

Has There Been Progress in Reducing Mortality Among Wisconsin Adults Ages 25 to 44?

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ABSTRACT

Wisconsin residents age 25-44 years represent an important life stage and a relatively large portion of the Wisconsin population. Focusing on the most common causes of death among Wisconsin adults 25-44 years old, we assess progress in reducing mortality, describe disparities between subgroups of this age group, and identify areas for improvement. Mortality trends and leading causes of death were examined from 1980-1999 by querying the Centers for Disease Control and Prevention's WONDER database using the methods established by the National Vital Statistics System. Mortality rates in Wisconsin declined slightly (5%) during this time, and are consistently lower than the national rates. Mortality due to unintentional injury, cancer, and coronary heart disease declined in this age group. However, this decline was in contrast to increases in mortality due to suicide, homicide, and HIV—all preventable causes of death. Finally, disparities in mortality rates increased between black and white Wisconsin residents. In order to make progress in this age group, public health efforts need to focus on effective strategies to prevent HIV and violence.

INTRODUCTION

Wisconsin adults aged 25-44 comprised nearly 30% of the state's population in 2000.¹ Individuals within this age group represent an important life stage and are typically embarking on some of the most productive years

of their lives. During this stage the knowledge and skills one has acquired are applied to adult work, and health behaviors established as adolescents are solidified and continued into adulthood.² Leading causes of death among this group are largely preventable, yet little progress has been seen in mortality reduction. For these reasons, premature death among those 25-44 years old is an important source of lives lost from the Wisconsin population.

National health objectives addressing major causes of death affecting those aged 25-44 have been set for 1990, 2000, and 2010 through the Healthy People initiative.³ However, similar objectives were not set for 2000 in Wisconsin's Public health agenda.⁴ Understanding the leading causes of death and trends in mortality reduction are important for directing public health resources and interventions appropriately. This paper will assess Wisconsin's progress in reducing mortality among adults aged 25-44, focusing on the most common causes of mortality in this age group, describing disparities between subgroups of this population, and identifying areas where specific objectives aimed at reducing mortality are needed.

METHODS

Mortality statistics for adults aged 25-44 from 1980 to 1999 were extracted from the WONDER mortality database maintained by the Centers for Disease Control and Prevention (CDC).¹ To assess Wisconsin's progress in comparison to the nation, all cause mortality rates were obtained for both the United States and Wisconsin for each year. In addition, all cause mortality rates stratified by gender and race were obtained. Mortality rates for leading causes of death stratified by gender and race were obtained for Wisconsin only.

15-Year Mortality Trends

To examine secular trends in mortality from 1980 to 1999 in adults 25-44, we compared age-adjusted all cause mortality rates for Wisconsin with the same rates

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for the United States. Five-year moving rates were calculated to minimize year-to-year variability. These rates were used to plot 15-year trends in mortality. By this method, the average for each 5 years of data is calculated and plotted at the midpoint year (e.g. annual mortality rates for 1980, 1981, 1982, 1983, and 1984 are averaged and plotted at 1982).

In addition, groups stratified by race and gender were compared. Due to limitations of WONDER, only blacks and whites were included in this analysis. Average annual expected deaths were determined by applying the 1980-1984 average annual mortality rate (mrate'82) to the average population for 1995-1999. The expected number of deaths for the 1995-1999 time period is calculated as follows: [mrate'82 * average annual population '95-'99]. The difference between the expected and actual deaths is the average number of lives saved (or lost) annually, which can be attributed to the change in the mortality rate from 1980-1984 to 1995-1999. The percent change in mortality from 1980-1984 and 1995-1999 was calculated as [(mrate'82 - mrate'97)/mrate'82 * 100].

Identification of Major Causes of Death

In addition to 15-year mortality trends, we compared the leading causes of death among those 25-44 years old in Wisconsin. Leading causes of death were determined through a ranking process set forth by the National Vital Statistics System.⁵ Once ranks establishing leading causes of death were obtained, age-adjusted rates were used to track trends in these causes over time. This technique is consistent with that used by the *Healthy People 2010* initiative to formulate priority objectives.³

Major causes of death were grouped according to the techniques utilized by the National Center for Health Statistics (NCHS).⁵ To determine the mortality rates for leading causes, the WONDER database was queried by ICD-9 code for the years 1980 to 1998. Data for 1999 was queried separately because ICD-10 (rather than ICD-9 codes) were used for the first time. The NCHS has established and published comparability ratios for the ICD-9 and ICD-10 codes allowing the 1999 data to be combined with data from 1980 to 1998.⁵ The following categories were queried: Unintentional Injury (ICD-9: E800-E869, E880-E929; ICD-10: V01-X59, Y85-Y86), Malignant Neoplasms (ICD-9: 140-208; ICD-10: C00-C97), Heart Disease (ICD-9: 390-398, 402, 404, 410-429; ICD-10: I00-I09, I11, I13, I20-I51), Suicide (ICD-9: E950-E959; ICD-10: X60-X84, Y87.0), Homicide (ICD-9: E960-E969; ICD-10: X85-Y09, Y87.1), HIV (ICD-9: 042-044; ICD-10: B20-

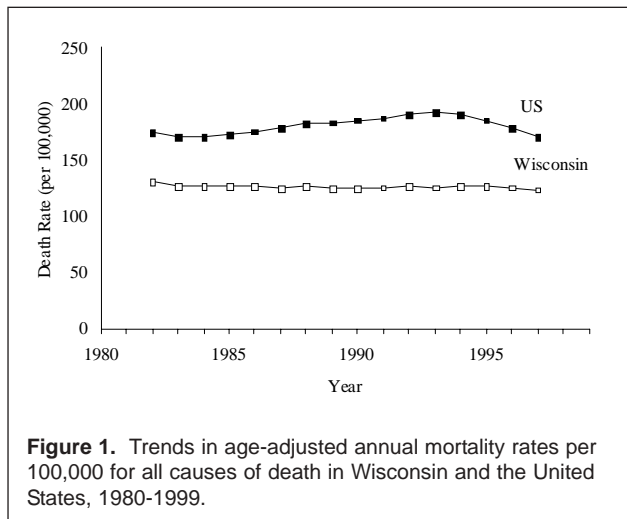


Figure 1. Trends in age-adjusted annual mortality rates per 100,000 for all causes of death in Wisconsin and the United States, 1980-1999.

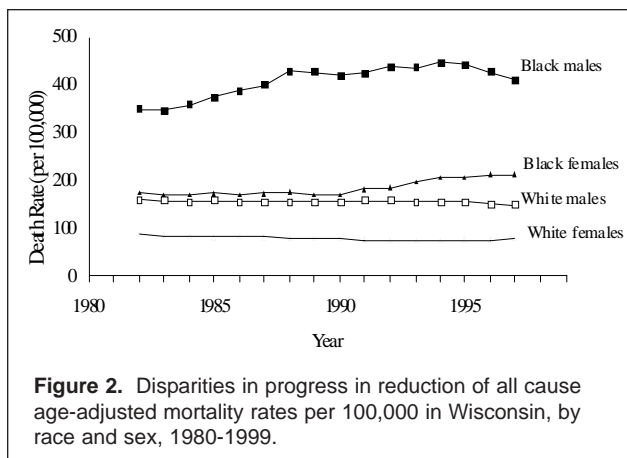


Figure 2. Disparities in progress in reduction of all cause age-adjusted mortality rates per 100,000 in Wisconsin, by race and sex, 1980-1999.

B24), and Cerebrovascular Disease (ICD-9: 430-434, 436-438; ICD-10: I60-I69).

RESULTS

Mortality trends for adults 25-44 in Wisconsin and the United States are presented in Figure 1. Comparison of the 5-year average rates for 1980-1984 and 1995-1999 reflects little fluctuation in mortality trends for either Wisconsin or the United States. During this period, mortality from all causes decreased in Wisconsin by 5.1%, with 130 deaths per 100,000 residents annually in 1980-1984, declining to 124 deaths per 100,000 residents annually in 1995-1999. Mortality rates from all causes of death decreased in the United States by only 1.9%, with 174 deaths per 100,000 annually in 1980-1984, declining to 171 deaths per 100,000 annually in 1995-1999.

When race and gender are considered, differences in mortality trends emerge. In the United States the mortality rate for all causes of death slightly decreased for

Table 1. All-Cause Mortality Rates, Average Annual Deaths, and Lives Saved Annually for Adults Ages 25-44 in Wisconsin, 1980-1999

	1980-1984		1995-1999			Percent* Change	Lives Saved (Lost)
	Rate	Number	Rate	Number	Expected		
All Groups							
US	174	109,336	171	140,769	145,029	-2%	4261
Wisconsin	130	1,587	124	1,960	2,063	-5%	104
Gender							
Females	90	537	85	670	715	-6%	45
Males	170	1,049	162	1,290	1,349	-5%	59
Race							
White							
Females	86	482	76	553	625	-11%	72
Males	162	957	148	1,090	1,178	-9%	88
Black							
Females	175	45	213	95	81	+18%	(14)
Males	349	77	413	166	145	+15%	(21)

* Percent change in mortality rates from 1980-1984 to 1995-1999.

white males and white females. For black males there is a greater decrease in the mortality rate, while black females in this age group experienced a slight increase in mortality during this period. A greater decrease is seen for white males and females in Wisconsin than in the United States (data not shown). However, black mortality rates in Wisconsin sharply increased for both males and females, with increases of 15.4% and 18.1% respectively (Table 1). However, mortality rates for black Wisconsin residents in this age group have decreased somewhat since their peak in 1994 (Figure 2).

An average of 104 fewer deaths per year occurred each year during 1995-1999 than were expected if the 1980-1984 average rate had continued through 1999 (Table 1). Similar changes were seen for both males and females overall, with 59 and 45 lives saved annually, respectively. However, disparities in lives saved annually persist between blacks and whites for both males and females. Although black males experienced 21 more deaths annually than expected from 1995-1999, white males experienced 88 fewer deaths than expected (Table 1). The disparity in mortality between black and white males is considerable. If recent trends in mortality among males continue, disparities will be substantially reduced, but are unlikely to reach the state goal set for 2010.

In Wisconsin, black females experienced 14 more deaths than expected, while white females experienced 72 fewer deaths than expected (Table 1). In contrast to males, the mortality disparity between black and white females increased slightly during this time, and is unlikely to meet 2010 goals if current trends continue. These trends are somewhat inconsistent with changes

in annual deaths for these subgroups nationwide (data not shown). In the United States, all subgroups experienced fewer deaths annually in the 1995-1999 period than would have been expected based on the 1980-1984 mortality rates. Nationwide, black females experienced far fewer lives saved during this period than any other subgroup of adults ages 25-44.

From 1980-1984 the leading causes of death for all adults aged 25-44 were unintentional injury, malignant neoplasms, heart disease, suicide, homicide, and cerebrovascular disease (Table 2). Little change was seen in the rankings of the leading causes of death between 1980-1984 and 1995-1999 with the exception of HIV. In 1980-1984 there were no reported deaths from HIV, whereas in 1995-1999 an average of 86 deaths occurred annually from HIV. Death from HIV peaked in 1993 in Wisconsin and has been decreasing since. From 1995 to 1999, HIV replaced cerebrovascular disease as the sixth leading cause of death.

Despite little change in overall rankings during this time, moderate reductions in mortality rates were seen for unintentional injury (9.0%), malignant neoplasms (15.8%), heart disease (25.3%), and cerebrovascular disease (23.0%). However, these improvements in mortality rates were negated by increased overall mortality from suicide (0.8%), homicide (9.6%), and HIV.

Black to white mortality rate ratios in Wisconsin vary by cause of death, with blacks accounting for a significantly higher proportion of deaths from HIV, homicide, and unintentional injury (data not shown). Improvements in mortality rates for heart disease and malignant neoplasms were apparent for blacks and whites of both genders. Improvements in cerebrovas-

Table 2. Average Annual Mortality Rates, Average Annual Deaths and Average Lives Saved Annually for Leading Causes of Death in Wisconsin Adults Ages 25-44 from 1980-1999

	1980-1984		1995-1999			Percent* Change	Lives Saved (Lost)
	Rate	Number	Rate	Number	Expected		
Unintentional Injury	29	397	26	419	460	-9%	41
Malignant Neoplasms	28	314	24	373	445	-16%	72
Heart Disease	22	236	16	260	349	-25%	89
Suicide	15	201	15	240	238	+1%	(2)
Homicide	5	64	5	87	79	+10%	(8)
HIV	0	0	5	86	0	-	(86)
Cerebrovascular Diseases	4	47	3	49	64	-23%	15

* Percent change in mortality rates from 1980-1984 to 1995-1999.

cular disease were seen only in whites (30.5%), while blacks had a 9.6% increase in cerebrovascular mortality. Increases in suicide mortality were seen for white males, and a substantial decrease was seen in suicide mortality rates among all females. Death from unintentional injury and homicide increased most among black females and black males respectively.

Projections to the year 2010 based on the estimated annual percent change suggest that there will continue to be minimal decreases in all cause mortality for both the United States and Wisconsin. For Wisconsin, if the past trends continue, disparities will continue to increase, with mortality rates substantially increasing for black males and females and slightly decreasing for white males and females.

DISCUSSION

Our analysis showed little progress in reducing mortality in Wisconsin adults aged 25-44 from 1980 to 1999. Despite minimal progress, mortality rates for adults in this age group have been consistently lower in Wisconsin than the United States. In addition, Wisconsin mortality rates experienced a greater percent reduction during this time than US mortality rates.

Substantial reductions in causes such as heart disease and cancer for all subgroups were offset by substantial increases in particular causes among subgroups such as HIV and homicide, eliminating reductions in the overall mortality rate. HIV, a disease that led to no deaths from 1980-1984, has been a significant source of lives lost in the Wisconsin population in the past decade. Currently ranked as the sixth leading cause of death in Wisconsin adults aged 25-44, HIV accounts for an average of 86 lives lost per year from this population. If HIV/AIDS had not appeared, the progress in mortality reduction for adults in this age group in Wisconsin would have nearly doubled, to almost 10%.

If current trends continue, Wisconsin will reach few

of the goals set forth by *Healthy People 2010* and *Healthiest Wisconsin 2010*.^{3,6} Both the United States and Wisconsin plans establish elimination of health disparities as a primary goal. However, 15-year trends in mortality rates indicate disparities between black and white Wisconsin adults 25-44 are increasing rather than decreasing. Despite this 15-year trend, mortality rates at the end of this period suggest that the black/white disparity among males is beginning to narrow, and will experience substantial reduction by 2010 if current trends continue.

More specifically, *Healthy People 2010* sets goals for mortality reduction specific to causes of death, using percent reduction as the target setting method. By this method, several goals will be reached in this age group overall, but vast differences by racial subgroup exist. For example, an overall goal of 20% reduction in death due to stroke has been set. Although in Wisconsin this age group as a whole has seen a 23% reduction, blacks experienced a 10% increase in stroke mortality, while whites experienced a 31% reduction. Similar, though less striking, trends in disparity in goal attainment are apparent for heart disease and cancer.

Both the US plan and the Wisconsin plan could benefit from the addition of goals specific to this population. Although the mortality reduction goals set for specific causes of death are useful for the adult population as a whole, it is difficult to interpret what targets are appropriate and achievable for this particular subgroup. As a result, monitoring progress towards goals is difficult.

An encouraging result of our analysis is that prevention strategies can be devised for several of the leading causes of death in this age group. While cancer in this age group is often difficult to prevent due to its aggressive progression, HIV and violence are good candidates for prevention strategies. For example, in 1999, the Surgeon General established suicide as an important

public health issue. In 2001, a national strategy for suicide prevention was presented with public health objectives such as expanding social networks, increasing outreach and support from community organizations, establishing training and resource centers, and encouraging support for help-seeking behaviors in the work place.⁷

Similar strategies based on the United Nations/World Health Organization recommendations for suicide prevention have been successfully implemented in the US Air Force.⁸ Suicide mortality rates dropped from 16.4 per 100,000 in 1994 to 9.4 in 1998. Although it is not clear which aspects of this multi-faceted program have been most effective in reducing mortality, or whether such a program will work in organizations or occupations with different hierarchical structures, implementation of programs modeled after the Air Force may be a useful next step.

Most public and private prevention activities focus on infants, children, and the elderly, and adults aged 25-44 may be overlooked as projects are planned and implemented, as evidenced by the relative paucity of mortality prevention literature targeting this age group. With the exception of the elderly, our society exerts less educative effort for this age group than any other. During this time, individuals are motivated to learn and to learn quickly. As noted by Havighurst, "early adulthood is the fullest of teachable moments and the emptiest of all efforts to teach."⁹ While difficult to quantify, this may be another reason for limited progress in this age group, and it may indicate that policy changes are needed to reduce mortality in Wisconsin adults aged 25-44.

Despite attempts to minimize error in this analysis, some limitations may exist. We have reported causes of death such as cancer, coronary heart disease, and others in this way because this information is included on death certificates and, in turn, available in data systems. Actual underlying causes of death may be quite different from what is reported on death certificates. For example, McGinnis and Foege found that tobacco use, poor diet and inactivity, excess alcohol consumption, toxic agents, firearms, and other factors were the most common actual causes of death in the United States.¹⁰ While the effects of these causes of death are greater in older age groups, these "upstream causes" of death should be considered and targeted when prevention strategies are planned.

CONCLUSION

Wisconsin adults 25-44 experienced lower mortality rates than the nation in 1980-1984 and 1995-1999, and

achieved greater reductions in mortality rates than the nation over this interval. Despite greater progress than the United States, the mortality rates in Wisconsin were remarkably similar in 1995-1999 and 1980-1984. Furthermore, disparities in Wisconsin are expanding for this age group as evidenced by a significantly higher mortality rate for blacks at the end of the study period than at the beginning. In contrast, whites experienced an overall decrease in mortality during this period. While improvements were seen in reducing cancer and heart disease, these were tempered by an increase in homicide, unintentional injuries, and HIV. Opportunities exist for reductions in mortality due to HIV/AIDS and violence, though effective prevention strategies need further exploration.

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