A Decline in Adult Mortality, Ages 45-64, in Wisconsin Over the Last 20 Years: Is It Enough?

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ABSTRACT

Introduction: Decreasing mortality is an important objective of health improvement. We examined the progress in reducing overall mortality in Wisconsin over the last 2 decades in the age group spanning 45-64 years. Goals for reducing mortality and disparities in mortality by 2010 were addressed.

Methods: We examined trends in all cause mortality for Wisconsin from 1980-1999 for ages 45-64. Mortality data was also examined by subgroups (race and gender) and cause. Mortality data was abstracted from Centers for Disease Control and Prevention’s WONDER.

Results: From 1980-99, adults aged 45-64 experienced a 22% decline in mortality and, consequently, over 1720 lives were “saved” annually in Wisconsin in this age group between 1995-1999. Mortality in black men and women declined 8% and 10% respectively in this interval as compared to 27% for white males and 19% for white females (P<0.05 for all groups for temporal change in death rates). Significant declines in cardiovascular and cancer mortality were achieved. Deaths from injuries increased slightly. The black to white mortality ratio is projected to increase by 2010.

Conclusions: Wisconsin has done well in reducing overall mortality in persons 45-64 years of age over the last 2 decades. Future challenges include reducing health disparities between blacks and whites.

BACKGROUND

The ages 45 to 64 are some of the most productive years of life. With increases in life expectancy, those who live to age 64 today can expect to live another 18 years. Although exposure to many of the risk factors for disease (such as smoking, unhealthy diet, and lack of physical activity) begins earlier in life, these factors continue to operate in this age group. Preventive activities and changes in health behavior for this age group can reap benefits later in life.

Individuals in this age group are often heads of households and economically productive members of society. Consequently mortality and morbidity experienced in this age group have profound influence not only on individuals but also on families and institutions in society that rely on the continued good health of these individuals.

The leading causes of death in this age group have traditionally been cardiac disease and cancer. Nationally, major initiatives such as the US Department of Health and Human Services’ supported Healthy People 2010 have established specific national objectives such as reducing coronary artery disease mortality to 166 per 100,000 population from 1998 levels of 208 per 100,000—a 20% improvement. Similar goals also exist for cancer and many other focus areas. Apart from increasing life expectancy and quality of life, a major goal for Healthy People 2010 is elimination of health disparities among segments of the population. Heart disease death rates are 40% higher and cancer deaths 30% higher nationally for blacks than whites.

In Wisconsin, state health objectives for 2010 have also focused on state-specific priorities, including protecting and promoting health for all and eliminating health disparities among socially or economically disadvantaged groups. This well-formulated plan did not, however, set specific objectives for reduction of the major causes of death by age group.

We sought to examine the progress in reduction of overall mortality in Wisconsin over the last 2 decades and to examine any disparities in mortality in the 45-64
age group. We also projected mortality for 2010 based on current trends, and set goals for 2010 for Wisconsin for reductions in overall mortality and disparities.

METHODS
We performed an analysis of trends in all cause mortality from 1980 to 1999. Mortality data were extracted from CDC WONDER for Wisconsin and the United States for all cause mortality from 1980 to 1999. This database is available free of charge through the CDC’s Web site. Mortality rates from 1980 to 1999, for ages 45-64 were calculated for each year using the number of deaths for each year divided by the total mid-year population in the same year. Mortality data were stratified by race (whites vs blacks—white race included all Caucasians and Hispanics) and gender for Wisconsin and the United States. All mortality rates were age adjusted by direct standardization using the US 2000 census population as the standard population.

To quantify trends in mortality over a 15-year period, the mortality rates of the “baseline” period (1980-1984) were compared to the rate of the “follow up” period (1995-1999). Chi square tests were used to calculate the significance of the change in rate over time.

To calculate expected number of deaths for 1995-1999, race and gender stratum specific (black males, white males, etc.), age adjusted mortality rates from 1980-1984 were applied to the same race and gender stratum specific population distributions between 1995-1999. The difference between observed and expected deaths is the number of lives saved (or lost) in the latter period, consequent to changes in the mortality rate since 1980. One limitation of our data set was that racial categories were limited to “white,” “black,” and “others,” with Hispanics included in the white category. Thus comparison of mortality rates of other racial groups with black and white mortality rates is not possible.

The top 5 causes of death in Wisconsin were abstracted from CDC WONDER utilizing ICD-9 and ICD-10 codes. The percentage change in the age adjusted mortality rates from 1980-1984 to 1995-1999 was calculated. Utilizing the ICD-10 codes for 1999 (this is the year that CDC data transitioned from ICD-9 to ICD-10 codes) did not produce any appreciable change in the trends of cause-specific mortality rate when we compared 1995-98 to 1999.

ICD-9 codes and ICD-10 codes for the top 5 disease groups are: malignant neoplasms (ICD-9: 140-208. ICD-10: C00-C97); heart disease (ICD-9: 390-429.9. ICD-10: I11.0-I51.9); cerebrovascular disease (ICD-9: 430-438. ICD-10: I60.0-I60.9); unintentional injury and adverse effects (ICD-9: E800-E949. ICD-10: V01-X59, Y40-Y86); and liver disease (ICD-9: 570-573.9. ICD-10: K70.0-K76.9).

RESULTS
Our results show that over the 15-year interval between 1980-1984 and 1995-1999, residents of Wisconsin aged 45-64 had a larger decline in mortality (22%) than US residents overall in the same age group (20%) (Table 1). These changes are statistically significant (P<0.05) and translate into 1720 lives saved in this age group in Wisconsin annually between 1995 and 1999.

The trend lines for black and white mortality indicate several interesting trends. First, as Figure 1 demonstrates, blacks have a higher mortality rate than whites in both Wisconsin and the United States. During the study period (1980-1999), the Wisconsin black and white mortality rates remained lower than their US counterparts. The projected decline in all cause mortality for Wisconsin residents from 1999 to 2010 is 23%,
exceeding the 18% decline projected for the United States over the same period. For Wisconsin whites the decline in mortality rate exceeds the rate of decline of mortality rates in US whites if projected out to 2010. The rate of decline in mortality was significantly slower in Wisconsin blacks compared to US blacks and if these rates of decline continue, blacks in Wisconsin will have a higher mortality rate than US blacks by 2015.

In Wisconsin, black males have the highest mortality rates among the gender and race groups examined (Figure 2). Furthermore, the percent decline in black male mortality over the 15-year interval has been only 8%, compared to 27% for white males in Wisconsin. Both of these are statistically significant over this time period (P<0.05). Wisconsin black females have had slower rates of decline in mortality compared to their white female counterparts as well. As Figure 2 and Table 1 indicate, the mortality rate in black females declined 10% over the 15-year span compared to 19% for white females (P<0.05 for both). In 1980 the black female mortality rate was actually lower than that of white males in Wisconsin (Figure 2). Since the mid-1980s, this trend has reversed and black females now have a higher mortality rate than white males, with trends indicating that this gap is widening. Similarly the trend lines in Figure 2 indicate that the reduction in mortality for both black females and males has almost flattened off over the 1990s, as opposed to the continued progress in mortality reduction seen for both white males and females. The gap in mortality rates between blacks and whites has increased over the last 15 years. Among men, the black to white mortality ratio has increased from 1.7 to 2.1; for women, the ratio has increased from 1.8 to 2.0.

The top 5 causes of death in this age group are listed in Table 2. The largest burden of death was from cancer and cardiovascular diseases. All race and gender groups experienced declines in the rates of the top 3 causes of death—cancer, cardiovascular and cerebrovascular disease—over the 15-year interval studied (data not shown). The largest declines were seen in cardiovascular death rates, including heart disease and stroke. Lesser declines were seen in cancer death rates. Unintentional injury-related death rates increased slightly from 1980 to 1999. However, the number of deaths due to injuries was much smaller than cardiovascular and cancer-related deaths (Table 2).

**DISCUSSION**

Wisconsin has made good strides in reducing premature mortality among persons 45-64 years of age over the last 2 decades. Overall the state compares favorably with the United States in the rate of mortality decline since 1980. In the age group we examined, each segment of the population experienced declines in mortality over this time period.

Unfortunately the mortality decline is not equitably distributed across all segments of the population. Blacks in this age group, and black males in particular, have not seen the same rate of decline as their white counterparts, particularly in the last decade. Even compared to the rates of decline in black mortality in the United States, blacks in Wisconsin have not done as well. If the current rates continue in both white and black mortality, we project that racial disparity in Wisconsin will increase by 2010, contrary to the goals of Healthy People 2010. Furthermore black mortality rates in Wisconsin will exceed black mortality rates in the United States overall within the next 15 years.

The reasons for this disparity in black and white mortality are not clear. Access to health care activities...
such as treatment, screening, and secondary prevention is lower in black Medicare beneficiaries nationally.\textsuperscript{4} Behavioral and socio-cultural risk factors such as alcohol abuse, tobacco smoking, obesity and physical inactivity\textsuperscript{5} are associated with a multitude of disease processes, and Wisconsin has not done well in reducing the levels of these behavioral risk factors over the last decade.\textsuperscript{6} Obesity, in particular, increased 82\% over the last decade. Mortality is strongly associated with obesity at all age strata\textsuperscript{7,8} as are these other risk factors. The Wisconsin health plan for 2010 includes all of these factors as health priorities.\textsuperscript{2} Further research is needed to see if differences exist in the trend of these common risk factors among blacks and whites. Research is also needed to elucidate if the racial disparities in health status are driven by socio-economic differences between the races. Policy to reduce health disparities should be based on the findings generated by such studies and should be culturally or economically specific for disadvantaged groups.

Overall cardiovascular disease and cancer deaths still account for the vast majority of deaths in this age group. From 1980 to 1984, cardiovascular deaths were the major cause of deaths in Wisconsin. Major decreases in cardiovascular mortality over the last 15 years and smaller decreases in cancer mortality have resulted in cancer mortality becoming the most common cause of death in this age group in 1995-1999. Over twice as many lives were saved from cardiovascular deaths as cancer deaths in 1995-1999. Improvements in treatment of cardiovascular disease as well as preventive measures such as blood pressure monitoring, cholesterol treatment, and lifestyle changes in diet and activity likely have contributed to the decline in cardiovascular deaths.\textsuperscript{9}

The reasons for a relatively low decline in cancer mortality in Wisconsin warrant continued investigation. Wisconsin residents experienced an increase in lung cancer mortality of 23\% from 1979 to 1998.\textsuperscript{10} Similarly, although breast cancer mortality has fallen among white women in Wisconsin, data indicate a 10\% increase in breast cancer mortality in black women from 1979 to 1996.\textsuperscript{11} Lower rates of decline in risk factors such as smoking, diet, and obesity probably contribute. Access to health services such as screening and surveillance for cancer and early detection may also play a role. If these risk factors continue unabated, disparities in cancer control will continue to grow. This area warrants further examination. Public health policy focus should be on highly prevalent risk factors in Wisconsin such as tobacco use, physical inactivity, and obesity.

Another area of concern includes mortality from unintentional injuries and accidents. Although Wisconsin has experienced a decline in motor-vehicle deaths over the last decade, blacks, white women, and the elderly (over 75) have not shown significant decreases in mortality from injury.\textsuperscript{12} Between 1986 and 1996, black males in particular have had small increases in mortality rates (4\%) from motor vehicle accidents, possibly related to high-risk behaviors such as not using seat belts and drinking and driving.\textsuperscript{12}

Liver disease mortality remains among the leading causes of death in Wisconsin. Alcohol abuse accounts for a significant proportion of liver disease in Wisconsin.\textsuperscript{13} The epidemic of hepatitis C infection, which has a high prevalence in blacks, likely accounts for a significant proportion of the remainder. The combination of the two (alcohol and hepatitis C) in individuals results in significant acceleration of progression to end stage liver disease.\textsuperscript{14} Measures to decrease alcohol abuse in all communities, especially in groups with high hepatitis C prevalence such as poor blacks and Vietnam era veterans, should be one of the priorities of the state’s public health plan. Similarly, testing of high-risk groups for hepatitis C infection and treatment of hepatitis C need to be considered.

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<th>Table 2. Top 5 Causes of Death, Wisconsin, Ages 45-64</th>
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<td><strong>Cause of Death</strong></td>
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<td>Malignant neoplasms</td>
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<td>Unintentional and adverse effects</td>
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<td>Liver Disease</td>
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*\# deaths, rates, # expected and lives saved are expressed as annual rates and numbers, death rates rounded to nearest integer.†Rate-Age adjusted death rate-adjusted for the United States 2000 population.‡All percent rate changes are significant at an alpha level of 0.05.
Setting goals is difficult. Declines in mortality may lag years or decades behind significant behavioral and risk factor modification. Based on Wisconsin's good overall performance from 1980 to 1999 (22% decline in mortality), an overall mortality decline goal of 25% from 1999 to 2010 is reasonable and would result in an overall mortality rate of 427 by 2010. Based on our projections from current trends (Figure 1), the white majority in Wisconsin seems well on target to meet these goals for 2010 (1999 age adjusted death rate 534, projected 2010 death rate 400/100,000). Blacks in Wisconsin are lagging significantly behind whites (1999 age adjusted death rate 1079, projected 2010 black mortality 975/100,000). At current trends, the black/white mortality rate ratio is likely to continue to increase by 2010, thereby increasing racial disparities in Wisconsin. A 25% decline in mortality for blacks (similar to that for whites) would achieve a black mortality rate of 805/100,000 for 2010 and maintain the black to white mortality ratio at 2.0. To reduce the black to white mortality ratio to 1.5 would entail reducing the black mortality rate by 44% by 2010. An eventual goal should be to equalize the black and white mortality rate in Wisconsin.

CONCLUSION
Mortality rates in the age group 45-64 have decreased by 22% over the last 15 years in Wisconsin. However, the relative declines in mortality among Wisconsin blacks are slower than that of US blacks overall. We propose that the goal for 2010 should be to make the decline in Wisconsin black mortality at least equivalent to that of the Wisconsin whites. This will require increased public health efforts to change high-risk behaviors and focus on common mortality causes in this segment of the population. Only by striving to decrease disparities in health can we hope to meet our goal of being the healthiest state.

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REFERENCES
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