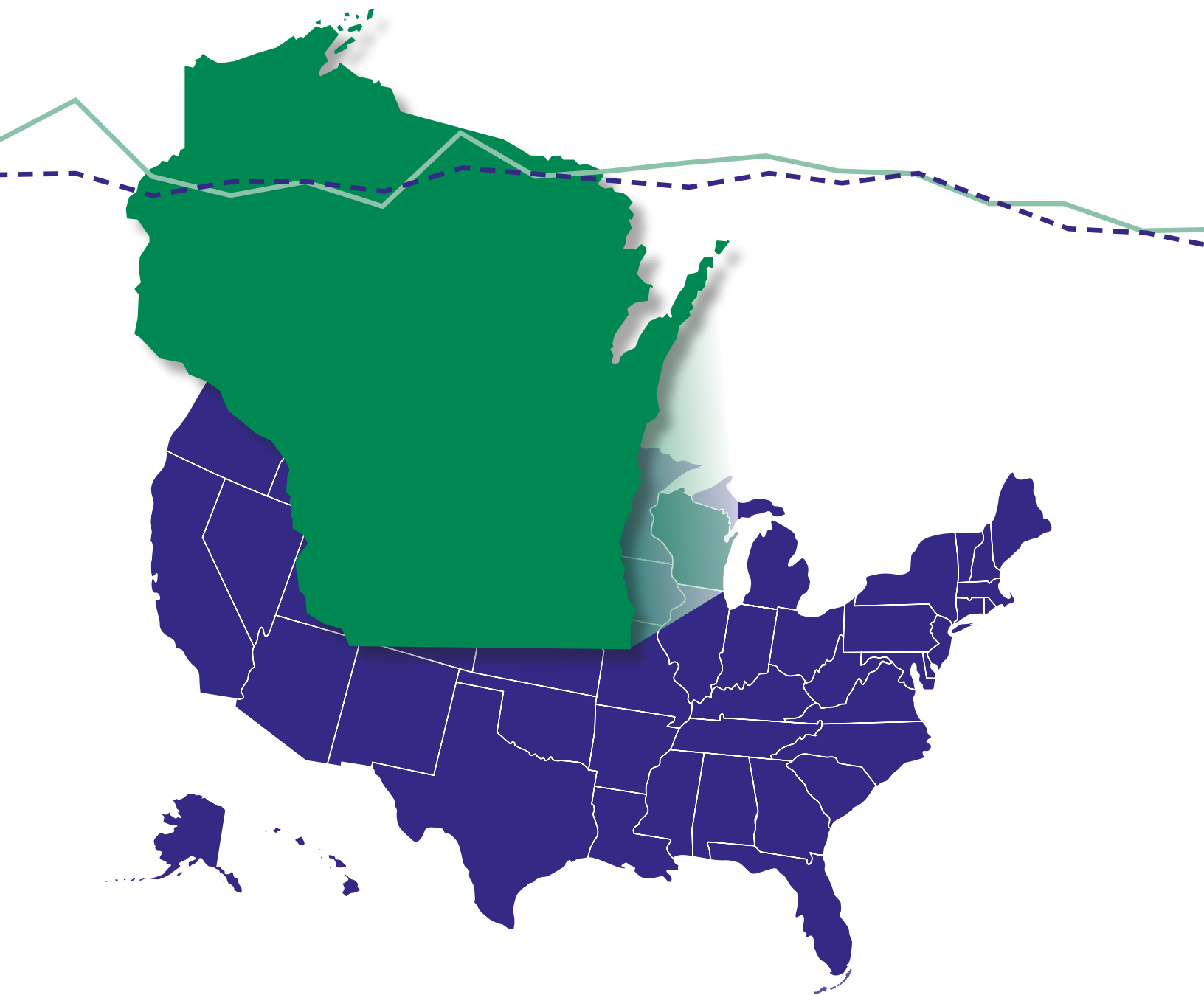


ADULT SMOKING IN WISCONSIN

An assessment of trends in adult smoking, 1990-2006



**TOBACCO SURVEILLANCE
& EVALUATION PROGRAM**
UNIVERSITY OF WISCONSIN
PAUL P. CARBONE
COMPREHENSIVE CANCER CENTER



**WISCONSIN DEPARTMENT OF
HEALTH AND FAMILY SERVICES**

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Executive Summary

The purpose of this report is to assess overall trends in adult smoking in Wisconsin and the United States since 1990. In addition, the prevalence of smoking was examined relative to select social and demographic factors in the state of Wisconsin. Data presented in this report reveal the following major patterns in adult smoking:

State and National

From 1990 to 2006, the prevalence of smoking among adults decreased gradually in both Wisconsin and the United States. In Wisconsin, the prevalence decreased from 25% in 1990 to 21% in 2006; in the United States, it decreased from 23% in 1990 to 20% in 2006.

Gender

Although men were generally more likely to smoke than women, the prevalence of smoking among both genders decreased in Wisconsin between 1990 and 2006. Among men, the prevalence decreased from 26% in 1990 to 23% in 2006; among women, it decreased from 23% in 1990 to 18% in 2006.

Age

In general, the prevalence of smoking is greater among young people than among older people in Wisconsin. As of 2005-2006, the highest smoking prevalence occurred among persons aged 25-29 years (31%), followed by persons aged 18-24 years (27%), and those aged 30-39 and 40-54 years (24%, respectively). The older age groups had substantially lower proportions of smokers, with 17% of people in the 55-64 year old age group and 8% of people 65 years and older being regular smokers in 2005-2006. For most age groups, the smoking prevalence decreased since 1991-1992, with the exception of the 25-29 year old group, among which an increase in smoking prevalence was detected.

Race

For all racial and ethnic groups examined, except American Indians, the prevalence of smoking decreased between 1991-1992 and 2005-2006. American Indians had the highest smoking prevalence in 2005-2006 (56%), followed by Blacks (29%), Whites (20%), Hispanics (19%), and Asians or Pacific Islanders (13%). Note: the American Indian and Asian/Pacific Islanders smoking prevalence estimates may not be reliable due to small sample sizes.

Education

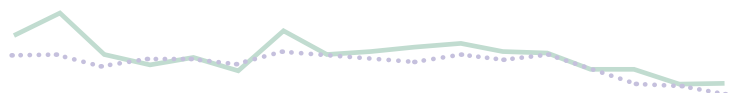
In 2005-2006, the prevalence of smoking was lower for individuals in each sequentially higher category of educational attainment: 32% among adults with less than a high school education, 26% among those with a high school degree or G.E.D., 22% among those with some post-high school education, and 9% among adults with a 4-year college degree or higher. Trends revealed a substantial decrease in smoking prevalence since 1993-1994 among adults with a 4-year college degree or higher, while there was a smaller decrease among those with high school diplomas or G.E.D.s. Smoking prevalence increased slightly among persons in the other two education groups.

Income

In 2006, the prevalence of smoking was lower for individuals in each sequentially higher category of household income, ranging from 34% among adults with household incomes less than \$25,000, to 13% among those with household incomes of \$75,000 or more.

Cigarette consumption

Between 1991 and 2006, average daily cigarette consumption decreased among smokers in Wisconsin. The percentage of smokers reporting smoking a pack or more per day decreased from 54% to 37%, while the percentage of smokers reporting smoking less than a pack per day increased from 45% to 63%.



Introduction

Tobacco use remains the leading preventable cause of disease and death in the United States. Cigarette smoking causes many diseases, including numerous types of cancer, cardiovascular disease, and respiratory disease.¹ The fact that cigarette smoking is harmful to the health of the smoker and to those exposed to secondhand smoke is well-known to the general public. Reports based on the 2003 Wisconsin Tobacco Survey revealed that most smokers believe smoking has negatively affected their health², and 94% of Wisconsin residents agree that secondhand smoke is harmful.³

Despite the well-known adverse health effects associated with cigarette smoking, reducing tobacco use has been a challenge to public health agencies around the country. One in five Americans, 18 years of age and older, still smoke cigarettes on a regular basis. In 2006, the prevalence of smoking among adults in the United States was 20%, while the prevalence in Wisconsin was 21%.⁴ The U.S. prevalence is far from the goal set forth in *Healthy People 2010*, which proposes to reduce the adult prevalence of cigarette smoking to 12% nationwide.⁵ The *Healthiest Wisconsin 2010* goal is to reduce adult smoking prevalence in Wisconsin to 19%.⁶

With these goals in mind, the purpose of this report is to examine overall trends in adult smoking in Wisconsin and the United States. Trends in the prevalence of smoking in Wisconsin were compared to those of the United States. In addition, the prevalence of smoking in Wisconsin was examined by various demographic subgroups. The data for this report came from the Behavioral Risk Factor Surveillance System.⁴

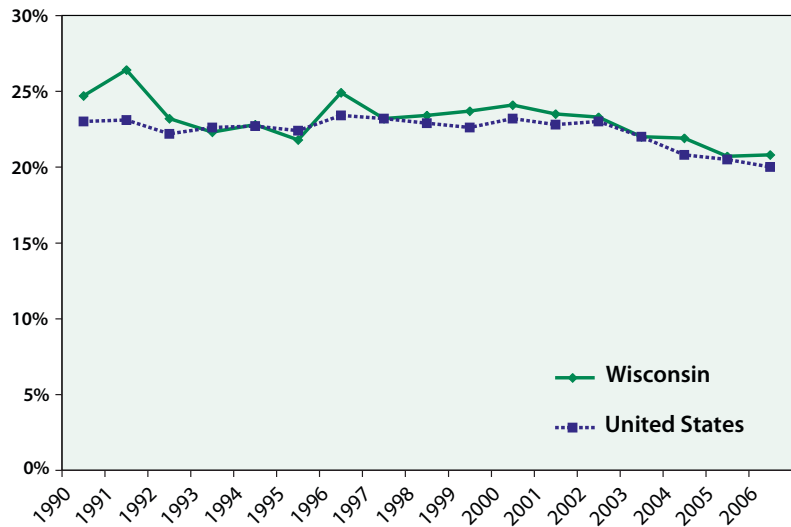
Findings presented here are intended to provide a resource for tobacco control programs working to reduce the prevalence of smoking among adults in Wisconsin. Knowledge of trends in smoking prevalence among different groups can aid in targeting those most at risk of smoking, and thus, most in need of prevention and cessation efforts. This report may also assist public health agencies in assessing progress and developing policies toward the overall goal of adult tobacco use reduction.

Results

Wisconsin and the United States

FIGURE 1. Prevalence of adult smoking, Wisconsin and the United States, 1990-2006

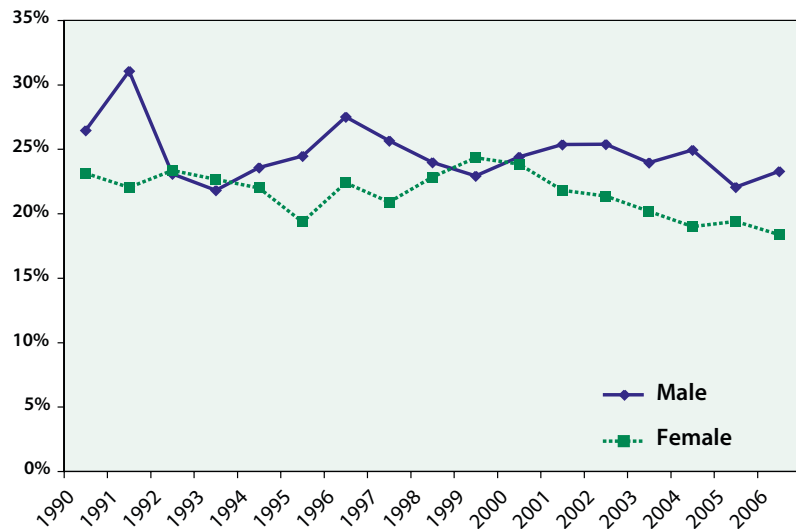
The percentage of adults who smoked in the United States and Wisconsin from 1990 to 2006 is shown in Figure 1. The United States and Wisconsin have had fairly similar percentages of adult smokers during the time period examined, and both experienced slight declines in those percentages since 1990. In Wisconsin, the prevalence of smoking among adults decreased from 25% in 1990 to 21% in 2006, representing a relative percent decrease of 16%[‡]. In the United States, the prevalence of smoking among adults decreased from 23% in 1990 to 20% in 2006, representing a relative percent decrease of 13%. (Data for Figure 1 are located in Table 1 of the appendix.)



Wisconsin, by gender

FIGURE 2. Prevalence of adult smoking in Wisconsin, by gender, 1990-2006

Figure 2 provides a comparison of the prevalence of smoking among men and women in Wisconsin from 1990 to 2006. In Wisconsin, men generally have a higher prevalence of smoking than women. Between 1990 and 2006, smoking prevalence decreased slightly among both men and women, although the relative decrease was greater among women. The prevalence among women decreased from 23% to 18%, a relative percent decrease of 21%, while the prevalence among men decreased from 26% to 23%, a relative percent decrease of 12%. (Data for Figure 2 are located in Table 2 of the appendix.)



[‡] Relative percent change provides a standard comparison between populations with different initial prevalences. Relative percent change is calculated by subtracting the prevalence for the initial time period from the prevalence for the most recent time period, and dividing the result by the prevalence for the initial time period. This number is then multiplied by 100% to get the relative percent change = $[(\% \text{ in } 2006 - \% \text{ in } 1990) \div \% \text{ in } 1990] \times 100\%$.

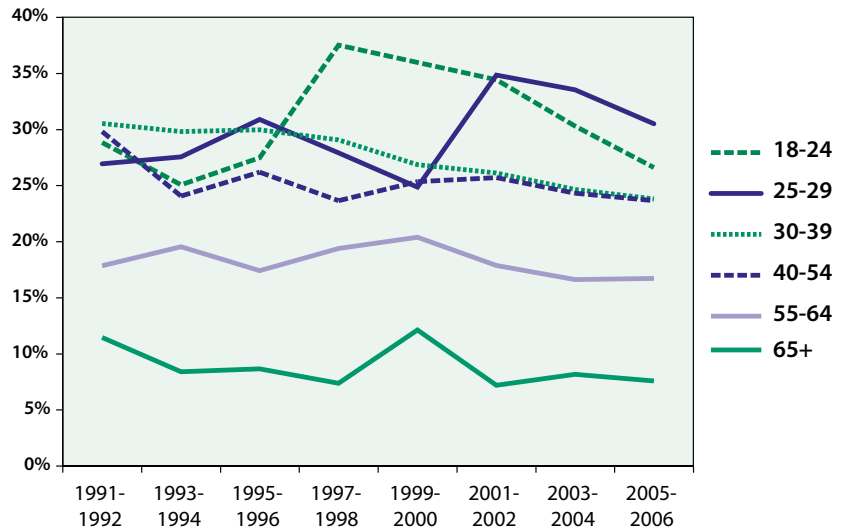
Wisconsin, by age

FIGURE 3. Prevalence of adult smoking in Wisconsin, by age, 1991-2006, by two-year averages

Figure 3 shows the trends in smoking prevalence among six different age groups in Wisconsin from 1991 to 2006 by two-year averages. Between 1991 and 2006, smoking prevalence decreased among most, but not all, adult age groups in Wisconsin. Among adults aged 18 to 24 years, smoking prevalence increase between 1993 and 1998. Subsequent to a peak prevalence of 38% during 1997-1998, prevalence among this age group decreased to 27% during 2005-2006.

The dramatic rise in smoking prevalence among this youngest age group between 1995 and 1998 was followed by a similar increase among the next age group (25-29 year olds) between 1999 and 2002 – a pattern suggestive of a cohort effect (i.e., the increase in smoking prevalence of 25-29 year olds was due to the aging of the 18-24 year olds from the previous years).

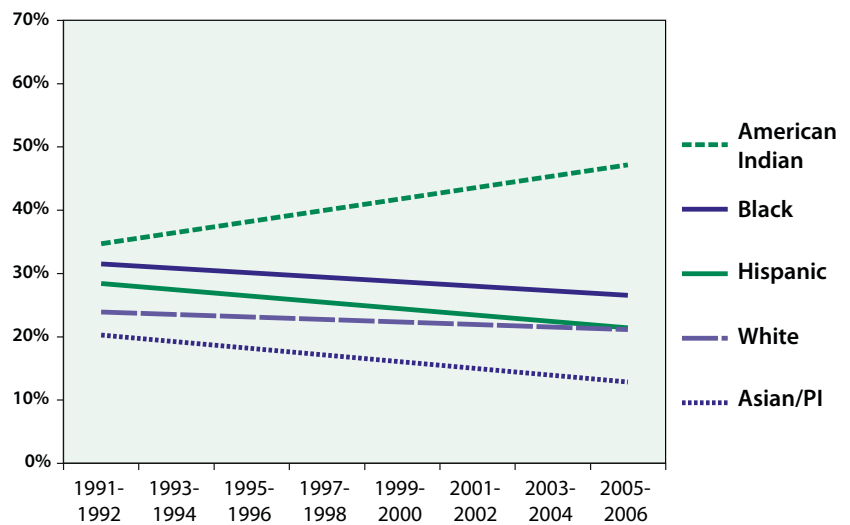
Persons aged 25-29 years have had the highest smoking prevalence since 2002 (31% during 2005-2006), and experienced an increase during the period examined. A moderate decline in smoking prevalence was observed among persons aged 30-39 and 40-54 years, each with a prevalence of 24% in 2005-2006. The older age groups had significantly lower proportions of smokers: 17% among persons aged 55-64 years old and 8% among persons aged 65 years and older in 2005-2006. (Data for Figure 3 are located in Table 3 of the appendix.)



Wisconsin, by race/ethnicity

FIGURE 4. Prevalence of adult smoking in Wisconsin, by race/ethnicity, 1991-2006, by two-year averages

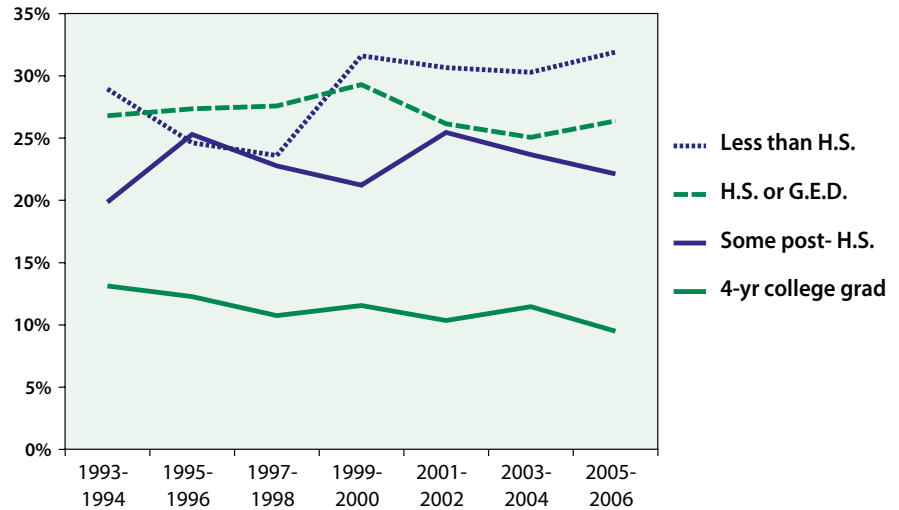
Figure 4 demonstrates the general trend in smoking prevalence by race/ethnicity in Wisconsin between 1991 and 2006 using linear regression (see technical notes for details). For Whites, Blacks, Hispanics, and Asians or Pacific Islanders (PI), the trendlines reveal a decrease in smoking prevalence. The trend in smoking prevalence for American Indians suggests an increase, though the reliability of the trendline is tenuous due to small sample sizes for this population (see discussion section). (Actual data points for Figure 4 are located in Table 4 of the appendix.)



Wisconsin, by education

FIGURE 5. Prevalence of adult smoking in Wisconsin (ages 25 years and older), by education, 1993-2006, by two-year averages

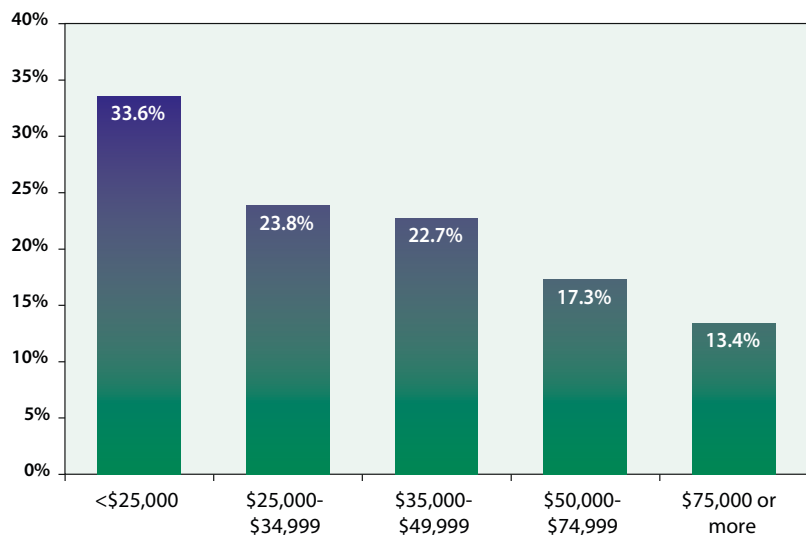
The percentage of adults aged 25 years and older who smoked in Wisconsin from 1993 to 2006 is shown by level of educational attainment in Figure 5. In 2005-2006, the prevalence of smoking was lower in each sequentially higher category of educational attainment. Furthermore, this educational disparity in smoking prevalence increased during the observed 14-year period. The absolute difference in prevalence between the lowest and highest educational groups was 16% during 1993-1994 (prevalence ranged from 29% to 13%), versus 23% during 2005-2006 (prevalence ranged from 32% to 9%). Among adults with less than a high school degree and those with some post-high school education but not a four-year degree, the prevalence of smoking increased slightly between 1993 and 2006. Among four-year college graduates, smoking prevalence decreased from 13% to 9%. Among adults with a high school diploma or G.E.D., the prevalence of smoking decreased very slightly between 1993 and 2006. (Data for Figure 5 are located in Table 5 of the appendix.)



Wisconsin, by household income

FIGURE 6. Prevalence of adult smoking in Wisconsin, by household income, 2006

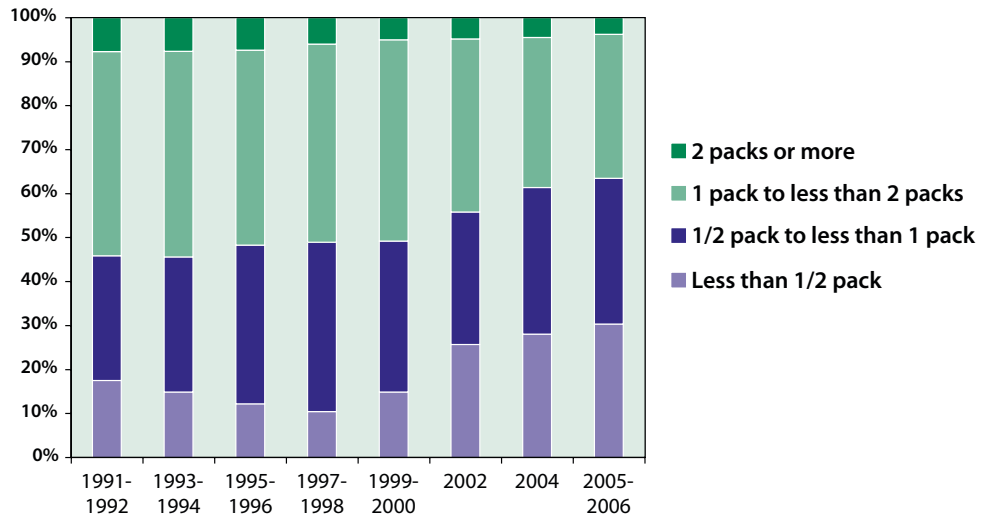
Figure 6 shows the prevalence of smoking among Wisconsin adults by household income for 2006. Smoking prevalence in 2006 was highest among respondents with household incomes of less than \$25,000 (34%). The prevalence of smoking was lower for individuals in each sequentially higher income group, with the highest earning group having a smoking prevalence of 13%.



Wisconsin, average cigarette consumption

FIGURE 7. Average daily cigarette consumption among smokers, Wisconsin, 1991-2006*, by two-year averages

Figure 7 illustrates the trend in average daily cigarette consumption among adult smokers in Wisconsin from 1991 to 2006. The trend is a decline in the average number of cigarettes smoked per day. The percentage of smokers reporting smoking a pack or more per day has decreased from 54% to 37%, while the percentage of smokers reporting smoking less than a pack per day has increased from 45% to 63%. (Data for Figure 7 are located in Table 6 of the appendix.)



* 2001 and 2003 data not available

Discussion

The prevalence of smoking among adults decreased in both Wisconsin and the United States between 1990 and 2006. Overall smoking prevalence in Wisconsin decreased from 25% in 1990 to 21% in 2006. During the same time period, smoking prevalence in the U.S. decreased from 23% to 20%. However, despite clear evidence that smoking is harmful to the health of smokers and those exposed to their smoke, more than 1 in 5 adults in Wisconsin still smoked regularly in 2006. Additionally, the prevalence of smoking among adults is not equally distributed within Wisconsin's population.

This report indicates that men, younger adults, Blacks and American Indians, and individuals with lower education and income levels smoke at proportions that are higher than average among Wisconsin adults. However, the trends in smoking prevalence among these subgroups have varied since the 1990s.

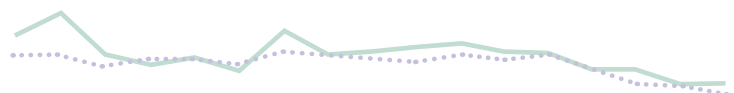
Among both genders, smoking prevalence decreased in Wisconsin between 1990 and 2006, although there was a greater decrease among females. In general, smoking among adults aged 30 years and older decreased slightly since 1991-1992. The smoking prevalence among adults in younger age groups increased during the late 1990s and early 2000s, and then declined from the peak levels observed during these years. Adults aged 25-29 years had the highest smoking prevalence (31%) in 2005-2006, a 13% increase from the observed prevalence in 1991-1992. The increase observed among this age group followed an increase previously observed among persons aged 18-24 years. These findings suggest that the smoking habits established among the youngest adults near the end of the 20th century carried on into the 21st century. This highlights the importance of early intervention efforts focused on youth and young adults.

Most racial/ethnic groups in Wisconsin experienced a decline in smoking prevalence since 1991-1992, with the exception of American Indians. An increase in smoking prevalence was observed for this group, although the reliability of this trend estimate is affected by the small samples of American Indians surveyed, and should be interpreted with caution. Nationally, the smoking prevalence among American Indians decreased, from 38% in 1990 to 33% in 2004.⁷

Trends in smoking prevalence have also varied according to educational attainment in Wisconsin. Only adults with a college degree or higher showed notable declines in smoking prevalence since 1993-1994. Adults with less than a 4-year college education had smoking trends that remained relatively stable or increased slightly, depending on level of education. Overall, the gap in prevalence between the lowest and highest educational groups increased during the observed 14-year period, representing an increasing educational disparity in smoking prevalence.

Trends in smoking prevalence relative to household income were difficult to ascertain because adjustment for inflation was not possible. Based on 2006 data, individuals with household incomes less than \$25,000 had a smoking prevalence of 34%, with each sequentially higher income group having a lower prevalence. This inverse relationship between income and smoking prevalence has been fairly constant in Wisconsin over the past decade (data not shown).

Although smoking prevalence is decreasing rather slowly, daily cigarette consumption has also been declining, which may help reduce the health burden related to tobacco use in Wisconsin. In 1991-1992, the majority of smokers consumed a pack of cigarettes or more per day, while in 2005-2006, the majority of smokers were smoking less than a pack per day.



Limitations

All data in this report came from the Behavioral Risk Factor Surveillance System Survey (BRFSS), which is a landline telephone survey. To the extent that any particular subgroup of the population does not have a landline telephone, estimates may not be representative of the entire state and/or U.S. population. Reliability of estimates may also be affected depending on the characteristics of people who are willing to complete the telephone survey. Additionally, prevalence estimates of racial groups such as American Indians may not be reliable due to small sample sizes in the survey.

Conclusion

A substantial drop in the overall consumption of cigarettes (packs per capita) in Wisconsin since 1990 was demonstrated in a recent report.⁸ The findings in the current study suggest this overall decrease in per capita cigarette consumption was due to a slow, but persistent, decline in the number of smokers, in combination with a reduction in daily cigarette consumption among those who do smoke. These positive findings, in part, reflect a changing social norm regarding the acceptance and expectations surrounding tobacco use in our society today. This changing norm is likely associated with the continued tobacco prevention and control efforts of the multitude of public health professionals around the state. But while progress has been observed in reducing the overall prevalence of smoking in Wisconsin, certain socio-demographic subgroups continue to be more likely to smoke, such as men, young adults, individuals of lower income and educational attainment, and Blacks and American Indians. These findings demonstrate the need for increased tobacco prevention efforts that more appropriately target these groups. Additionally, the observed increase in smoking prevalence among American Indians is a finding that deserves further investigation and substantiation through sampling larger numbers of this population.

In order to meet the *Healthiest Wisconsin 2010* goal of reducing the smoking prevalence in Wisconsin to 19%, further work needs to be done in the area of tobacco use prevention and cessation. Current initiatives being discussed in the Wisconsin legislature, such as an increase in the tobacco tax and a statewide smoke-free workplace policy, have elsewhere been associated with decreases in smoking prevalence.^{9,10} These proposals could have a significant impact on moving Wisconsin toward the 2010 goal. Without a doubt, achieving this goal will take a sustained effort from public health agencies, healthcare personnel, and other concerned groups working to reduce the toll of tobacco on individuals and communities.

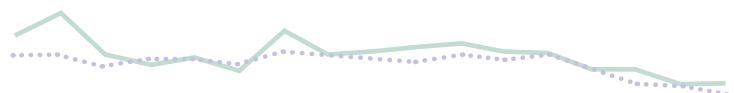
Technical Notes

All data in this report are from the Behavioral Risk Factor Surveillance System Survey (BRFSS), which is coordinated by the Centers for Disease Control and Prevention (CDC). The BRFSS is a state-based random-digit-dialing telephone survey of non-institutionalized adults aged 18 years and older. Current smokers were defined as those individuals that reported having smoked at least 100 cigarettes in their lifetime and were smoking either every day or some days at the time of the survey. Statistical analyses were conducted using SAS 9.1 software.¹¹

Data on smoking prevalence and cigarette consumption were analyzed for the years 1990-2006, or 1991-2006 for two-year averages, when available. The smoking prevalence trends for race/ethnicity were analyzed using a linear regression trendline because of the large variation between data points that resulted from small sample sizes and possible uneven sampling. The smoking prevalence trend for household income was difficult to analyze within each income category over several years without adjustment for inflation. Because this was not possible with the available data, only the most recent year of data is shown. Data on cigarette consumption is missing for years 2001 and 2003 because the question on consumption was not included in the survey those years. Smoking prevalence for educational attainment was only analyzed for adults aged 25 years and older in order to avoid distortion caused by the aggregation of individuals actively pursuing higher education with those who will ultimately attain less education.

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Appendix of Data Tables

Table 1

Prevalence of adult smoking and relative percent change, Wisconsin and the United States, 1990-2006

	Wisconsin	United States
1990	24.7%	23.0%
1991	26.4%	23.1%
1992	23.2%	22.2%
1993	22.3%	22.6%
1994	22.8%	22.7%
1995	21.8%	22.4%
1996	24.9%	23.4%
1997	23.2%	23.2%
1998	23.4%	22.9%
1999	23.7%	22.6%
2000	24.1%	23.2%
2001	23.5%	22.8%
2002	23.3%	23.0%
2003	22.0%	22.0%
2004	21.9%	20.8%
2005	20.7%	20.5%
2006	20.8%	20.0%
Relative percent change	-15.8%	-13.0%

Table 2

Prevalence of adult smoking in Wisconsin and relative percent change, by gender, 1990-2006

	Male	Female
1990	26.5%	23.1%
1991	31.1%	22.0%
1992	23.1%	23.4%
1993	21.8%	22.7%
1994	23.6%	22.0%
1995	24.5%	19.4%
1996	27.5%	22.4%
1997	25.7%	20.9%
1998	24.0%	22.8%
1999	22.9%	24.4%
2000	24.4%	23.9%
2001	25.4%	21.8%
2002	25.4%	21.4%
2003	24.0%	20.2%
2004	25.0%	19.0%
2005	22.1%	19.4%
2006	23.3%	18.4%
Relative percent change	-12.0%	-20.6%

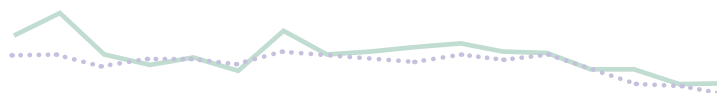


Table 3

Prevalence of adult smoking in Wisconsin and relative percent change, by age, 1991-2006, by two-year averages

	18-24	25-29	30-39	40-54	55-64	65+
1991-1992	28.8%	26.9%	30.5%	29.8%	17.9%	11.5%
1993-1994	25.1%	27.6%	29.8%	24.1%	19.5%	8.4%
1995-1996	27.5%	30.9%	30.0%	26.2%	17.4%	8.7%
1997-1998	37.5%	27.9%	29.1%	23.6%	19.4%	7.4%
1999-2000	36.0%	24.8%	26.9%	25.3%	20.4%	12.1%
2001-2002	34.4%	34.9%	26.1%	25.7%	17.9%	7.2%
2003-2004	30.3%	33.5%	24.7%	24.3%	16.6%	8.2%
2005-2006	26.6%	30.5%	23.8%	23.7%	16.7%	7.6%
Relative percent change	-7.7%	+13.2%	-22.0%	-20.6%	-6.4%	-33.9%

Table 4

Prevalence of adult smoking in Wisconsin and relative percent change, by race/ethnicity, 1991-2006, by two-year averages

	White	Black	Hispanic	Asian/PI*	American Indian*
1991-1992	24.3%	37.7%	27.3%	17.3%	34.6%
1993-1994	22.2%	28.6%	27.5%	17.1%	32.0%
1995-1996	22.9%	29.6%	27.5%	29.1%	29.0%
1997-1998	23.0%	23.5%	22.0%	10.8%	59.5%
1999-2000	23.3%	27.4%	28.6%	21.2%	48.9%
2001-2002	22.8%	26.8%	24.9%	7.6%	39.6%
2003-2004	21.4%	29.2%	21.9%	16.7%	28.0%
2005-2006	20.2%	29.3%	19.4%	12.6%	55.8%
Relative percent change	-17.1%	-22.1%	-28.8%	-27.1%	+61.6%

* Estimates may not be reliable due to small sample sizes

Table 5

Prevalence of adult smoking in Wisconsin (ages 25+) and relative percent change, by education, 1993-2006, by two-year averages

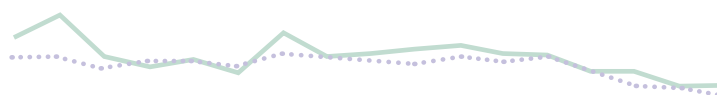
	Less than H.S.	H.S. or G.E.D.	Some post-H.S.	4-yr college grad
1993-1994	29.0%	26.8%	19.9%	13.1%
1995-1996	24.6%	27.4%	25.3%	12.3%
1997-1998	23.6%	27.6%	22.8%	10.7%
1999-2000	31.6%	29.3%	21.2%	11.6%
2001-2002	30.6%	26.1%	25.5%	10.3%
2003-2004	30.3%	25.1%	23.7%	11.5%
2005-2006	31.9%	26.4%	22.1%	9.5%
Relative percent change	+10.2%	-1.6%	+11.4%	-27.6%

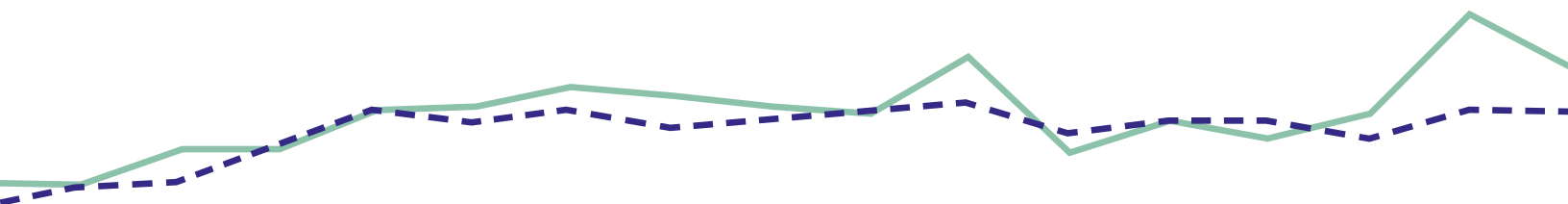
Table 6

Average daily cigarette consumption among smokers in Wisconsin and relative percent change, 1991-2006*, by two-year averages

	Less than 1/2 pack	1/2 pack to less than 1 pack	1 pack to less than 2 packs	2 packs or more
1991-1992	17.5%	28.4%	46.4%	7.7%
1993-1994	14.8%	30.7%	46.8%	7.7%
1995-1996	12.2%	36.1%	44.3%	7.4%
1997-1998	10.4%	38.5%	45.1%	6.0%
1999-2000	14.9%	34.4%	45.7%	5.1%
2002	25.7%	30.2%	39.4%	4.8%
2004	28.0%	33.4%	34.1%	4.5%
2005-2006	30.3%	33.1%	32.8%	3.8%
Relative percent change	+73.4%	+16.9%	-29.5%	-50.9%

* 2001 and 2003 data not available





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& EVALUATION PROGRAM**
UNIVERSITY OF WISCONSIN
PAUL P. CARBONE
COMPREHENSIVE CANCER CENTER



**WISCONSIN DEPARTMENT OF
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