



## Brief Original Report

## Smoke-free home and vehicle rules by tobacco use status among US adults

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## ABSTRACT

**Objective.** To assess the prevalence and characteristics of smoke-free home and vehicle rules by tobacco use.

**Methods.** Data came from the 2012–2013 National Adult Tobacco Survey, a telephone survey of adults aged  $\geq 18$ . Respondents who reported smoking is ‘never allowed’ inside their home or any family vehicle were considered to have smoke-free home and vehicle rules, respectively. Prevalence and characteristics of smoke-free rules were assessed overall and by current tobacco use (combustible only, noncombustible only, combustible and noncombustible, no current tobacco use). Assessed characteristics included: sex, age, race/ethnicity, education, marital status, income, region, and sexual orientation.

**Results.** Nationally, 83.7% of adults ( $n = 48,871$ ) had smoke-free home rules and 78.1% ( $n = 46,183$ ) had smoke-free vehicle rules. By tobacco use, prevalence was highest among nonusers of tobacco (homes: 90.8%; vehicles: 88.9%) and lowest among combustible-only users (homes: 53.7%; vehicles: 34.2%). Prevalence of smoke-free home and vehicle rules was higher among males, adults with a graduate degree, and adults living in the West.

**Conclusions.** Most adults have smoke-free home and vehicle rules, but differences exist by tobacco use. Opportunities exist to educate adults about the dangers of secondhand smoke and the benefits of smoke-free environments, particularly among combustible tobacco users.

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## Introduction

Secondhand smoke (SHS) exposure causes disease and death among nonsmoking adults and children (USDHHS, 2006, 2012, 2014). The Surgeon General has concluded there is no risk-free level of SHS exposure, and that completely eliminating smoking in indoor settings is the only way to fully protect nonsmokers (USDHHS, 2006). In the past decade, considerable progress has occurred in the implementation of comprehensive state and local smoke-free laws that prohibit smoking in worksites, bars, and restaurants; as of January 2015, 26 states and the District of Columbia had implemented such laws (CDC, 2015).

Historically, the voluntary adoption of smoke-free policies has increased, however, homes and vehicles remain significant sources of SHS exposure, particularly for children (USDHHS, 2006). One international study from New Zealand demonstrated that youth SHS exposure

rates in vehicles and homes decreased between 2006 and 2012 (Healey et al., 2015). A US study from 2009–2010 found the prevalence of SHS exposure in vehicles to be 73.6% (King et al., 2013) and another national study reported the prevalence of smoke-free home rules increased from 43.0% in 1992–1993 to 83.0% in 2010–2011 (CDC, 2014a).

Although cigarette smoking has declined (USDHHS, 2014), more Americans are using other tobacco products, including combustible (e.g., cigars, cigarillos, and little cigars), noncombustible (e.g., chewing tobacco and snus), and emerging products (e.g., electronic cigarettes) (USDHHS, 2014; CDC, 2014b). As highlighted in the 2014 Surgeon General's report, this diversification of the tobacco product landscape has made it increasingly important to assess tobacco control interventions in the context of all forms of tobacco use (USDHHS, 2014).

In addition to protecting nonsmokers from SHS (USDHHS, 2006, 2014), implementing smoke-free rules in private settings can encourage smoking cessation (USDHHS, 2012), prevent relapse, and reduce the social acceptability of tobacco use (Hopkins et al., 2010). To date, studies of smoke-free home and vehicle rules have been assessed by cigarette smoking; however, no studies have assessed such rules by other tobacco use (King et al., 2013). Therefore, we assessed the prevalence and

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characteristics of smoke-free home and vehicle rules among US adults by tobacco use.

## Methods

### Data source

Data came from the 2012–2013 National Adult Tobacco Survey (NATS), a landline and cellular telephone survey of noninstitutionalized civilian US adults aged  $\geq 18$  (CDC, 2013). The sampling design was composed of independent samples drawn from households in the 50 US states and District of Columbia. During October 2012 to July 2013, 60,192 interviews were completed (landline: 57,999; cellular: 2193); the response rate was 44.9% (landline: 47.2%; cellular: 36.3%).

### Measures

#### Smoke-free rules

Smoke-free home rules were determined by the question, "Not counting decks, porches, or garages, inside your home, is smoking *always allowed*, *allowed only at some times or in some places*, or *never allowed*?" Respondents who selected *never allowed* were classified as having a smoke-free home rule. Smoke-free vehicle rules were determined by the question, "Not counting motorcycles, in the vehicles that you or family members who live with you own or lease, is smoking *always allowed in all vehicles*, *sometimes allowed in at least one vehicle*, or *never allowed in any vehicle*?" Respondents who selected *never allowed in any vehicle* were classified as having a smoke-free vehicle rule. Missing responses, refusals, and responses of 'don't know' or 'family doesn't own or lease a vehicle' (vehicle only) were excluded (homes:  $n = 2402$ ; vehicles:  $n = 3220$ ).

#### Tobacco use

Tobacco use was categorized as: 1) any tobacco; 2) combustible only; 3) noncombustible only; 4) both combustible and noncombustible; and 5) no current tobacco use. Current combustible use was defined as smoking  $\geq 100$  cigarettes, cigars/cigarillos/filtered little cigars  $\geq 50$  times, regular pipes  $\geq 1$  time, or water pipes/hookahs  $\geq 1$  time during their lifetime, and now using these respective products 'everyday' or 'some days'. Current noncombustible use was defined as using chewing tobacco, snuff, or dip  $\geq 20$  times during their lifetime, or snus or dissolvable tobacco products on 1 or more days, and now using these products 'everyday' or 'some days'. Any tobacco use was defined as current combustible use, and/or noncombustible use, and/or electronic cigarettes use (use  $\geq 1$  time during lifetime and now use 'everyday' or 'some days'). Based on conclusions of the 2014 Surgeon General's report, electronic cigarettes were categorized as a noncombustible product as they provide doses of nicotine and other additives to the user in an aerosol nicotine delivery systems (USDHHS, 2014). No current tobacco use was defined as not currently using combustible tobacco, noncombustible tobacco, or electronic cigarettes.

#### Sociodemographics

Sociodemographics included: sex, age, race/ethnicity, education, marital status, annual household income, US region, and sexual orientation.

#### Analysis

Descriptive statistics were calculated using SAS-callable SUDAAN v10 (SAS Institute Inc.) to assess smoke-free home and vehicle rule prevalence by sociodemographics and tobacco use. Chi-square tests were performed to determine overall significance for each tobacco use category (i.e., any tobacco; combustible only; noncombustible only; both combustible and noncombustible; and no current tobacco use) and sociodemographic variable ( $p < 0.05$ ). Data were weighted to adjust for selection and nonresponse.

## Results

### Smoke-free home rules

Overall, 83.7% of adults had smoke-free home rules. By tobacco use, prevalence was highest among nonusers (90.8%), followed by noncombustible-only users (82.5%), both combustible and noncombustible users (54.9%), and combustible-only users (53.7%) (Table 1). Irrespective of tobacco use, prevalence was generally higher among males

and respondents aged 44 years and less, married or partnered, with a graduate degree, income of  $\geq \$100,000$ , or living in the West (Table 1).

Chi-square findings revealed prevalence differences among adults who reported having 100% smoke-free home rules by tobacco use status and selected sociodemographic characteristics. Significant differences were noted in any tobacco users, combustible-only tobacco users, non-combustible-only tobacco users, and no current tobacco users by sex, age, marital status, annual household income, region and sexual orientation. Among any tobacco users, the prevalence of smoke-free rules in homes was greater for: men, married or partnered individuals, those with an annual household income of  $\geq \$100,000$ , and residents of states in the West ( $p < 0.05$ ). Among no current tobacco users, the prevalence of smoke-free rules in homes was greater for women, adults 25–44 years of age, married or partnered individuals, those with an annual household income of  $\geq \$100,000$ , residents of states in the West, and heterosexual or straight individuals ( $p < 0.05$ ).

### Smoke-free vehicle rules

Overall, 78.1% of US adults had smoke-free vehicle rules (Table 2). By tobacco use, prevalence was highest among nonusers (88.9%), followed by noncombustible-only users (69.1%), combustible-only users (34.2%), and both combustible and noncombustible users (24.2%). Irrespective of tobacco use, prevalence was generally higher among males and respondents aged  $\geq 65$ , with a graduate degree, living in the West, or with unspecified sexual orientation.

Chi-square findings revealed prevalence differences among adults who reported having 100% smoke-free vehicle rules by tobacco use status and selected sociodemographic characteristics. Significant differences were noted in any tobacco users, combustible-only tobacco users, and no current tobacco users by sex, age, educational attainment, marital status, annual household income, region and sexual orientation. Among any tobacco users, the prevalence of smoke-free rules in vehicles was greater for men, residents of states in the West, and those with an unspecified sexual orientation ( $p < 0.05$ ). Among no current tobacco users, the prevalence of smoke-free rules in vehicles was greater for women, adults aged  $\geq 65$  years of age, those with a graduate degree, married or partnered individuals, those with an annual household income of  $\geq \$100,000$ , residents of states in the West, and those with an unspecified sexual orientation ( $p < 0.05$ ).

## Discussion

This study reveals that approximately 8 in 10 US adults report smoke-free rules at home (83.7%) and in their vehicle (78.1%). However, variations in such rules exist by tobacco use; about one-half of any tobacco users reported having smoke-free rules, while about one-third reported smoke-free vehicle rules. These findings indicate that opportunities exist to educate all tobacco users about the dangers of SHS and to promote voluntary adoption of smoke-free rules in private settings, particularly among combustible tobacco users. Additionally, jurisdictions with comprehensive policies prohibiting smoking in public places and worksites could extend SHS protections to include areas that are typically excluded from these policies. Continued efforts are critical to increase awareness of the hazards of SHS exposure in US adults and the benefits of smoke-free home and vehicle rules to help inform state and local level capacity.

Among combustible-only users, 53.7% reported having smoke-free home rules (Table 1) and 34.2% reported having smoke-free vehicle rules (Table 2), both of which are higher than previously reported estimates among cigarette smokers (King et al., 2013; Ayo-Yusuf et al., 2014). Reasons for the high level of prevalence of smoke-free homes rules among respondents 44 years of age and less may be related to shifting social norms around the acceptability of smoke-free policies in indoor settings. The higher prevalence of smoke-free rules may be due to the proliferation of comprehensive smoke-free laws, declines in

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