	0.50-6.90
Hispanic	1.00		1.00		1.00		1.00	
Other	2.00	1.21-3.32 ^b	0.64	0.27-1.52	0.94	0.37-2.41	0.32	0.08-1.37
Educational status								
< high school	2.20	1.76-2.76 ^c	1.62	1.09-2.39 ^a	0.79	0.51-1.24	0.56	0.25-1.30
High school	1.65	1.38-1.97 ^c	1.42	0.98-2.05	1.03	0.76-1.40	0.74	0.43-1.27
College or more	1.00		1.00		1.00		1.00	
Marital status								
Married	1.00		1.00		1.00		1.00	
Separated/divorced/widowed	2.16	1.75-2.66 ^c	2.47	1.83-3.35 ^c	1.45	1.02-2.08 ^a	1.59	0.92-2.74
Never married	1.46	1.15-1.85 ^b	2.90	1.62-5.19 ^c	0.84	0.56-1.25	0.68	0.20-2.31
Current employment								
Employed	1.00		1.00		1.00		1.00	
Not employed	1.07	0.91-1.25	0.84	0.60-1.18	1.13	0.86-1.50	1.24	0.67-2.28
Family income								
\$0-\$39,999	2.09	1.65-2.64 ^c	0.89	0.59-1.34	0.83	0.56-1.21	0.70	0.30-1.64
\$40,000-\$74,999	1.27	0.98-1.65	0.87	0.54-1.42	0.56	0.40-0.80 ^b	0.85	0.41-1.76

	Adjusted logistic regression ^{<i>l</i>}		Past-year cigarette smoking AOR 95% CI		Past-year cigar use AOR 95% CI	
	Aged	50-64 years	Aged	65+ years	Aged	65+ years
\$75,000+	1.00	1.00	1.00	1.00	1.00	1.00
County type						
Large metropolitan	1.00	1.00	1.00	1.00	1.00	1.00
Small metropolitan	1.00	0.81-1.23	0.93	0.66-1.33	0.82	0.61-1.10
Non-metropolitan	0.94	0.76-1.17	1.03	0.71-1.49	0.77	0.55-1.08
Survey year						
2008	1.01	0.86-1.18	1.04	0.79-1.39	1.05	0.84-1.32
2009	1.00	1.00	1.00	1.00	1.00	1.00

CI: confidence intervals.

^{*a*} $p < 0.05$

^{*b*} $p < 0.01$

^{*c*} $p < 0.001$.

^{*l*} Each adjusted logistic regression model included sex, race/ethnicity, education, marital status, family income, employment status, county type, and survey year.

Table 3

Adjusted odds ratios (AOR) of past-year smokeless tobacco use and past-month daily cigarette smoking among adults aged 50 or older by age group (N=10891)

	Adjusted logistic regression ¹		Past-year smokeless tobacco use ^b AOR 95% CI		Past-month daily cigarette smoking ³ AOR 95% CI	
	Aged	Aged	Aged	Aged	Aged	Aged
	50-64 years	65+ years	50-64 years	65+ years	50-64 years	65+ years
Sex						
Male	8.42	12.37	4.68-15.13 ^c	5.28-28.98 ^c	1.44	1.56
Female	1.00	1.00			1.00	1.15-2.12 ^b
Race/ethnicity						
White	13.28	0.74	1.57-112.24 ^a	0.33-1.68	4.08	1.01
African-American	9.30	.....	1.05-82.83a	.....	2.43	0.73
Hispanic	1.00	1.00			1.00	0.34-1.57
Other	21.69	.....	2.34-200.79 ^b	.....	3.87	0.43
Educational status						
< high school	2.18	2.30	1.17-4.05 ^a	1.13-4.67 ^a	2.14	1.93
High school	1.45	1.80	0.93-2.28	0.86-3.74	1.52	1.64
College or more	1.00	1.00			1.00	1.11-2.41 ^b
Marital status						
Married	1.00	1.00			1.00	
Separated/divorced/widowed	0.77	0.67	0.41-1.44	0.34-1.32	2.15	2.85
Never married	0.87	2.30	0.44-1.72	0.91-5.82	1.39	2.69
Current employment						
Employed	1.00	1.00			1.00	
Not employed	0.89	1.09	0.55-1.43	0.56-2.13	1.10	0.78
Family income						
\$0-\$39,999	0.67	1.52	0.40-1.13	0.56-4.11	2.13	0.93
					1.60-2.84 ^c	0.55-1.57

	Adjusted logistic regression ^f		Past-year smokeless tobacco use ^b		Past-month daily cigarette smoking ³	
	Aged	95% CI	Aged	95% CI	Aged	95% CI
\$40,000–\$74,999	0.66		1.42	0.46–4.39	1.47	1.11–1.95 ^b
\$75,000+	1.00		1.00		1.00	1.00
County type						
Large metropolitan	1.00		1.00		1.00	1.00
Small metropolitan	1.87	1.04–3.34 ^a	2.71	1.24–5.92 ^b	0.91	0.74–1.12
Non-metropolitan	2.92	1.54–5.52 ^b	7.15	2.77–18.42 ^c	0.94	0.72–1.23
Survey year						
2008	1.60	1.03–2.49 ^a	1.29	0.72–2.30	0.93	0.76–1.14
2009	1.00		1.00		1.00	1.00
Survey year						
2008	1.01	0.88–1.16	1.00	0.80–1.25	1.49	1.03–2.17 [*]
2009	1.00		1.00		0.97	0.83–1.15

CI: confidence intervals.

Pipe tobacco use (0.7%) was not examined by logistic regression analysis.

CI: confidence intervals

†: $P < 0.01$

‡: $P < 0.001$.

^a Each adjusted logistic regression model included age, sex, race/ethnicity, education, marital status, family income, employment status, county type, and survey year.

^b Smokeless tobacco use included chewing tobacco and snuff.

^c Past-year data are not available.

^a $p < 0.05$

^b $p < 0.01$

^c $p < 0.001$.

^f Each adjusted logistic regression model included sex, race/ethnicity, education, marital status, family income, employment status, county type, and survey year.

² Smokeless tobacco use included chewing tobacco and snuff.

³ Past-year data are not available.

* $P < 0.05$

Table 4

Adjusted odds ratios (AOR) of binge drinking, drug use, depression, and anxiety in relation to tobacco use among adults aged 50 years or older: models controlling for sociodemographic variables (N=10,891)

Adjusted logistic regression ^a	Prevalence of the condition in the first column	Past-year cigarette smoking vs. no		Past-year cigar use vs. no		Past-year smokeless tobacco use vs. no		Past-month daily cigarette smoking ^c vs. no	
		% (SE)	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
Aged 50-64 years									
Binge alcohol	17.8 (0.86)**	2.60	2.11-3.19[‡]	2.39	1.79-3.19[‡]	1.33	0.88-2.00	1.90	1.57-2.31[‡]
Illicit/nonmedical drug use	7.9 (0.43)**	3.00	2.38-3.78[‡]	2.71	2.01-3.66[‡]	1.92	0.94-3.95	2.16	1.67-2.79[‡]
Depression	9.1 (0.46)**	1.21	0.95-1.54	1.16	0.75-1.79	1.22	0.57-2.60	1.12	0.83-1.49
Anxiety	5.7 (0.33)**	1.73	1.31-2.30[‡]	1.15	0.70-1.87	2.15	0.91-5.09	1.66	1.23-2.23[‡]
Aged 65+ years									
Binge alcohol	9.2 (0.64)	2.20	1.40-3.46[‡]	3.07	1.64-5.75[‡]	1.29	0.69-2.39	1.89	1.07-3.33[*]
Illicit/nonmedical drug use	1.5 (0.26)	3.55	1.96-6.45[‡]	1.19	0.34-4.15	1.95	0.51-7.41	1.41	0.50-3.94
Depression	4.5 (0.39)	1.14	0.57-2.29	0.53	0.13-2.22	1.30	0.26-6.44	1.31	0.54-3.16
Anxiety	3.2 (0.39)	1.02	0.43-2.41	2.20	0.69-7.01	0.89	0.10-7.95	1.04	0.36-2.99

CI: confidence intervals.

** χ^2 (df=1) $P < 0.001$ by age group (50-64 years vs. 65+ years)

* $P < 0.05$

[‡] $P < 0.0001$.

^a Each adjusted logistic regression model adjusted for age, sex, race/ethnicity, education, marital status, family income, employment status, county type, and survey year.

^b Smokeless tobacco use included chewing tobacco and snuff.

^c Past-year daily use data are not available.