

# Smokefree Home Rules Adoption by Smokers and Nonsmokers Minnesota, 1999–2010

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**Background:** Smokefree workplace policies have successfully limited indoor exposure to secondhand smoke. However, exposure still exists in other indoor locations, most notably in the home.

**Purpose:** This paper examines change in the public's awareness of secondhand smoke harm, exposure to secondhand smoke, and prevalence of smokefree home rules between 1999 and 2010 in Minnesota.

**Methods:** The Minnesota Adult Tobacco Survey is a statewide, cross-sectional, random-digit-dial telephone-based survey. The survey measures tobacco use, behaviors, attitudes, and beliefs among adults aged 18 and older in 1999, 2003, 2007, and 2010. Analysis was conducted in 2011.

**Results:** There was a significant decrease in self-reported exposure to secondhand smoke among all nonsmokers in Minnesota from 2003 (60.9%) to 2010 (37.7%) ( $p < 0.05$ ). The prevalence of smokefree home rules adoption among all Minnesotans increased significantly between each time point: 1999 (64.5%); 2003 (74.8%); 2007 (83.2%); 2010 (87.2%) ( $p < 0.05$ ). Although smokers tended to adopt smokefree home rules at rates lower than nonsmokers, the percentage of smokefree home rules among smokers nearly doubled between 1999 (31.4%) and 2010 (58.1%) ( $p < 0.05$ ).

**Conclusions:** Over 10 years, Minnesotans reported a significant decline in exposure to secondhand smoke and a significant increase in voluntary smokefree home rules. Such a trend is notable as virtually all public tobacco control efforts were aimed at raising awareness and support for smokefree policies within workplaces. These findings demonstrate positive changes in social norms and suggest that behavior change in public settings might also be translated into practice in private settings.

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## Introduction

Exposure to secondhand smoke causes adverse health outcomes including cardiovascular disease, coronary heart disease, and lung cancer in adults, as well as an increased risk of sudden infant death syndrome, acute respiratory infections, and ear problems in children.<sup>1,2</sup> These health risks lead to premature death and disease in both children and adults who do not smoke. Indeed, the 2006 Surgeon General's Report on the Health Consequences of Involuntary Exposure to To-

bacco Smoke concluded there is no risk-free level of exposure to secondhand smoke.<sup>1</sup>

Efforts by many U.S. states over the past 20 years to restrict exposure to secondhand smoke have resulted in the passage of comprehensive smokefree policies in workplaces across the country. As of 2010, a total of 25 states and the District of Columbia prohibit smoking in indoor areas of workplaces, restaurants and bars. An additional 18 states have partial or less restrictive laws in place, and only seven states have no statewide smoking restrictions.<sup>3</sup> The Healthy People 2020 objective is for all states to enact smokefree laws prohibiting smoking in public places and worksites.<sup>4</sup>

Although comprehensive smokefree workplace policies were successful in limiting indoor exposure to secondhand smoke, exposure still exists in other indoor locations, most notably in the home. Because the home is a private location, smokefree home rules are established voluntarily. Two exceptions include public housing

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structures and multi-unit housing, in which smokefree rules can be mandated by the housing authority or management of the housing unit. Although concern has arisen speculating that exposure to secondhand smoke will increase in private locations if smoking is prohibited in public locations, several studies<sup>5–10</sup> have linked the passage of smokefree workplace policies with shifts in social norms, resulting in more voluntary smokefree home rules. In the 18 months following implementation of smokefree legislation in England, Lee et al.<sup>8</sup> found large declines in indoor smoking in all venues including the home and cars, but no additional declines in overall prevalence of smoking or cigarette consumption after secular trends were taken into consideration. Similarly, children in Scotland were more likely to report comprehensive smokefree home rules after implementation of smokefree legislation.<sup>7</sup> Although neither study claimed a causal link, both acknowledged a growing literature that attributes increased smoking restrictions in private locations with mandated changes in smoking in public places. Recently, Cheng and colleagues<sup>9</sup> used a U.S. population-based survey to conclusively determine a norm spreading effect of smokefree workplace laws that are positively associated with the adoption of smokefree home rules. In perhaps the most conclusive publication to date, Mons and colleagues<sup>10</sup> found no evidence of displacement of smoking into the home after national smokefree legislation was passed in four European countries. They also found some evidence to support the notion that such legislation increased smokefree home rules in those countries.<sup>10</sup>

The adoption of a smokefree home rule is advantageous for several reasons. In addition to significantly reducing exposure to secondhand smoke in the home,<sup>11–13</sup> smokers in households with such rules are more likely to be aware of tobacco control messaging and have an interest in quitting than smokers in homes without these rules.<sup>14</sup> Smokefree home rules have been shown to support quit attempts and reduce the likelihood of relapse.<sup>15–18</sup> Finally, smokefree home rules, in addition to public policies restricting smoking in public places, have been found to reduce the rate of youth initiation of smoking.<sup>19</sup>

By 2010, Minnesota had implemented comprehensive tobacco control programming including youth prevention, price increases, and a statewide smokefree law. However, smokefree homes were not being actively promoted. Therefore, the purpose of this study was to examine changes in awareness among adult Minnesotans between 1999 and 2010 of secondhand smoke harm, exposure to secondhand smoke, and prevalence of smokefree home rules. This is particularly relevant given the absence of a coordinated statewide effort focused on promoting a reduction of secondhand smoke exposure in the home. If,

indeed, shifts in norms at the household level followed legislative action at the state level, it is most useful to further understand the unique characteristics of smokers who are more impacted by this shift than nonsmokers.

## Methods

### Data Source

The data, analyzed in 2011, are from the Minnesota Adult Tobacco Survey (MATS), a statewide, cross-sectional, random-digit-dial (RDD) telephone-based survey with previously reported methods.<sup>20</sup> MATS measures tobacco use, behaviors, attitudes, and beliefs among adults aged 18 and older in 1999 ( $N=5968$ ); 2003 ( $n=8782$ ); 2007 ( $n=12,580$ ); and 2010 ( $n=7057$ ). The Minnesota Department of Health IRB approved the 2003, 2007, and 2010 questionnaires, data-collection, and data security procedures.<sup>20</sup>

The RDD sampling method for all rounds of the MATS involved a two-step process: a household screening questionnaire was developed to identify households and then identify and sample people within the households. The main questionnaire contained all of the questions for the interview. All rounds of the MATS used computer-assisted telephone interviewing, contained the same core questions, and lasted between 12 and 24 minutes depending on the smoking status of the respondent.<sup>20</sup>

Several communication methods were used before and during data collection for each round of the MATS survey to improve response rates. These included letters, an informational website, and contact numbers that potential respondents could call for information. Consistent with other large-scale, telephone-based surveys, MATS telephone interviewers made a second attempt to secure cooperation of those who initially declined participation.<sup>20</sup>

Sample sizes for the 2003 and 2007 surveys were larger than the other surveys. Samples of Blue Cross and Blue Shield health plan members were added for these two survey years. There was also a change in the sampling frame for the 2010 survey. To attain the sample size of previous surveys and address growing concerns about coverage in telephone-based surveys, the 2010 MATS used two sampling frames: (1) all possible Minnesota cellular telephone numbers, and (2) all possible Minnesota landline telephone numbers.<sup>20</sup>

The response rate for MATS 2010 was calculated using the American Association for Public Opinion Research methodology and was 44.5% for the cell phone sample and 45.0% for the landline sample (information on response rate standards can be found at [www.aapor.org/For\\_Researchers/4683.htm](http://www.aapor.org/For_Researchers/4683.htm)). These response rates are comparable to prior rounds of the MATS survey.<sup>20</sup> Each MATS survey was weighted to represent the entire non-institutionalized adult population in Minnesota. The 2010 weighting process was designed to account for demographic differences in representation in the cell phone and landline frames. More information on the MATS methodology can be found at [www.mnadulttobaccosurvey.org](http://www.mnadulttobaccosurvey.org).

### Measures

**Smoking characteristics.** Current smokers were defined as those who reported having smoked 100 cigarettes in their lifetime and who currently smoked *every day* or *some days*. Smoking dependence was measured by one item: *How soon after you wake up do you smoke your first cigarette?* Responses were: within 5, 6–30,

31–60, and after 60 minutes.<sup>21</sup> Smoking intensity was defined by the number of cigarettes smoked per day as either light (less than 15) or non-light smoker (15 or more). Age of initiation was measured by asking: *How old were you the first time you smoked a cigarette, even one or two puffs?* Responses were grouped into four categories (11 years or younger, 12–14, 15–17, 18–20, 21 and older). Consistent with the Tobacco Use Supplement of the Current Population Survey, quit attempts was a dichotomous variable determined by asking, *During the past 12 months, have you stopped smoking for 1 day or longer because you were trying to quit smoking?*<sup>15</sup> Recent instruments from the Tobacco Use Supplement can be found at [riskfactor.cancer.gov/studies/tus-cps/info.html](http://riskfactor.cancer.gov/studies/tus-cps/info.html).

**Smoking rules in the home.** Respondents were asked which statement best described the rules about smoking in their home (not including decks, garages, or porches): “smoking is not allowed anywhere,” “smoking is allowed in some places or at some times,” or “smoking is allowed anywhere inside the home.” Those who responded that “smoking is not allowed anywhere” were considered to have a smokefree home. This classification was based on research showing efforts to contain smoking in one part of the house offer no protection to household members<sup>22</sup> and is comparable to how smokefree homes are assessed in the Tobacco Use Supplement of the Current Population Survey.<sup>17,23</sup>

**Attitudes about smoking in cars with children.** To assess attitudes about smoking in cars with children, respondents were asked: *Do you think smoking should be allowed in cars when children are in them?*

**Awareness of secondhand smoke harm.** Respondents were asked if they think breathing smoke from other people’s cigarettes was very, somewhat, not very harmful, or not at all harmful to one’s health. For the purposes of analysis, “very” and “somewhat harmful” were combined to capture overall agreement.

**Exposure to secondhand smoke.** To assess exposure to secondhand smoke in any location, participants were asked if, in the past 7 days, anyone had smoked near them in their workplace, car, home, or another location. Respondents reporting more than 1 day of exposure were classified as being exposed. This measure is directly comparable to that used in the Behavioral Risk Factor Surveillance System’s optional tobacco module.<sup>24</sup> Exposure was not assessed in the 1999 survey.

**Other variables.** Demographic factors included age, gender, income, marital status, and highest educational level completed. Household composition included the number of other adult smokers in the home and number of children in the household by age.

## Data Analysis

Statistical analyses were conducted using SPSS, version 19.0, with the Complex Samples module. To test potential differences by demographic characteristics and smoking-related perceptions/behaviors, several tests of bivariate relationships were used. A multivariate logistic regression model was created to look at possible predictors of smokefree home rules. The regression analysis was restricted to smokers because smoking was more likely to occur in the homes of smokers and smokers are more likely to exhibit changes in their perceptions of smokefree norms. In the regression model, a dichotomous smokefree home rules dependent variable (0=no rule, smoking is allowed in the home; and 1=rule,

smoking is not allowed anywhere in the home) was regressed on various predictor variables including demographics, smoking characteristics, household composition, and relevant attitudes and beliefs. To accommodate missing data, a listwise deletion method was used. Findings were identical when nonsignificant predictors were removed; therefore, a final parsimonious model is presented. The final model contained 812 smokers, which represented 90.4% of the valid sample.

## Results

Respondents reported a consistently high level of awareness of the harm of secondhand smoke in all of the survey years. In 2003, 90.9% of Minnesotans agreed secondhand smoke is harmful. That rate remained high in 2007 (93.0%) and 2010 (92.3%). There was a significant decrease in exposure to secondhand smoke among nonsmokers between 2003 (60.9%) and 2010 (37.7%) ( $p<0.05$ ). All age, gender, and education categories saw significant declines in exposure rates across time with the exception of those aged 18–24 years (Table 1).

The prevalence of smokefree home rules among all Minnesotans increased significantly across the four time periods: 1999 (64.5%); 2003 (74.8%); 2007 (83.2%); 2010 (87.2%) ( $p<0.05$ ). As seen in Figure 1, the presence of smokefree home rules increased for both smokers and nonsmokers. Similar trends were found among smokers who lived with another adult smoker; with 20.4% reporting home smokefree rules in 1999 and 54.9% in 2010 (data not shown in figure). Figure 1 also illustrates policy change during the same time frame. There was a steady increase in the number of local smokefree ordinances implemented between 2000 and 2005 that culminated in the passage of the statewide law in 2007 banning smoking in all workplaces, including restaurants and bars. Other notable events included increases in taxes on tobacco products and increases in coverage for cessation medications from health plans and through the QUITPLAN® Helpline (The QUITPLAN Helpline is a statewide phone service that provides cessation treatment to Minnesotans who do not have such services covered by insurance).<sup>25,26</sup>

Although smokers tend to adopt smokefree home rules at rates lower than nonsmokers, the percentage of smokefree home rules among smokers has nearly doubled between 1999 (31.4%) and 2010 (58.1%) ( $p<0.05$ ) (Table 2). Taking a closer look at the demographics between smoker and nonsmoker groups between 1999 and 2010, the presence of smokefree home rules generally increased across all age, gender, and education levels.

Further, a greater proportion of homes were found to have smokefree rules when there were no other adult smokers in the home. Similarly, both smokers and nonsmokers consistently reported a higher proportion of smokefree home rules when children (aged <18 years

**Table 1.** Exposure to secondhand smoke in any location among nonsmokers in Minnesota, 2003–2010, % (95%CI)

Characteristics	2003	2007	2010
Overall	60.9 (58.9, 62.8)	49.5 (47.8, 51.2)	37.7 (36.1, 39.3)
<b>Age (years)</b>			
18–24	75.3 (70.1, 79.9)	67.2 (60.9, 73.0)	67.7 (62.5, 72.5)
25–44	66.1 (62.6, 69.5)	51.8 (48.6, 55.1)	39.1 (36.3, 42.1)
45–64	58.9 (55.4, 62.4)	47.6 (45.2, 50.1)	32.5 (30.2, 34.9)
≥65	43.8 (40.3, 47.4)	36.3 (34.0, 38.7)	24.2 (21.7, 26.8)
<b>Gender</b>			
Female	54.9 (52.2, 57.6)	45.8 (43.7, 47.9)	33.2 (31.2, 35.3)
Male	67.3 (64.5, 70.1)	53.4 (50.7, 56.1)	42.5 (40.1, 44.9)
<b>Education</b>			
<High school	58.5 (49.6, 66.7)	47.5 (41.2, 53.9)	40.9 (33.9, 48.4)
High school graduate/GED	63.9 (60.2, 67.5)	53.0 (49.5, 56.5)	40.4 (37.0, 43.9)
Some college or technical school	62.7 (59.0, 66.3)	52.0 (48.8, 55.2)	43.1 (40.3, 46.0)
College graduate or beyond	56.8 (53.8, 59.8)	44.3 (42.0, 46.7)	29.4 (27.3, 31.6)

Note: All comparisons across time are significant at  $p < 0.05$  with the exception of those aged 18–24 years at all three time points. GED, General Educational Development test

and <5 years) were living in those homes. Several subgroups were notably lagging in their adoption of smoke-free home rules, including older smokers (34.0%), and those with the lowest education attainment (35.7%).

### Predictors of Smokefree Home Rules Among Smokers in 2010

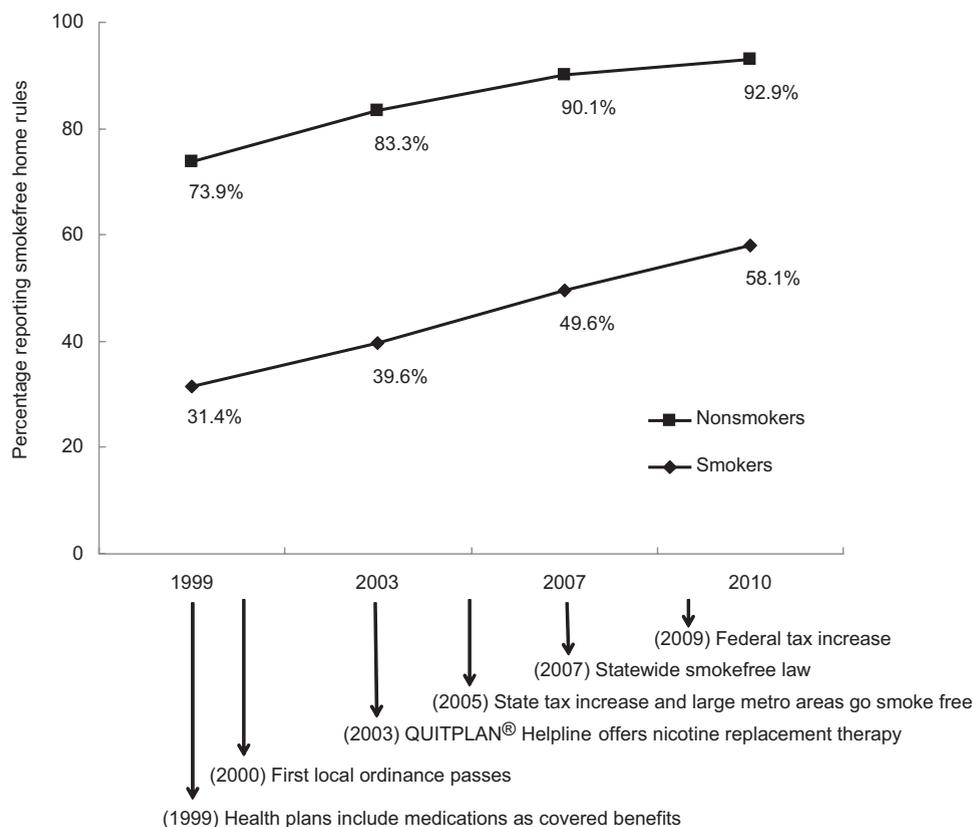
Characteristics included in the model were demographics (age, gender, education, income, marital status); smoking characteristics (smoking status, dependence, age of initiation, and smoking intensity, quit attempt in the past 12 months); household composition (other adult smokers in the home and children in the home); and beliefs of the harm of secondhand smoke as well as attitudes about smoking in cars with children in them. As shown in Table 3, respondents aged 24–44, light smokers, and those who had young children in the home were more likely to have smokefree home rules. Those who earned less than \$35k and those who believe smoking could be allowed in cars when children are present were less likely to have smokefree home rules.

### Discussion

Results showed that over the course of 10 years, there has been high awareness of the harms of secondhand smoke, a significant decrease in exposure to secondhand smoke, and an increase in the implementation of voluntary smokefree home rules. These events have occurred during a time of active tobacco control policy change in

Minnesota that culminated in the prohibition of smoking in all workplaces in 2007. Increases in smokefree home rules are notable since virtually all tobacco control efforts were aimed at raising awareness and support for smoke-free policies within workplaces, not on influencing rules in private homes. Although there were several small-scale, regional efforts such as pledge campaigns to promote smokefree home rules, the majority of Minnesota's population was not exposed to an organized statewide campaign concerning smokefree home rules (C. Fercello, Minnesota Department of Health, personal communication, 2011). These findings suggest positive changes in social norms and imply behavior change in general public settings might also be translated into practice in private settings.

Although there is some variation in the adoption of smokefree home rules between smokers and nonsmokers, there has been a prominent and significant trend toward adopting smokefree home rules during the past decade. The increase in adoption between 1999 and 2010 was larger for smokers both in relative (+85%) and absolute terms (+26%) compared to nonsmokers (+27% and +19%, respectively). Over time, the largest increase in the adoption of smokefree home rules was among the group aged 25–44 years. This aligns with previous research demonstrating wide adoption of smokefree home rules among households likely to have small children living in them.<sup>1,6,7,10,13,27</sup> Indeed, MATS data show that nonsmokers' homes with children have proportionally higher rates of smokefree home rules than do homes with no



**Figure 1.** Increase in smokefree home rules with implementation of tobacco control strategies

Note: Comparisons between smokers and nonsmokers are significantly different from each other ( $p < 0.05$ ).

children. Smokers who live with children have considerably lower rates of smokefree home rules than nonsmokers who live with children, yet both smokers and nonsmokers have significantly increased their adoption of smokefree home rules in homes where children are present.

The characteristics of smokers with smokefree homes such as age and income were expected and consistent with previously published literature.<sup>18,27-29</sup> The presence of young children (aged <5 years) in the home was predictive of having a smokefree home rule, and believing that smoking should not be allowed in cars with children was a significant predictor. Taken together, these findings suggest a consistent concern about the effect of secondhand smoke exposure on children.

Tracking the adoption of smokefree home rules is one measure of social norm change in environments in which there are no widespread public campaigns promoting smokefree homes. Although the data cannot conclude that workplace smoking bans cause an increase in smokefree home rules, one can posit a link between the implementation of a statewide smokefree workplace law, the demonstrated high level of awareness of the harm of secondhand smoke exposure, the decreased exposure to secondhand smoke, and an increase in smokefree home rules. The current study further supports the assertion made

elsewhere that smokefree public policies contribute to shifts in social norms resulting in an increase in voluntary smokefree home rules.<sup>6-10</sup> During this period, the overall prevalence rate of smoking in Minnesota dropped significantly from 22.1% in 1999 to 16.1% in 2010.<sup>30</sup> Although secular tobacco use trends and a statewide smokefree workplace policy may account for part of the increased adoption of smokefree home rules, broad social norm changes regarding the acceptability of exposure to secondhand smoke among adults and children are likely to have had as large an impact on this development.<sup>9,10,23,31</sup>

## Limitations

All MATS data are self-reported and subject to recall bias and social desirability.

Mumford et al. note that the validity of self-reported home smoking rules can be particularly difficult to assess and confirm using self-reported data-collection measures alone.<sup>32</sup> Although the smoking status of respondents was not biochemically verified, studies have shown that population surveys provide an unbiased estimate of smoking behavior.<sup>33</sup>

The collected data represent the behaviors and attitudes of Minnesotans and may not be generalizable to populations outside of Minnesota. Further research with national data sets is needed to confirm if the trends seen in Minnesota are also present nationally.

In Minnesota, high levels of the perceived harm of secondhand smoke provided the context in which local and statewide smokefree policy change occurred. A significant decline in exposure to secondhand smoke was coupled with a significant increase in voluntary smokefree home rules. Such a trend is notable since virtually all public tobacco control efforts were aimed at raising awareness and support for smokefree policies within workplaces. These findings suggest positive changes in social norms and imply behavior change in generally public settings might also be translated into practice in private settings.

**Table 2.** Percentage of Minnesota smokers and nonsmokers with smokefree homes at four time points

Characteristics	1999		2003		2007		2010	
	Smokers	Nonsmokers	Smokers	Nonsmokers	Smokers	Nonsmokers	Smokers	Nonsmokers
<b>Overall</b>	31.4 (27.3, 35.7)	73.9 (71.7, 76.0)	39.6 (35.3, 44.1)	83.3 (81.8, 84.7)	49.6 (45.0, 54.2)	90.1 (89.0, 91.1)	58.1* (54.0, 62.0)	92.9* (92.0, 93.7)
<b>Age (years)</b>								
18–24	45.8 (35.0, 57.1)	73.8 (65.7, 80.5)	46.8 (39.1, 54.7)	82.9 (78.6, 86.5)	70.6 (59.6, 79.6)	92.3 (89.3, 94.5)	65.6* (54.7, 75.0)	88.6* (84.0, 91.9)
25–44	29.1 (23.8, 35.0)	80.8 (77.9, 83.3)	46.7 (39.2, 54.3)	87.3 (84.7, 89.5)	56.3 (48.2, 64.1)	92.5 (90.0, 94.4)	67.4* (60.8, 73.4)	95.8* (94.3, 96.9)
45–64	27.1 (20.1, 35.4)	69.6 (65.6, 73.3)	25.9 (20.6, 32.1)	82.7 (80.1, 84.9)	36.0 (30.2, 42.2)	89.7 (88.1, 91.0)	45.5* (39.2, 51.9)	93.3* (92.0, 94.4)
≥65	19.3 (9.1, 36.5)	66.7 (60.8, 72.1)	29.4 (18.9, 42.7)	75.8 (72.4, 79.0)	24.5 (16.4, 35.0)	84.2 (82.3, 85.9)	34.0 (23.9, 45.7)	89.3* (87.3, 91.1)
<b>Gender</b>								
Female	26.3 (21.2, 32.2)	75.2 (72.5, 77.7)	30.0 (25.2, 35.2)	85.7 (83.9, 87.4)	42.5 (36.2, 49.1)	91.4 (90.2, 92.4)	54.8* (48.9, 60.7)	93.2* (91.9, 94.2)
Male	35.9 (30.0, 42.2)	72.5 (69.0, 75.8)	47.4 (41.3, 53.6)	80.7 (78.3, 82.8)	55.7 (49.5, 61.8)	88.8 (86.8, 90.5)	60.7* (55.2, 66.1)	92.6* (91.2, 93.8)
<b>Education</b>								
<High school	29.6 (19.2, 42.7)	71.4 (64.8, 77.2)	34.6 (24.5, 46.4)	75.7 (68.5, 81.8)	33.9 (21.3, 49.2)	84.0 (78.6, 88.2)	35.7 (23.4, 50.2)	82.7 (76.2, 87.7)
High school graduate/GED	28.5 (22.5, 35.5)	67.7 (63.0, 72.0)	36.8 (30.6, 43.6)	77.2 (74.1, 80.0)	49.3 (41.8, 56.9)	84.8 (81.7, 87.5)	57.7* (50.6, 64.5)	91.9* (89.9, 93.5)
Some college or technical school	30.9 (24.2, 38.6)	72.3 (68.3, 75.9)	41.8 (33.5, 50.6)	84.5 (81.9, 86.9)	51.6 (44.9, 58.1)	91.3 (89.8, 92.6)	61.8* (55.9, 67.3)	92.4* (90.7, 93.7)
≥College graduate	44.1 (33.4, 55.5)	82.8 (79.2, 85.8)	46.9 (38.0, 56.1)	89.8 (87.6, 91.7)	66.0 (57.0, 74.1)	94.6 (93.4, 95.6)	68.2* (58.1, 76.9)	96.4* (95.5, 97.1)
<b>Lives with other adult smokers<sup>a</sup></b>								
Yes	NA	NA	28.2 (22.8, 34.4)	51.4 (45.1, 57.6)	40.6 (33.4, 48.2)	67.8 (61.5, 73.6)	54.9 (48.5, 61.2)	74.4 (69.6, 78.7)
No	NA	NA	50.2 (44.7, 55.8)	87.8 (86.6, 88.9)	57.6 (52.3, 62.7)	93.0 (92.2, 93.7)	61.0 (55.8, 66.0)	95.5 (94.8, 96.2)
<b>Any children in home (aged &lt;18 years)</b>								
Yes	39.5 (33.4, 46.0)	79.1 (75.9, 82.0)	49.2 (41.9, 56.6)	88.3 (86.0, 90.2)	60.6 (53.6, 67.3)	93.8 (92.3, 95.0)	69.1* (62.4, 75.1)	95.2* (93.8, 96.3)
No	23.8 (18.9, 29.6)	70.7 (67.8, 73.5)	32.3 (27.4, 37.5)	80.1 (78.1, 81.9)	41.3 (35.3, 47.6)	87.3 (85.7, 88.7)	50.6* (45.5, 55.7)	91.5* (90.3, 92.6)
<b>Young children in home (aged &lt;5 years<sup>b</sup>)</b>								
Yes	44.0 (35.0, 53.4)	82.4 (77.9, 86.2)	67.8 (57.8, 76.4)	90.4 (86.4, 93.4)	69.8 (55.7, 80.9)	97.0 (94.7, 98.3)	80.2* (70.1, 87.4)	96.9* (94.4, 98.3)
No	27.9 (23.5, 32.8)	72.0 (69.5, 74.4)	33.2 (29.1, 37.5)	81.9 (80.2, 83.4)	45.5 (40.6, 50.4)	88.6 (87.3, 89.8)	53.0* (48.5, 57.4)	92.2* (91.2, 93.1)

Note: Values are percentages with 95% CIs in parentheses. Significance is noted only across the greatest period of time where data are available.

<sup>a</sup>“Lives with other adult smokers” was not collected in 1999.

<sup>b</sup>In 1999, young children were aged <6 years.

\* $p < 0.05$ , 1999 and 2010

GED, General Educational Development test; NA, not available

**Table 3.** Predictors of smokefree home rules among smokers in 2010

Predictor	OR (95% CI)
<b>Age (years)</b>	
18–24	2.27 (0.98, 5.25)
25–44	<b>3.14 (1.55, 6.36)</b>
45–65	1.18 (0.60, 2.33)
≥65	ref
<b>Income (\$)</b>	
<35,000	<b>0.27 (0.15, 0.49)</b>
35,000–49,999	0.52 (0.27, 1.03)
50,000–75,000	0.70 (0.36, 1.37)
≥75,000	ref
<b>Cigarettes per day</b>	
Light smokers (≤10)	<b>2.75 (1.81, 4.18)</b>
Non-light smokers (≥11)	ref
<b>Children in home</b>	
Young children in home (aged <5 years)	<b>2.84 (1.51, 5.34)</b>
No young children in home (aged <5 years)	ref
<b>Belief that smoking should be allowed in a car with children</b>	<b>0.31 (0.16, 0.58)</b>
<b>Belief that smoking should not be allowed in a car with children</b>	ref

Note: Significant findings are in bold. Nonsignificant predictors were removed from the model. Model controlled for gender, education, marital status, smoking status, dependence, age of initiation, smoking intensity, quit attempt in the past 12 months, presence of other adult smokers in the home, and beliefs about the harm of secondhand smoke exposure.

Jeong Kyu Lee, PhD, was instrumental in the analysis of MATS data. Westat provided substantial leadership in completing the MATS data collection in 2007 and 2010.

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## References

1. CDC, DHHS. Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion and Office on Smoking and Health. The health consequences of involuntary exposure to tobacco smoke, a report of the Surgeon General, 2006.
2. Hahn EJ. Smokefree legislation: a review of health and economic outcomes research. *Am J Prev Med* 2010;39(6S1):S66–S76.
3. CDC. State smokefree laws for worksites, restaurants, and bars—U.S., 2000–2010. *MMWR Morb Mortal Wkly Rep* 2011;60(15):472–5.
4. DHHS. Healthy People 2020. 2011. [www.healthypeople.gov/2020/default.aspx](http://www.healthypeople.gov/2020/default.aspx).
5. Gilpin EA, Lee L, Pierce JP. Changes in population attitudes about where smoking should not be allowed: California versus the rest of the USA. *Tob Control* 2004;13(1):38–44.
6. Borland R, Yong HH, Cummings KM, Hyland A, Anderson S, Fong GT. Determinants and consequences of smokefree homes: findings from the International Tobacco Control (ITC) Four Country Survey. *Tob Control* 2006;15(S3):iii42–iii50.
7. Akhtar PC, Haw SJ, Currie DB, Zachary R, Currie CE. Smoking restrictions in the home and secondhand smoke exposure among primary schoolchildren before and after introduction of the Scottish smokefree legislation. *Tob Control* 2009;18(5):409–15.
8. Lee JT, Glantz SA, Millett C. Effect of smokefree legislation on adult smoking behaviour in England in the 18 months following implementation. *PLoS One* 2011;6(6):e20933.
9. Cheng KW, Glantz SA, Lightwood JM. Association between smokefree laws and voluntary smokefree-home rules. *Am J Prev Med* 2011;41(6):566–72.
10. Mons U, Nagelhout GE, Allwright S, et al. Impact of national smokefree legislation on home smoking bans: findings from the International Tobacco Control Policy Evaluation Project Europe Surveys. *Tob Control* 2012.
11. Spencer N, Blackburn C, Bonas S, Coe C, Dolan A. Parent reported home smoking bans and toddler (18–30 month) smoke exposure: a cross-sectional survey. *Arch Dis Child* 2005;90(7):670–4.
12. Biener L, Cullen D, Di ZX, Hammond SK. Household smoking restrictions and adolescents' exposure to environmental tobacco smoke. *Prev Med* 1997;26(3):358–63.
13. Pizacani BA, Martin DP, Stark MJ, Koepsell TD, Thompson B, Diehr P. Household smoking bans: which households have them and do they work? *Prev Med* 2003;36(1):99–107.
14. Norman GJ, Ribisl KM, Howard-Pitney B, Howard KA, Unger JB. The relationship between home smoking bans and exposure to state tobacco control efforts and smoking behaviors. *Am J Health Promot* 2000;15(2):81–8.
15. Farkas AJ, Gilpin EA, Distefan JM, Pierce JP. The effects of household and workplace smoking restrictions on quitting behaviours. *Tob Control* 1999;8(3):261–5.
16. Hyland A, Higbee C, Travers MJ, et al. Smokefree homes and smoking cessation and relapse in a longitudinal population of adults. *Nicotine Tob Res* 2009;11(6):614–8.
17. Messer K, Mills AL, White MM, Pierce JP. The effect of smokefree homes on smoking behavior in the U.S. *Am J Prev Med* 2008;35(3):210–6.
18. Gilpin EA, White MM, Farkas AJ, Pierce JP. Home smoking restrictions: which smokers have them and how they are associated with smoking behavior. *Nicotine Tob Res* 1999;1(2):153–62.
19. Wakefield MA, Chaloupka FJ, Kaufman NJ, Orleans CT, Barker DC, Ruel EE. Effect of restrictions on smoking at home, at school, and in public places on teenage smoking: cross sectional study. *BMJ* 2000;321(7257):333–7.
20. Boyle RG, St Claire AW, Kinney AM, D'Silva J, Carusi C. Concurrent use of cigarettes and smokeless tobacco in Minnesota. *J Environ Public Health* 2012;2012:493109.
21. Heatherton TF, Kozlowski LT, Frecker RC, Fagerström KO. The Fagerström Test for Nicotine Dependence: a revision of the Fagerström Tolerance Questionnaire. *Br J Addict* 1991;86(9):1119–27.
22. Van Deusen A, Hyland A, Travers MJ, et al. Secondhand smoke and particulate matter exposure in the home. *Nicotine Tob Res* 2009;11(6):635–41.
23. Pierce JP, White MM, Messer K. Changing age-specific patterns of cigarette consumption in the U.S., 1992–2002: association with smokefree homes and state-level tobacco control activity. *Nicotine Tob Res* 2009;11(2):171–7.

24. Cigarette smoking among adults and trends in smoking cessation—U.S., 2008. *MMWR Morb Mortal Wkly Rep* 2009;58(44):1227–32.
25. Schillo BA, Wendling A, Saul J, et al. Expanding access to nicotine replacement therapy through Minnesota's QUITLINE partnership. *Tob Control* 2007;16(S1):i37–i41.
26. Boyle RG, Solberg LI, Magnan S, Davidson G, Alesci NL. Does insurance coverage for drug therapy affect smoking cessation? *Health Aff (Millwood)* 2002;21(6):162–8.
27. Mills AL, White MM, Pierce JP, Messer K. Home smoking bans among U.S. Households with children and smokers opportunities for intervention. *Am J Prev Med* 2011;41(6):559–65.
28. Okah FA, Choi WS, Okuyemi KS, Ahluwalia JS. Effect of children on home smoking restriction by inner-city smokers. *Pediatrics* 2002;109(2):244–9.
29. Mills AL, Messer K, Gilpin EA, Pierce JP. The effect of smokefree homes on adult smoking behavior: a review. *Nicotine Tob Res* 2009;11(10):1131–41.
30. CDC. Decrease in smoking prevalence—Minnesota, 1999–2010. *MMWR Morb Mortal Wkly Rep* 2011;60(5):138–41.
31. CDC. State-specific prevalence of smokefree home rules—U.S., 1992–2003. *MMWR Morb Mortal Wkly Rep* 2007;56(20):501–4.
32. Mumford EA, Levy DT, Romano EO. Home smoking restrictions. Problems in classification. *Am J Prev Med* 2004;27(2):126–31.
33. Gilpin EA, Pierce JP, Cavin SW, et al. Estimates of population smoking prevalence: self-vs proxy reports of smoking status. *Am J Public Health* 1994;84(10):1576–9.

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