

Progress in Reducing Cigarette Consumption: The Wisconsin Tobacco Control Program, 2001-2003

Priti Bandi, MS; Patrick L. Remington, MD, MPH; D. Paul Moberg, PhD

ABSTRACT

Objectives: In 2000, the Wisconsin Legislature allocated \$20.8 million annually to establish a comprehensive tobacco control program. The purpose of this study was to evaluate the impact of Wisconsin's tobacco control program on reducing cigarette consumption during its first 2 years of operation.

Methods: Per capita cigarette sales were used to estimate cigarette consumption. Trends in cigarette consumption in Wisconsin between 2001 and 2003 were compared with trends in the United States as a whole, with groups of states, and with Wisconsin's peer state group.

Results: Cigarette consumption in Wisconsin declined 9.2% from 2001 to 2003. In the same time period cigarette consumption in the United States declined only 3.8%. Wisconsin also demonstrated a greater percent decline in its cigarette consumption rate than did 3 of the 4 state groups. Finally, compared to its peer state group Wisconsin performed better between 2001 and 2003, with a decline of 9.2% compared to only a 4.2% reduction in its peer state group.

Summary: Wisconsin has shown progress in reducing cigarette consumption during the first 2 years of its tobacco control program. Greater declines in Wisconsin

compared to the United States, most state groups and its own peer state group suggest early effectiveness of Wisconsin's tobacco control program. Wisconsin will require continued implementation of evidence-based policy initiatives and aggressive tobacco control activities in order to maintain its progress toward decreasing the public health burden of tobacco.

INTRODUCTION

In 1999, Wisconsin implemented a comprehensive tobacco control program when it established the Wisconsin Tobacco Control Board.¹ In 2000, the Legislature provided \$20.8 million annually and charged the Board with overseeing expenditures of revenue allocated from the Master Settlement Agreement with tobacco companies. The Board funded a number of programs, which became operational in the spring and summer of 2001, including a Quit Line, a statewide counter-marketing media campaign and local tobacco control coalitions.² Funding continued at this level through December 2001, but declined to approximately \$13 million annually since January 2002 (See Figure 1).

The Wisconsin Tobacco Control Board established 7 primary goals to monitor the impact of the state's tobacco control activities. The goals included reducing youth and adult tobacco use, reducing cigarette consumption, and establishing smoke-free restaurant ordinances, smoke-free government owned buildings, and smoke-free work environments.³ One of the baseline goals was a 20% reduction in cigarette consumption between 2000 and 2005. A 20% reduction in cigarette consumption from 2000 would set the 2005 goal at 64.1 packs per person.

The purpose of this study is to evaluate the progress of Wisconsin's tobacco control program during the first 2 years of operation. Progress is assessed by measuring reductions in cigarette consumption and contrasting these declines to those on a national level, and to other groups of states in the United States.

This project was funded by the Tobacco Prevention and Control Program, Division of Public Health, Wisconsin Department of Health and Family Services. At the time of this study, Ms Bandi was a graduate student in the University of Wisconsin (UW) Department of Population Health Sciences. Doctor Remington is a professor and director of the University of Wisconsin Population Health Institute, UW Department of Population Health Sciences. Dr Moberg is the deputy director of the UW Population Health Institute and a senior scientist in the UW Department of Population Health Sciences. Please address correspondence to: Patrick L. Remington, MD, MPH, Department of Population Health Sciences, 760 WARF Building, 610 Walnut St, Madison WI 53705; phone 608.263.1745; fax 608.263.2820; e-mail plreming@wisc.edu.

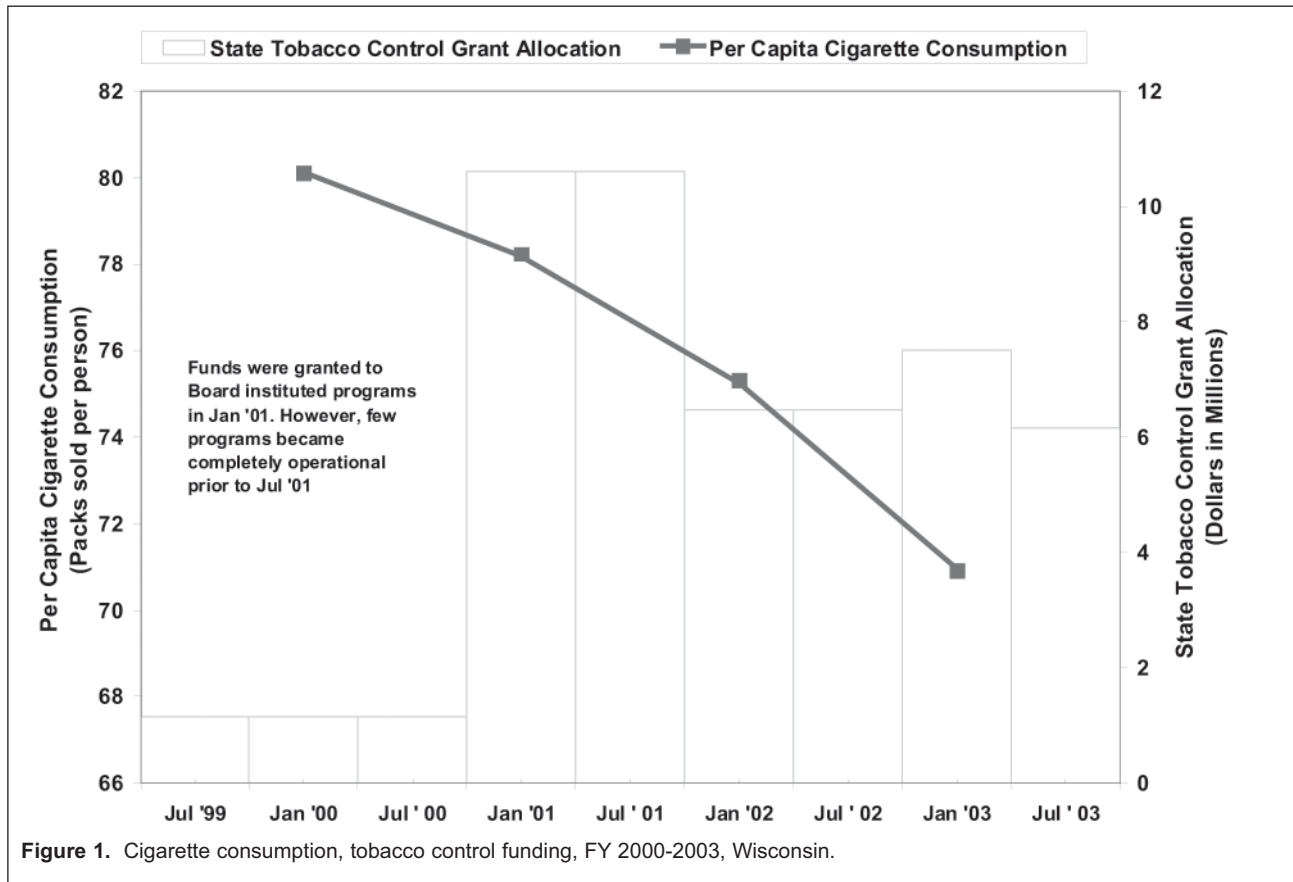


Figure 1. Cigarette consumption, tobacco control funding, FY 2000-2003, Wisconsin.

METHODS

Data Sources

Historical data on per capita cigarette sales and the average retail price per pack of cigarettes were obtained from the *Tax Burden on Tobacco* (a tobacco industry trade publication), a compilation of cigarette excise tax-related information.⁴ Per capita cigarette sales are a measure used to estimate cigarette consumption. The Wisconsin Department of Revenue provides data on cigarette sales (packs) in a fiscal year (FY) and mid-year population estimates to the publishers of the *Tax Burden on Tobacco*. Cigarette consumption is then estimated as the total cigarette sales (in packs) in the state, divided by the total population estimate (all ages) in a particular state in that year. The US cigarette consumption estimate is comprised of a weighted average of sales in all 50 states and the District of Columbia. Per capita cigarette sales will be referred to as “cigarette consumption” in the article.

Cigarette consumption estimates obtained from data on cigarette sales are not subject to errors due to sampling or underreporting that are inherent in population surveys.⁵ Hence this measure was chosen for the purpose of this study. Data on sociodemographic characteristics of states, including state education level and

percent Hispanic, were obtained from the US Census 2000.⁶ Data were also obtained on state tobacco policy-related variables including inflation-adjusted cigarette price,^{4,7} and smoke-free air laws.⁸

Baseline Year

Cigarette consumption in FY 2001 was chosen as the baseline year for this report. (Fiscal year here extends from July 1 of the previous year to June 30 of the present year.) Even though funds were allocated to programs instituted by the Board in January 2001, consumption in FY 2001 was chosen as baseline since few of these programs became completely operational prior to July 2001.

Analysis

Reductions in cigarette consumption were used to assess the effectiveness of Wisconsin’s tobacco control program in the following manner.

First, progress in reducing cigarette consumption during the first 2 years of the program was calculated as a cumulative percent change between the baseline year (FY 2001) and the most recent year for which data were available in Wisconsin and the rest of the country (FY 2003). Annual percent changes for the 2 years were also calculated.

Table 1. Comparison of Wisconsin to the United States - Cigarette Consumption* and Percent Change, 2001-2003

	Cigarette Consumption 2001	Cigarette Consumption 2002	Cigarette Consumption 2003	% Change 2001-2002	% Change 2002-2003	% Change 2001-2003
United States	81.8	79.8	78.7	-2.4	-1.4	-3.8
Wisconsin	78.2	75.3	71.0	-3.7	-5.7	-9.2

* Packs per person

Next, the impact of Wisconsin's tobacco control program in the first 2 years of operation was assessed by comparing the change in cigarette consumption in Wisconsin to that in the United States as a whole. However, the United States as a whole may not be an appropriate comparison group since there may be specific states that are driving a major portion of the change in the US cigarette consumption measure. Therefore, further analyses were conducted comparing Wisconsin's declines in cigarette consumption to groups of similar states. State characteristics related to cigarette consumption at the individual and population level were used in an analysis conducted to derive these state groups. (Multivariate cluster analysis was used to derive comparison groups of states. More information on the analysis can be obtained from the first author.) These characteristics include the state education level (defined as the percent of the population with a bachelor's degree or higher), Hispanic ethnicity within a state (defined as the percent of population that is Hispanic or Latino), average inflation adjusted real price per pack of cigarettes in cents (including state and federal excise taxes) for FY 2000 and FY 2001, and an average score of the level of smoke-free air laws for 2000 and 2001. Four groups of states were identified in the analysis.

Wisconsin was then compared to these groups of states in the following manner. Percent change in the cigarette consumption between FY 2001 and FY 2003, annually and cumulatively, was calculated for each state. Then the median and mean of these percent changes were computed within each state group. These mean and median percent changes in cigarette consumption for each state group were then compared to Wisconsin's percent decline. The state group containing Wisconsin was defined as its peer state group. This group consisted of states with characteristics that were most similar to Wisconsin. Progress in reducing cigarette consumption again was compared, this time between Wisconsin and the peer state group. (Wisconsin was omitted from the peer group in the comparison analyses.) Analyses were conducted using Excel (Microsoft Corporation, Redmond, WA), SAS (SAS Institute Inc., Cary, NC) and SPSS (SPSS Inc. Chicago, IL) software packages.

RESULTS

Wisconsin's Progress, FY 2000 – FY 2003

Figure 1 demonstrates a time trend of Wisconsin's progress in reducing cigarette consumption since FY 2000. It also shows the state contractual grant allocation toward tobacco control in the 4-year period between FY 2000 and FY 2003. Tobacco grant allocations are used as a substitute for actual expenditures toward tobacco control in this time period. Although not completely representative of each other, contractual grant allocations can be used to approximate actual state-level expenditures toward tobacco control. As Figure 1 demonstrates, Wisconsin has experienced consistent declines in cigarette consumption since FY 2000. From the baseline year of FY 2001, Wisconsin's cigarette consumption declined 3.7% in FY 2002 and 5.7% in FY 2003. Overall, between FY 2001 and FY 2003, Wisconsin's cigarette consumption declined 9.2%.

Wisconsin's Comparison to the United States

Table 1 shows the cigarette consumption for FY 2001, FY 2002, FY 2003, and the percent change in cigarette consumption between the 3 time periods for the United States and Wisconsin. Between FY 2001 and FY 2003, cigarette consumption in Wisconsin declined 9.2% while consumption in the United States declined 3.8%.

In the first year of the program, between FY 2001 and FY 2002, cigarette consumption in Wisconsin declined 3.7% compared to 2.4% in the United States. In the second year of the program, between FY 2002 and FY 2003, cigarette consumption in Wisconsin declined 5.7% compared to 1.4% in the United States. Wisconsin's cumulative percent decline in cigarette consumption in the first 2 years of the program was 5.4 percentage points greater than the decline in the United States.

Wisconsin's Comparison to the 4 Derived Groups of States, Including its Peer State Group

Table 2 displays the mean and median of cigarette consumption in FY 2001, FY 2002, FY 2003, and the percent changes in cigarette consumption between these time periods for the 4 groups of states, including Wisconsin's peer state group and Wisconsin.

Wisconsin had a greater reduction in cigarette con-

Table 2. Comparison of Wisconsin to State Groups-Cigarette Consumption* and Percent Change 2001-2003

	Cigarette Consumption 2001	Cigarette Consumption 2002	Cigarette Consumption 2003	% Change 2001-2002	% Change 2002-2003	% Change 2001-2003
Group 1 (n=16)						
Mean	98.6	96.0	95.7	-2.3	-0.9	-3.5
Median	98.3	96.9	91.4	-2.5	-2.4	-4.4
Group 2† (n=10)						
Mean	87.8	87.0	86.9	-0.8	-3.3	-4.2
Median	78.7	77.8	72.0	-1.7	-6.9	-5.8
Group 3 (n=13)						
Mean	77.3	74.5	75.4	-3.7	0.6	-3.1
Median	78.6	77.9	74.7	-2.9	1.0	-3.3
Group 4 (n=11)						
Mean	53.6	53.5	47.0	0.3	-11.3	-10.8
Median	50.2	51.1	47.5	1.1	-10.1	-13.3
Wisconsin						
Mean	78.2	75.3	71.0	-3.7	-5.7	-9.2

* Packs per person,

Group 1— Alabama, Arkansas, Indiana, Iowa, Kentucky, Louisiana, Mississippi, Missouri, Montana, North Dakota, Ohio, Oklahoma, South Carolina, South Dakota, Tennessee, West Virginia

Group 2 (†Wisconsin excluded from this group: Peer state group) – Alaska, Delaware, Kansas, Maine, Maryland, Michigan, Minnesota, Nebraska, New Hampshire, Vermont

Group 3 – Arizona, Colorado, Florida, Georgia, Idaho, Nevada, New Mexico, North Carolina, Oregon, Pennsylvania, Texas, Virginia, Wyoming

Group 4 – California, Connecticut, District of Columbia, Hawaii, Illinois, Massachusetts, New Jersey, New York, Rhode Island, Utah, Washington

sumption in the first 2 years of its program than 3 of the 4 state groups. Only Group 4, with a decline of 10.8%, showed a greater reduction than Wisconsin during this time period.

Wisconsin performed considerably better than its own peer state group (Group 2) between FY 2001 and FY 2003, with a cumulative percent decline of 9.2%, compared to 4.2% for the peer state group. In the first year of the program, between FY 2001 and FY 2002, cigarette consumption in Wisconsin declined 3.7% while consumption in its peer state group declined 0.8%. In the second year of the program, between FY 2002 and FY 2003, cigarette consumption in Wisconsin declined 5.7% compared to a decline of 3.3% in its peer state group. Wisconsin's cumulative percent decline in the first 2 years of its program, between FY 2001 and FY 2003, was 5.0 percentage points greater than the decline in its peer state group.

DISCUSSION

Wisconsin's cigarette consumption declined significantly during the first 2 years of the statewide program, with an overall decline of 9.2% from FY 2001 to FY 2003. The data suggest that the Wisconsin Tobacco Control

Program was effective in reducing cigarette consumption relative to national and peer state trends in the first 2 years of its implementation. Two years after program implementation, Wisconsin has shown a higher rate of decline than the United States overall.

A comparison of the percent change in cigarette consumption between Wisconsin and the derived groups of states also indicated progress. All but 1 state group showed smaller mean declines than Wisconsin's percent decline. Also, Wisconsin performed better than its peer state group in reducing its cigarette consumption between FY 2001 and FY 2003. These reductions may be partly attributable to the activities of the Wisconsin Tobacco Control Program.

Wisconsin's progress toward the Wisconsin Tobacco Control Board goal to reduce cigarette consumption by 20% by FY 2005 has been considerable in the first 2 years of the program, showing a cumulative decline of 9.2% between FY 2001 and FY 2003. However, in the third year of the program, FY 2004, Wisconsin's cigarette consumption stood at 69.9 packs per person, showing a decline of only 1.5% from consumption in FY 2003 (data not shown).^{9,10} This slower rate of decline in FY 2004, compared to the previous 2 years, could be

a consequence of a variety of factors, including declining funding for tobacco control, stationary cigarette excise taxes, or national secular trends of slowing declines in cigarette consumption. However, since cigarette consumption data in FY 2004 for the United States and other states were not yet available, it was not possible to determine whether this apparent leveling off in the decline in cigarette consumption was reflective of national secular trends during this period.

There are limitations to this study that need to be considered. This study only evaluated the impact of the Wisconsin Tobacco Control Program in reducing cigarette consumption. Other measures of tobacco usage in the state, such as prevalence of adult current smokers and youth current smokers, may not necessarily mimic the declines in cigarette consumption. Therefore, separate analyses assessing progress in these tobacco usage measures are needed to evaluate Wisconsin's progress toward decreasing tobacco usage.

Another possible confounder is that in October 2001, Wisconsin increased its state cigarette tax by 18 cents, from 59 cents per pack of cigarettes to 77 cents per pack. It can be hypothesized^{11,12} that this tax increase may have contributed in part to the decreases in cigarette consumption seen in Wisconsin after FY 2001. Further analysis involving long-term trends in cigarette consumption, before and after program implementation, will need to be conducted in order to investigate this possibility.

Finally, data on per capita cigarette sales do not account for illegal transport or sale of cigarettes, which may include inter-state smuggling, Internet transactions, or sales not otherwise reported to the Department of Revenue.¹³ In spite of these drawbacks, per capita cigarette sales are an optimal measure for comparison of cigarette consumption because of the uniformity of measurement across states and the country.¹⁴

In conclusion, Wisconsin has demonstrated considerable declines in cigarette consumption in the first 2 years of its tobacco control program. Wisconsin has also shown relatively greater declines in cigarette consumption compared to the United States, other groups of states, and its own peer state group. However, the most recent data indicate a marked drop in the rate of decline in cigarette consumption in the third year of the program. Wisconsin will, therefore, require continued implementation of evidence-based policy initiatives and aggressive tobacco control activities in order to maintain its progress toward decreasing the public health burden of tobacco.

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