Trends in Cigarette Smoking Among High School Youth in Wisconsin and the United States, 1993-2004

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ABSTRACT
Trends in current cigarette smoking among high school students in Wisconsin and the United States were examined using data from the Youth Risk Behavior Surveillance System and the Youth Tobacco Survey. Data were analyzed for years 1993 through 2004.

Results of the analyses reveal an increasing prevalence in current smoking among high school youth in both Wisconsin and the United States during most of the 1990’s, followed by a downward trend. During the period under consideration, peak prevalence is observed for the United States in 1997 (36.4%), with rates decreasing to 22.3% in 2004. In Wisconsin, rates peaked during 1999 (38.1%) and decreased to 20.9% in 2004. Subgroup analyses of Wisconsin data show similar rates of smoking among females (21.9%) and males (19.8%) in 2004. Analysis by grade demonstrate a narrowing of the gap between the oldest and the youngest grades over time, with all 4 grades displaying decreasing rates in current smoking.

Overall, the findings are very positive, and suggest that efforts aimed at reducing tobacco use among our youth have been effective at both the state and national level. However, recent cuts in state and federal funding have led to reductions in tobacco control program initiatives. Thus, vigilant monitoring is crucial as we continue to work towards the “Healthy People 2010” goal that states that no more than 16% of high school students will report current cigarette use.

INTRODUCTION
Youth smoking has been an issue of great concern over the past decade as rates of current cigarette use increased among high school students in both Wisconsin and the United States during the 1990s. While the rate of US youth who reported “ever” smoking cigarettes remained at 70% from 1991 to 1999, the rate of “current” smoking increased from 28% to 35% during the same time period. Thus, among those youth who did experiment with cigarettes, a growing percentage was continuing the practice. In fact, high school students reported levels of current smoking that surpassed those of adults by 11 percentage points little more than 5 years ago. In 1999, 24% of the nation’s persons aged 18 years and older reported being current smokers,1 while 35% of high school students reported current cigarette use.2 Though the definition of current smoking is not identical for these 2 groups, the escalating rates of youth smoking were nonetheless forewarning of what future adult smoking rates might look like if the trend was not arrested. (For adult smoking, a current smoker is defined as someone who has smoked at least 100 cigarettes in a lifetime, and now smokes either every day or some days. For youth smoking, a current smoker is defined as someone who reports having smoked cigarettes during the past 30 days.)

More recent data have revealed a turning point in youth smoking trends in Wisconsin, and the United States more generally.3 At the national level, high school current smoking rates began their downward trend between 1997 (36.4%) and 1999 (34.8%). A change in Wisconsin’s trend was observed between 1999 (38.1%) and 2000 (32.9%). Accordingly, it is difficult to ascertain whether progress in Wisconsin has simply been a reflection of what is occurring at the national level, or if state efforts have additionally impacted youth smoking.

What is certain is that many states stepped up their efforts to reduce tobacco consumption by allocating portions of moneys from the Master Settlement Agreement (1998) to fund tobacco control programs. In Wisconsin, 1999 Wisconsin Act 9 established a segregated, nonlapsible tobacco control fund to support
activities related to a statewide, comprehensive tobacco control program, and created the Tobacco Control Board. The Wisconsin Tobacco Control Board was appointed by the Governor in February 2000 to oversee allocation of funds from Wisconsin's share of the settlement. The board was responsible for developing a strategic plan, allocating funds to state and local initiatives, and monitoring the progress of funded programs. The Board set forth 7 primary goals by which to monitor the state's progress in reducing tobacco use and its associated costs. One of its goals included reducing tobacco use among high school-age youth by 20% by 2005. Goals for the longer term were established in “Healthiest Wisconsin 2010: A Partnership Plan to Improve the Health of the Public,” specifying a reduction in youth tobacco use to 16% by 2010.

The purpose of this study is to assess recent trends in current cigarette smoking among high school-age youth in Wisconsin and the United States. Of particular interest is whether youth smoking rates have continued to decrease in Wisconsin, and how state levels compare to those of the United States as a whole. Also examined is whether trends in high school smoking are the same for males and females, and finally, whether trends in youth smoking are comparable across all high school levels.

**METHODS**

The Youth Risk Behavior Surveillance System (YRBSS) is conducted as part of a national effort by the US Centers for Disease Control and Prevention (CDC) to monitor a number of health-risk behaviors, including tobacco use of the nation’s high school students. The YRBSS includes a national school-based survey (the YRBS) conducted by the CDC as well as state and local school-based surveys conducted by education and health agencies. In Wisconsin, the Department of Public Instruction (DPI) has overseen the administration of the YRBS every 2 years beginning with 1991. The state YRBS is administered to students in Wisconsin’s public high schools. Survey procedures were designed to protect the privacy of students by allowing anonymous and voluntary participation. Local parent permission procedures were followed before administration, including informing parents that their child’s participation was voluntary. For this paper, YRBS data for years 1993-2003 are used. (Wisconsin data are not available for 1995 due to a low response rate.)

The Youth Tobacco Survey (YTS) is a comprehensive measure of youth awareness, attitudes, and related behaviors about tobacco among students in grades 6-12. The YTS questionnaire was developed based on a collaborative effort of the CDC-Office of Smoking and Health (CDC/OSH) and representatives of federal, state and private-sector partners. Data is collected via an anonymous, self-administered survey during the spring of the academic year. At the national level, the YTS was conducted by the American Legacy Foundation in 2000 and 2002. In 2004, it was conducted by the CDC. In Wisconsin, the YTS was first administered during the spring semester of the 1999-2000 academic year to a random sample of public middle and high schools, and has been continued on an annual basis for public middle school youth, and on a biennial basis for public high school youth (alternating with the YRBS). Survey administration has been carried out by the University of Wisconsin Comprehensive Cancer Center (UWCCC), under contract with the Wisconsin Department of Health and Family Services (DHFS).

Overall response rates vary among the surveys and from year to year. However, CDC guidelines require that all surveys have a scientifically selected sample, appropriate documentation, and an overall response rate of 60% or greater in order to facilitate weighting. Data used in these analyses were weighted, within each data set, to account for non-response and to be representative of the universe of 9th through 12th grade students from which the sample was selected. The data are self-reported, and the extent of underreporting or over-reporting of smoking behavior cannot be determined. However, detailed discussion of the methodology employed by the YRBS demonstrate that the data are of acceptable quality (see Brener et al). The methodologies employed in administration of the YTS and the YRBS are very similar.

Analyses were conducted using SPSS Complex Samples, version 13.0. Missing data were not included in the analyses. Current smoking prevalence was assessed using the question, “During the past 30 days, on how many days did you smoke cigarettes?” A current smoker was defined as someone who reported having smoked cigarettes on 1 or more of the past 30 days.

**RESULTS**

Figure 1 displays the rates of current smoking among high school students in Wisconsin and the United States, from 1993 to 2004. In general, Wisconsin has had higher levels of student smoking, relative to the national average. Notably, while the prevalence of smoking in the United States declined between 1997 and 1999, student smoking in Wisconsin continued to rise. However, rates in Wisconsin began to decline after 1999, and have continued on this downward trend through 2004.
Table 1 displays current smoking prevalence rates and relative percent change for high school students in Wisconsin and the United States, by year. In addition, the ratio of current smoking in Wisconsin to the United States is presented in the last column. These data reveal that while the prevalence of current smoking was generally higher among Wisconsin youth as compared to the national averages, the relative percent change (decline) in smoking prevalence among high school students in Wisconsin was greater than that for the nation between 2002 and 2003 (-12.9% vs -2.7%, respectively), and between 2003 and 2004 (-11.4% vs 1.8%, respectively). In addition, while rates were 14-20% higher in Wisconsin during 2000-2002, they were 6% lower in 2004.

Current Cigarette Smoking Among Wisconsin Youth, By Gender
Rates of current smoking are presented for Wisconsin high school students by gender in Figure 2. In general, the trend in youth smoking has been fairly similar among males and females during the observed time period, with rates peaking in the late 1990s, followed by a downward trend. However, more pronounced differences were observed in 1997 and 2001. Interestingly, the rate for males was higher than that for females by 8.1 percentage points in 1997, while in 2001 the rate for females was 8.1 percentage points higher than for males. Since 2002, the rates have been relatively comparable for the 2 groups, with 21.9% of females and 19.8% of males reporting current cigarette use in 2004. (See Table 2 for data.)

Current Cigarette Smoking Among Wisconsin Youth, By Grade
In general, smoking rates are greater for each successive grade, within each calendar year. However, the gap between the oldest and youngest grades has narrowed from 14.5 percentage points in 1999 (45.8% and 31.3%, respectively) to 11.2 points in 2004 (25.7% and 14.5%, respectively). More importantly, the percent of high school students who reported being current cigarette smokers has declined among all 4 grades since 1999. Figure 3 exhibits the peak levels of current smoking that occurred in the late 1990s, followed by the generalized downward trends within each group. (See Table 2 for data.)

DISCUSSION
It is well documented that most smokers begin cigarette use in their adolescent years.11 Moreover, the steepest gradient for lifetime smoking is observed in the teenage years, with past-month and past-year prevalence peaking when people are in their late teens or early 20s.12
Given the known consequences of smoking for morbidity and mortality, and the enduring nature of smoking habits established during adolescence, it is imperative that efforts continue to dissuade our youth from initiating a practice that is so costly to themselves and to society at large.

The analyses presented here demonstrate that while the percent of youth reporting current cigarette smoking was on an upward trend during the 1990s, progress on efforts to dissuade youth from smoking began to be observed in the latter part of the decade. Moreover, the percent of students that report being current smokers, defined as having smoked any cigarettes in the past 30 days, has continued on this downward trend in Wisconsin, and the United States more generally, through 2004. And, this progress has been displayed among all subgroups – males and females, grades 9 through 12.

One of the goals of “Healthiest Wisconsin” included reducing tobacco use among high school-age youth by 20% by 2005. Using the 2000 rate from the Wisconsin Youth Tobacco Survey of 33% as a baseline from which to progress effectively means the target for 2005 is 26.4%. We have, in fact, surpassed that goal. Given the recent cuts in funding allocated to tobacco control and prevention efforts, it remains to be seen if we can stay on course. Continued monitoring of state and national trends in tobacco use and characteristics of adolescents who use tobacco is therefore essential for planning and evaluating tobacco prevention efforts.

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