

Exposure to Secondhand Smoke in Wisconsin Homes



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Acknowledgments

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Executive Summary

The purpose of this report is to examine trends in exposure to secondhand smoke in homes in Wisconsin. Our interest in this topic is driven by the negative health effects of secondhand smoke and the extent to which it is present in Wisconsin homes. Household exposure may also have particularly adverse effects on children. Our analyses revealed the following major findings:

- The percent of homes with no-smoking policies increased from 37% in 1992 to 75% in 2006.
- Between 1995 and 2003, the prevalence of no-smoking policies increased among homes with and without smokers.
- However in 2003, households without a smoker were twice as likely to have a no-smoking policy as those with a smoker.
- In fifty-eight percent of homes with smokers, smoking occurred in the last seven days. Three-quarters of those homes allowed smoking every day.
- Approximately 211,000 children in the state are exposed to secondhand smoke in their homes.

Overall, considerable progress has been made in terms of reductions in exposure to secondhand smoke in homes among both adults and children. However, continued efforts, aimed at encouraging individuals to either quit smoking or eliminate indoor exposure to smoke, are needed. Promising and evidence-based strategies to reduce home exposure to secondhand smoke include promoting parental cessation in homes with the greatest risk, tailoring public campaigns to “take it outside” to specific sub-populations and creating smoke free public places.



Health Effects of Secondhand Smoke

In June, 2006, the Office of the Surgeon General released the first report on secondhand smoke in nearly twenty years.¹ After extensive analysis of existing evidence concerning the association of secondhand smoke exposure with disease, the report concluded that secondhand smoke is associated with an increased risk of disease and premature death in adults and children who do not smoke. Specifically, all adults exposed to secondhand smoke are at an increased risk for coronary heart disease, and lifetime non-smokers face greater risk of lung cancer.¹ This is particularly important to non-smoking spouses who may be exposed to secondhand smoke over many years.

Children are also at risk of a wide range of serious health effects. These include lower respiratory illnesses, middle ear disease, and compromised lung function. There is also evidence of a causal relationship between parental smoking and ever having asthma among school age children. Furthermore, there is sufficient evidence of a relationship between exposure to secondhand smoke and sudden infant death syndrome (SIDS).¹

Exposure to secondhand smoke occurs in some homes, workplaces, and other public settings such as restaurants, bars and malls. While the impact of such exposure may vary by the frequency, duration, and concentration of the smoke, taken cumulatively, the consequences of secondhand smoke exposure are significant to overall health and well-being. A report published by the University of Wisconsin Paul P. Carbone Comprehensive Cancer Center estimated that between the years 2000 and 2004, approximately 800 deaths were associated with secondhand smoke annually in the state of Wisconsin² – comparable to the toll from traffic accidents each year.³

Exposure to Secondhand Smoke

Two of the major conclusions of the Surgeon General's report are that there is no safe level of exposure to secondhand smoke and that millions of Americans are still exposed to it despite considerable progress in tobacco prevention and control efforts. The report also noted that children are exposed more frequently than nonsmoking adults, and are more vulnerable to the toxins in smoke because their bodies are still developing. Moreover, the report showed that the home is the place where children are most frequently exposed to secondhand smoke.¹

Recognizing the importance of home-based exposure to secondhand smoke as a health issue, the Wisconsin Tobacco and Prevention Control Program identified a series of progressive goals to reduce children's exposure to secondhand smoke.⁴

- By December 31, 2006, the percent of homes with children that are smoke-free will increase from 74% to 80%.
- By December 31, 2008, the percent of homes with children that are smoke-free will increase from 74% to 85%.
- By December 31, 2010, the percent of homes with children that are smoke-free will increase from 74% to 90%.

In addition, *Healthy People 2010*, the national health objectives, also set the goal of reducing the proportion of children who are regularly exposed to secondhand smoke in the home to 10%.⁵

The purpose of this report is to examine trends in home exposure to tobacco smoke and home smoking policies, particularly as they affect children. Wisconsin data are compared to national data regarding no-

smoking policies in the home. More detailed analyses, examining trends in no-smoking policies and reported exposure to smoke, relative to the presence of children and smokers in the home, are presented for the state of Wisconsin. Interventions to reduce exposure are also discussed.

Methods

State and national data come from the Tobacco Use Supplement of the Current Population Survey (TUS-CPS) and the Behavioral Risk Factor Surveillance System (BRFSS). Additional Wisconsin data on adults were taken from the Wisconsin Tobacco Survey (WTS). Youth level data for Wisconsin were obtained from the Youth Tobacco Survey (YTS). Some of the trends presented in this report were adapted from previously published analyses. However, the majority of findings were obtained from new analyses using data from several existing surveys and SAS software.⁶ For a more detailed discussion of these data, see the [Technical Notes](#) at the end of this report.

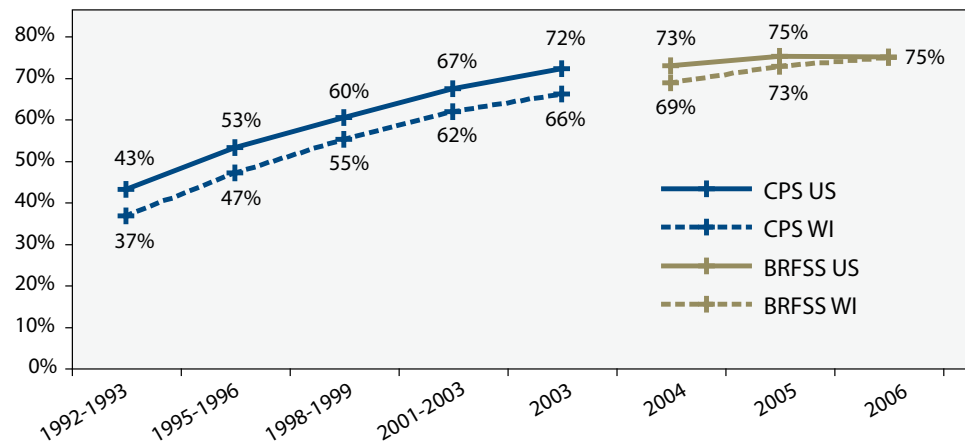
Results

Smoking policies in homes—Wisconsin and the United States

FIGURE 1. Percentage of Homes with a No-smoking Policy, Wisconsin and the U.S., 1992-2006

During the 1990s, Wisconsin trailed behind the U.S. average prevalence of household no-smoking policies, according to the Tobacco Use Supplement of the Current Population Survey (TUS-CPS).⁷ Until 2005, the rate of adoption of home policies in Wisconsin was roughly equal to the U.S.

average, about 3% per year. Specifically, prevalence rose from 37% in 1993 to 66% in 2003, compared with the U.S. average, which rose from 43% to 72% (see Figure 1). More recent data from the Behavioral Risk Factor Surveillance System (BRFSS) indicate that this gap may have closed. In 2006, the prevalence of home smoking bans in both Wisconsin and the U.S. had reached 75%.



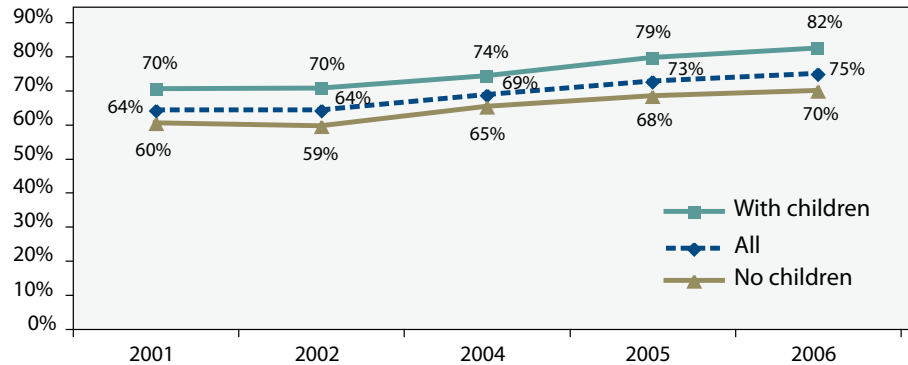
Data sources: 1992-2003 data are from the Current Population Survey (CPS); 2004-2006 data are from the Behavioral Risk Factor Surveillance System (BRFSS)



Smoking policies in Wisconsin homes — by presence of children and smokers

FIGURE 2. Percentage of Homes with a No-smoking Policy, by Presence of Children, Wisconsin, 2001-2006

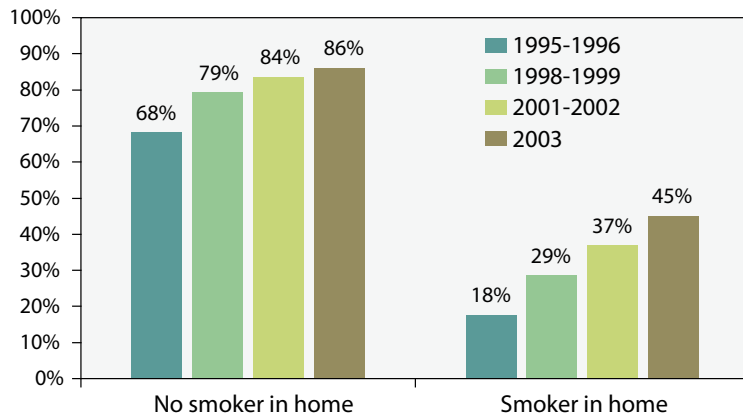
Data presented in **Figure 2** show the proportion of adults living in homes with a no-smoking policy by whether children are present in the home. Between 2001 and 2006, households with children present have been consistently more likely to have no-smoking policies in place (82% in 2006).



Data source: Wisconsin Behavioral Risk Factor Surveillance System. Note: Question not asked in 2003.

FIGURE 3. Percentage of Homes with Children and a No-smoking Policy, by Presence of Smoker, Wisconsin, 1995-2003

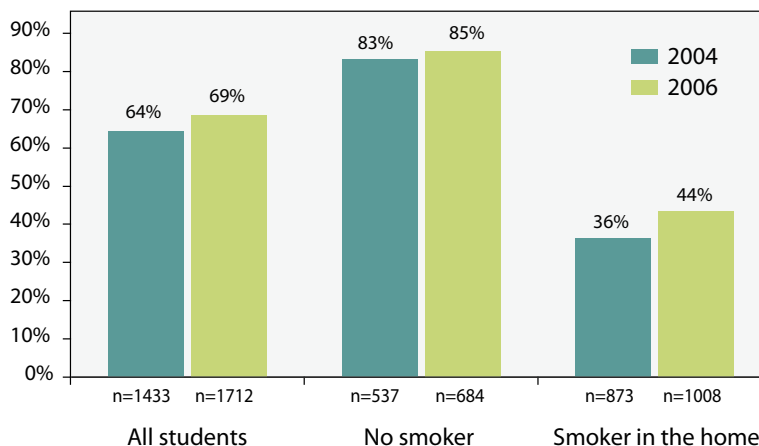
Figure 3 shows the proportion of adults with children who reported having a no-smoking policy by whether a smoker lived in the household. Households with smokers were half as likely to have such a policy compared to those without a smoker in 2003, the most recent year for which data is available (45% vs. 86%). Both types of households exhibited an increase in the adoption of no-smoking policies between 1995 and 2003. Households with a smoker reported both greater relative and greater absolute percent increases in smoking policy adoptions during that time period than households without a smoker (150% relative and 27% absolute, compared to 26% and 18%, respectively).



Data source: Current Population Survey

FIGURE 4. Percentage of High School Students Living in Homes with a No-smoking Policy, by Presence of a Smoker in the Home, Wisconsin, 2004, 2006

Surveys of youth indicate similar increasing trends in the adoption of no-smoking policies in the home. In 2004 and 2006, middle and high school students were asked about the smoking rules in their homes. Data for 2004 and 2006 high school students are shown in **Figure 4**.



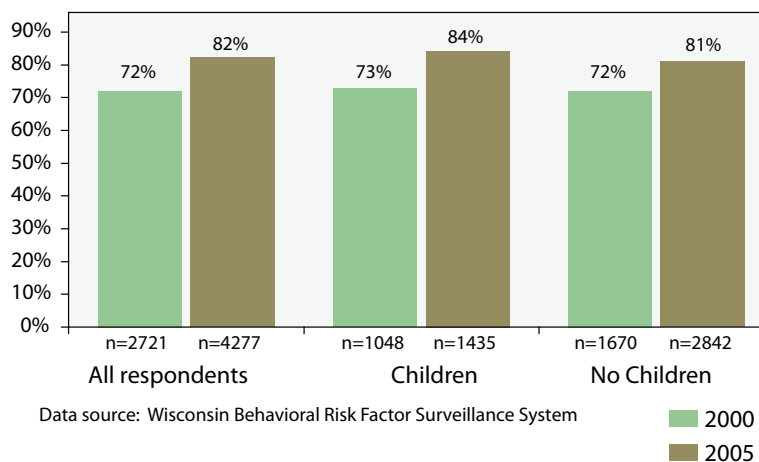
Data source: Wisconsin Youth Tobacco Survey

In 2004, 64% of Wisconsin high school students reported that smoking was not allowed in their home. By 2006, the percentage of homes not allowing smoking had risen to 69%. Similar to adults, children living with a smoker were nearly half as likely to report having a no-smoking rule compared to children that did not live with a smoker (44% vs. 85% in 2006).

Exposure in Wisconsin homes—by presence of children and smokers

FIGURE 5. Percentage of Homes where No Smoking Has Occurred in the Past 30 Days, by Presence of Children, Wisconsin, 2000 and 2005

While household rules or policies are one measure of exposure to secondhand smoke in the home, some surveys provide a more direct indicator – reports of actual smoking in the home. **Figure 5** presents the proportion of adult respondents to the 2000 and 2005 BRFSS



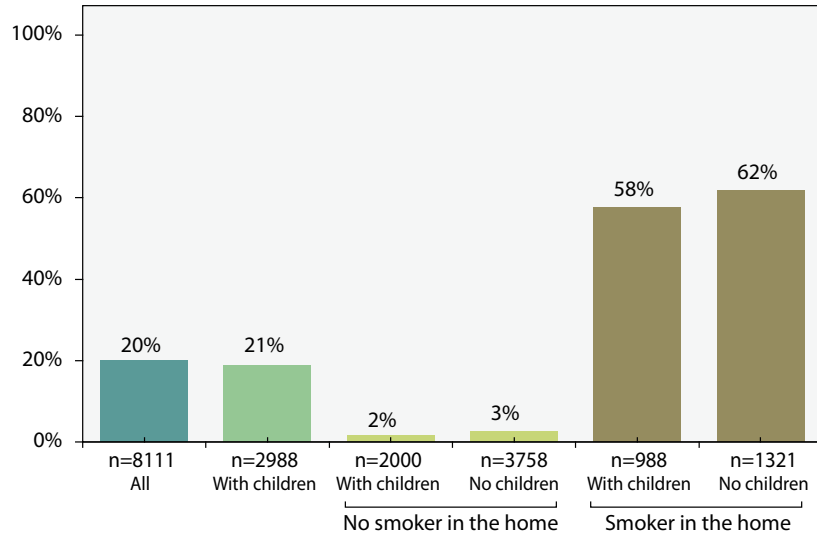
Data source: Wisconsin Behavioral Risk Factor Surveillance System

who reported that no smoking had occurred in their homes *during the previous 30 days* by presence of children. From 2000 to 2005, the percentage of homes with children reporting “no smoking” increased overall from 73% to 84%. Similar relative increases were noted among respondents with and without children.ⁱ

ⁱIn 2006, the BRFSS did not ask respondents whether smoking had occurred in the home during the past 30 days.



FIGURE 6. Percentage of Homes where Smoking has Occurred in the Past 7 Days, by Presence of Smoker and Children, Wisconsin, 2003

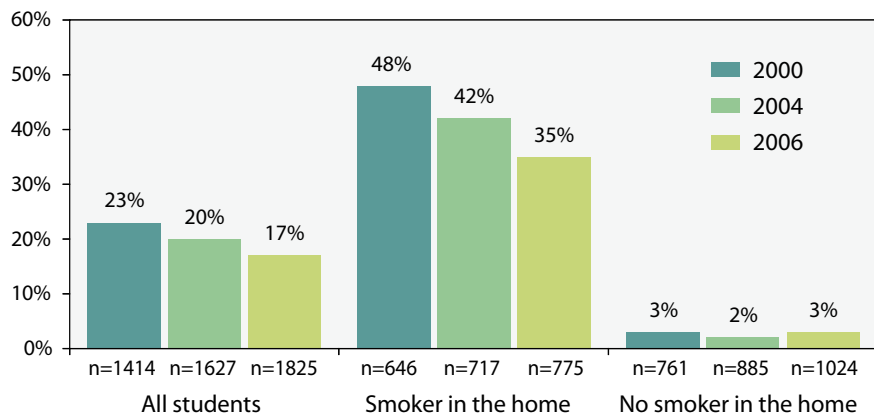


Data source: Wisconsin Tobacco Survey

Analyses indicate that in 43% of homes with smokers and children, smoking occurred every day (of the last seven).

Data from the 2003 WTS allow for examination of the frequency of smoking in the home in the past seven days, by the presence of both children and smokers. Data presented in **Figure 6** indicate that in 58% of smokers' homes with children, smoking occurred within the last 7 days. This contrasts with only 2% of children's exposure in the homes of non-smokers. Additional analyses indicated that in 43% of homes with smokers and children present, smoking occurred every day out of the last 7 (data not shown).

FIGURE 7. Percentage of Middle School Students who Experienced Daily Secondhand Exposure in the Home, by Presence of Smoker, Wisconsin, 2000-2006



Data source: Wisconsin Youth Tobacco Survey

Results from youth surveys mirror those from the adult surveys. According to data from the Wisconsin Youth Tobacco Survey, 35% of middle school youth who live with a smoker reported daily exposure in 2006, compared to 48% in 2000 (**Figure 7**). Daily exposure among children who did not live with a smoker was consistently low – 3% in both 2000 and 2006.



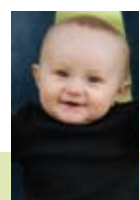
Discussion

The findings in this report indicate that an increasing number of homes in Wisconsin, and the United States more generally, have adopted no-smoking policies. In little more than a decade, the proportion of homes in Wisconsin with a no-smoking policy nearly doubled to 75%. In the U.S., non-smoking rules increased from 10% to 32% among households with a smoker and from 57% to 84% among households with no smoker.⁸ This steady increase in smoke-free Wisconsin homes reflects a dramatic shift in the social norms related to tobacco use in homes between 1992 and 2006. Most notably, this shift to a new social norm occurred when the smoking prevalence among adults did not appreciably decline.⁹

Importantly, the percentage of children exposed to secondhand smoke in the home has declined. According to adult respondents, the percentage of Wisconsin homes with children that have a no-smoking policy increased from 70% in 2001 to 82% in 2006. Surveys of Wisconsin youth yield similar results. These findings are consistent with previously published national trends. Analysis of National Health Interview Survey data found that, nationally, secondhand smoke exposure in homes with children declined from 36% in 1992 to 25% in 2000.¹⁰ Conversely, this indicates that 75% of homes with children were smokefree by the year 2000, across the nation. In Wisconsin, by 2005, 84% of homes with children were reportedly smokefree, thus surpassing the state goal of 80%.

Though considerable progress has made towards achieving the state's goal, this goal does not focus directly on the group of children most directly and substantially affected by smoking in the home – those children that live with a smoker. While the adoption of no-smoking policies has increased substantially in homes with smokers, such homes are still about half as likely to have such policies as homes without a smoker. High school students surveyed in 2006 who lived with a smoker were approximately 50% less likely to have a no-smoking rule in their home when compared to those not living with a smoker. Data from the 2003 Wisconsin Tobacco Survey indicated that in almost 60% of homes where both a smoker and children were co-residing, smoking had occurred in the past seven days. In three-quarters of those homes, smoking occurred each day.

The importance of emphasizing the exposure of children to secondhand smoke in the home is perhaps best exemplified by findings from the National Health and Nutrition Examination Survey (NHANES). Comparing data across four time periods, between 1988 and 2002, one study found a significant decreasing trend in the presence of cotinine, a metabolite of nicotine, in nearly 30,000 nonsmoking adults and children. This decrease was in all age groups. However, children ages 4-11 generally had the highest levels of serum cotinine during every time period studied, followed by adolescents, then adults.¹¹ These findings highlight the need to continue to encourage all adults to adopt no-smoking policies in their homes – the place where children are most likely to be exposed.





Policy Recommendations

The elimination of home smoking would remove the primary source of secondhand smoke exposure for children. However, because the home is the essence of a private, not public, place, policy initiatives that regulate the use of tobacco products in the home are largely impossible to enact or administer. Therefore, a combination of education and policy changes that alter social norms are keys to a wider adoption of smoking bans in homes. An analysis of data from the Behavioral Risk Factor Surveillance System found that states with high percentages of home smoking bans have either relatively low smoking prevalence due to socio-cultural factors (e.g. Utah, Idaho, Colorado) or comprehensive tobacco control and education programs (e.g. California, Florida, Oregon).¹² At the individual level, smokers who believe that secondhand smoke is very harmful are more likely to have a home smoking ban.⁷

Tailor Public Campaigns to Specific Sub-populations of Smokers:

Tobacco control community-education campaigns designed to encourage smoke-free homes have possibly reached the ceiling of their effectiveness in the community as a whole. Homes without smokers generally have either strict policies against smoking or no policies because there is no possibility that smoking will occur.¹³ In Wisconsin and in the nation, the challenge is to focus attention and education on smoking as a behavior that has dangerous health effects. An example of this latter kind of effort is the “Don’t Pass Gas” campaign recently fielded by the American Legacy Foundation in which smoking parents are scolded and embarrassed by their children for “passing gas.”¹⁴

Despite African-American children’s lower reported exposure to ETS than white children, they suffer higher rates of tobacco-related illnesses and display higher levels of serum cotinine, a biochemical marker of nicotine.¹⁵ This suggests the argument that greater efforts should be focused on this vulnerable sub-population. Educational and intervention programs specifically targeted towards the parents of African-American children at risk may be more effective than general campaigns. For example, the California-initiated “Not in Mama’s Kitchen” focuses its materials and message on empowering black families to “take control over their children’s health” through ensuring that homes are smoke-free.¹⁶

Promote Parental Cessation in Homes with Greatest Risk:

This approach is important because the patient-child may be injured by smoking but they cannot remove themselves from the smoke.

Pediatricians and other children’s health providers are uniquely situated to provide cessation counseling to parents who smoke. Previously, physician-patient protocol focused counseling and intervention only when the patient was the smoker. Now, pediatricians are advised to recommend counseling to the parent when the patient-child is suffering adverse effects of the parents’ secondhand smoke. This approach is important because the patient-child’s health may be injured by smoking but they cannot remove themselves from the smoke.

A recently implemented intervention encourages basic cessation counseling techniques for the pediatrician-parent/smoker interaction.¹⁷ While this intervention has not been systematically evaluated, it has shown potential in the “Healthy Air for Kids

Campaign”, a current pilot program at the University of Wisconsin’s Center for Tobacco Research and Intervention, directed at Wisconsin pediatricians and their patients’ parents who smoke. Given the strong causal relationship between exposure to secondhand smoke and a host of immediate and long-term illnesses, this educational initiative has the potential to significantly reduce pediatric illnesses.

Require Smoke-free Public Places:

Some opponents of smoking bans in public places have argued that these policies will increase children’s exposure to smoke because smokers will move their drinking and smoking from the bar to the home. While this makes some intuitive sense, early data do not support this hypothesis. A recent study of the effects of Ireland’s recent ban on smoking in bars found that 22% of Irish smokers reported placing stronger restrictions on smoking in their home after the introduction of the legislation, 6% reported smoking more in their homes, and 71% said that the law had no effect on their smoking behavior.¹⁸ A study of the effects of the ban on smoking in public places in Scotland, including bars and restaurants, found a very similar result of no additional smoking in homes.¹⁹ More generally, public bans on smoking may not only reflect public opinion and practice, but further influence and gain support among people that initially did not support the ban.²⁰ This process of social normalization of clean indoor air, which denormalizes social smoking, particularly among children, is supported by the near universal knowledge about the potential harms of secondhand smoke.



Future Research

Several areas of research could further inform the effective implementation of interventions to reduce exposure to environmental tobacco smoke in the home. The following fundamental questions were raised by the CDC’s Task Force on Community Preventive Service:²¹

- How effective are educational methods in reducing exposure to secondhand smoke in the home?
- Are home smoking bans more effective than smoking restrictions such as going outside when children are present or limiting smoking to specific rooms and times of day?
- What information or message is effective in prompting and maintaining smoke-free practices in the home?
- What channels are effective for dissemination of information to reduce secondhand smoke in the home?

In addition to the CDC’s questions, we should ask:

- Are there behavioral or social determinants and/or predictors of smoking behavior at home?
- Are community campaigns such as a “pledge” for smoke free homes effective in eliminating smoking in the homes of smokers?





Limitations

Because secondhand smoke is perceived as harmful by the vast majority of the population, some respondents, especially those with children at home, may not describe practices in their homes consistently.

Survey research on home smoking has taken a number of approaches with regards to sampling methodology, sample sizes, modality of questionnaire administration, topics included, and question phrasing. The unique construction of each of the surveys makes it difficult to compare data across sources and years.

Some surveys ask if the respondent has children, while others ask if the smoking occurs only when children are absent. Another standard survey question asks if the respondent has a “home policy” in regard to smoking, while others use the term “rules”. Surveys may also focus on differing units of analysis such as the behavior or exposure of the adult respondent or information on the household.

Questions on home policies may understate the prevalence of homes where smoking is not allowed because respondents who do not smoke are not likely to establish a specific rule.

A small number of surveys include questions concerned with the frequency of smoking in the home. These questions can take the form of whether smoking has occurred in the last thirty days, the magnitude of exposure over a given period of time, or a combination of these and other factors. These combinations, plus variations in phrasing, make it difficult to compare results across surveys.

Equally problematic are concerns about the reliability of survey responses from individuals who smoke in their homes. Because secondhand smoke is perceived as harmful by the vast majority of the population, respondents, especially those with children at home, may not describe practices in their homes consistently.ⁱⁱ A certain amount of universal misreporting is suggested by surveys that interview multiple respondents from the same household. It is common to find conflicting responses to questions on household practices from different members of the same household. For example, in one study examining data of multiple respondents from the same household, researchers found that 12% of multi-member households gave different answers on whether there was a household ban. Homes with a smoker were 60% more likely to give differing reports on their home practice than homes without smokers.²²

Data from the 2003 Wisconsin Tobacco Survey suggest that many smokers do not state that smoking is allowed in the home and instead state that they have no rules. More than half of the smokers in homes with children who say they have no rules also report that they smoked in their home every one of the past seven days. Similarly, 92% of smokers who say they have no rules on smoking also smoked at home at least once in the last week. This difference between the stated home policy and a description of practices may in part be due to the problem of “self-report” on a topic that may attribute stigma to the survey respondent.

ⁱⁱData from the 2003 Wisconsin Tobacco Survey indicate that 87% of current smokers either agreed or strongly agreed that breathing smoke from someone else’s cigarette is harmful. This compared with 97% of never smokers and 92% of former smokers.



Conclusions

We found a substantial increase in the report of home smoking bans from 1992 to 2006. While a similar trend took place during the period from 1970-1990, this was likely due to the parallel reduction in smoking prevalence during that time. In contrast, prevalence has declined very little in the past fifteen years. The more recent positive progress may therefore be attributed to an increase in public knowledge about the dangers of secondhand smoke and a change in social norms likely associated with policies such as workplace smoking bans. If prevalence does not substantially decrease in the future, further education campaigns and policy initiatives may be needed to further reduce exposure, especially childhood exposure to secondhand smoke.

Childhood exposure to secondhand smoke is associated with many health risks and developmental problems. Despite broad public understanding of the health risk, this report found that the majority of smokers continue to expose themselves, their children, and others to secondhand smoke. We estimate that approximately 211,000 youth in the state are exposed to secondhand smoke in their homes.ⁱⁱⁱ

Because resolution of the problem entails a change in a significant and on-going behavior within the home, broad social effort and support may be required. Research on individual states as well as nations with more comprehensive tobacco control policies and programs indicate that a comprehensive program of denormalization of tobacco use is effective across all socio-economic groups.²³ At the same time, education and intervention programs such as the Center for Tobacco Research and Intervention's "Healthy Air for Kids" campaign can reduce exposure in the near term.

ⁱⁱⁱ The estimate of 211,000 was derived from data from the Department of Health and Family Services, Bureau of Health Information. Their July 1, 2006 population estimate of 1,321,945 for Wisconsin residents aged 0-17 was multiplied by .16, which is the proportion of respondents in households with children that allowed smoking during the previous 30 days in 2005. (See Figure 5)

Childhood exposure to secondhand smoke is associated with numerous health risks and developmental problems. We estimate that approximately 211,000 youth in the state are exposed to secondhand smoke in their homes.





Technical Notes

The analyses included in this report use data from a wide variety of state and national surveys:

Tobacco Use Supplement to the Current Population Survey (TUS-CPS) is a personal interview survey of tobacco use that was administered as a supplement to the Census Bureau's Current Population Survey in 1992-1993, 1995-1996, 1998-1999, 2000, 2001-2002, and 2003.

Behavioral Risk Factor Surveillance System (BRFSS) is a representative, statewide telephone survey. The survey was established by the Centers for Disease Control and Prevention and is administered by the Wisconsin Department of Health and Family Services. This analysis includes data from 1999 to 2006, except that the question on home smoking policies was omitted in 2003. The sample size in Wisconsin varied from 2,177 in 1999 to 4,831 in 2006. Because the BRFSS question on whether anyone smoked in the home during the past 30 days was not included in the 2006 BRFSS, the 2005 data are reported for this measure. Data from the US BRFSS, a national pooling of state-administered surveys, was also used, in order to compare Wisconsin and US home smoking ban prevalence.

Youth Tobacco Survey (YTS) is a school-based written survey conducted with students in grades 6-12 in randomly selected schools and classes. Responses were weighted to account for non-response and to reflect the overall Wisconsin public high and middle school population. The survey was developed and administered by the Wisconsin Department of Health and Family Services. This analysis includes data from 2000, 2004, and 2006. The sample size among middle school students varied from 1,440 in 2000 to 1,892 respondents in 2006. The sample size among high school students varied from 1,307 in 2000 to 1,737 respondents in 2006.

Wisconsin Tobacco Survey (WTS) was conducted by the Center for Tobacco Research and Intervention in 2001 and 2003. This analysis includes data from the 2003 survey. The survey of over 100 questions on tobacco use and cessation, health care services and demographics was fielded to 8,111 Wisconsin respondents at least 18 years old.



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