

Reducing Mortality in Adolescents and Young Adults in Wisconsin: Are We Making Progress?

David Todem, MS; Carinna Harding, MS

ABSTRACT

Objective: Has there been progress in the reduction of adolescent and young adult mortality in Wisconsin over the last 20 years? This paper addresses this question by examining the mortality trends—and disparities by race and gender—of adolescents and young adults in Wisconsin, ages 15-24.

Methods: Mortality data for blacks and whites from 1980-1999 for Wisconsin and the United States were accessed from the Centers for Disease Control and Prevention's Web-based database system CDC WONDER. Mean death rates were calculated for the 5-year spans 1980-1984 and 1995-1999. A Poisson model for rates was used to summarize the death rates and perform predictions.

Results: Wisconsin and the United States have reduced mortality in the age group 15-24 by about 17% and 16%, respectively, between 1980-1984 and 1995-1999. In spite of this overall progress, significant disparities still exist between white and black older adolescents and young adults. When compared to 1980-1984, Wisconsin mortality rates for 1995-1999 were 24% lower among whites, but 73% higher among blacks. Disparities still exist when rates are analyzed by the leading causes of deaths. Deaths due to motor vehicle injuries have decreased for whites by about 31% compared to an increase of 19% for blacks.

Conclusions: Wisconsin has made progress in reducing death rates in adolescents and young adults, especially in fatal motor vehicle injuries. However, significant dis-

parities still exist between whites and blacks, males and females, and leading causes of deaths. Wisconsin should work to reduce the mortality rate in adolescents and young adults and to eliminate disparities by 2010.

INTRODUCTION

Mortality among adolescents and young adults in Wisconsin and in the nation is important because most deaths in this age group are preventable. The leading causes of death are unintentional injuries, including motor vehicle injuries, homicide, and suicide.¹ These external causes of deaths have their origin in environmental and behavioral factors. Thus, the health treatments for adolescents are primarily social and behavioral, rather than biomedical. As such, it may be possible to prevent or reduce mortality among adolescents and young adults.

A recent issue of the *Wisconsin Medical Journal* focused on preventing youth violence.² Other than this effort, which focuses on one of the leading causes of death in this age group, very little has been written about monitoring mortality trends in adolescents and young adults. Nationally, most literature studied specific causes of death within this age group, but did not solely focus on this particular age group as a whole. Furthermore, national objectives presented in *Healthy People 2010* include reducing older adolescent mortality to 39.8 per 100,000 and young adult mortality to 49.0 per 100,000. *Healthy People 2010* would also like to eliminate racial disparities by 2010.

The objectives of this paper are, first, to compare the overall mortality trends among older adolescents and young adults in Wisconsin to those in the nation for the period 1980-1999; second, to examine the mortality trends in Wisconsin by race (black vs white), gender and age group (15-19 vs 20-24) and to explore the mortality trends by leading causes of deaths to identify areas where important progress has been made; and finally to predict the mortality rates for the next 10 years

Authors are in the MS program in Population Health at the University of Wisconsin-Madison. Additionally, Harding is an employee of EDS. Todem is a PhD student in the Departments of Biostatistics & Medical Informatics and Statistics. Please address correspondence to David Todem, MS, Department of Biostatistics and Medical Informatics, University of Wisconsin Medical School, WARF Building, 610 N Walnut St, Madison, WI 53726-2397; e-mail: todem@biostat.wisc.edu.

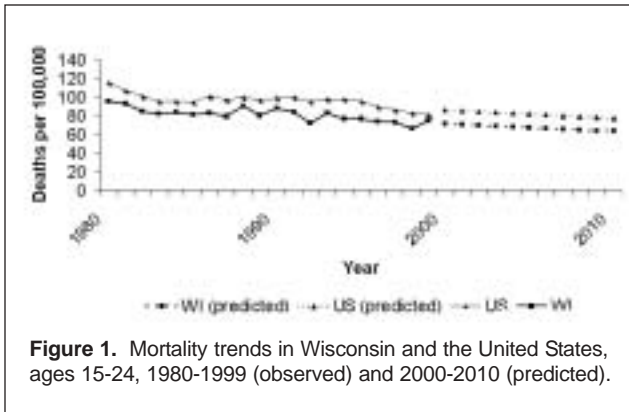


Figure 1. Mortality trends in Wisconsin and the United States, ages 15-24, 1980-1999 (observed) and 2000-2010 (predicted).

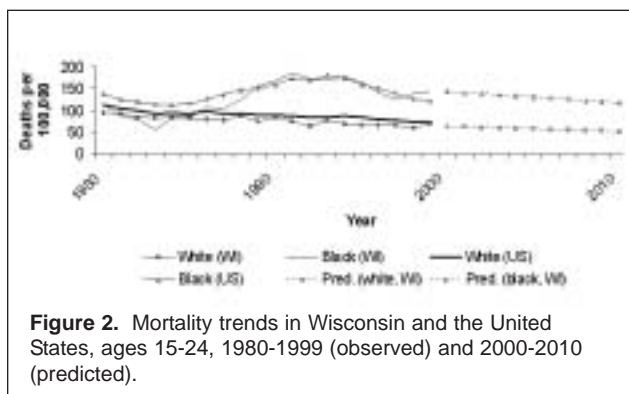


Figure 2. Mortality trends in Wisconsin and the United States, ages 15-24, 1980-1999 (observed) and 2000-2010 (predicted).

and assess whether the national mortality target is likely to be met by Wisconsin if the current trends continue.

METHODS

Older adolescent and young adult (15-24 years of age) mortality data in Wisconsin and the United States for the period 1980-1999 were accessed from the Centers for Disease Control and Prevention's Web-based database system CDC WONDER. These mortality data were then analyzed across region (Wisconsin/United States), gender, race, age, and causes of death. Within racial categories, only rates for blacks and whites were analyzed, as numbers in the "other" race category were too small for valid comparison.

Mortality rates by causes of death for the period 1980-1998 were retrieved from the database using the ICD-9 group codes, and specified as follows: motor vehicle accidents (G079), all other accidents and adverse effects (G080), suicide (G081), and Homicide (G082). Deaths from "other" causes were obtained by subtracting the deaths from the above causes to "all cause" deaths. Since the causes of death defined using ICD-10 codes were not comparable to the ICD-9 codes, analyses were restricted only to the period 1980-1998.

To study the mortality trend, age-specific annual death rates for the period 1980-1984 were compared to the annual average rates for the period 1995-1999. These average rates were also used to see where Wisconsin ranks in the nation in terms of older adolescent and young adult mortality. The change in the rates between these 2 periods was then measured using the percentage change computed by subtracting the average rate in 1980-1984 from the average rate in 1995-1999 and then dividing this difference by the rate in 1980-1984.

Confidence intervals around these percentage changes were derived to test for statistical significance (results not shown).³ For public health importance, the number of lives saved or lost was computed as the difference between the expected number of deaths in the period 1995-1999 (assuming the average rate in period 1980-1984 is continued in the period 1995-1999) and the observed deaths for the same period.

Finally, a Poisson regression model for rates was used to summarize the mortality trends from 1991-1999 for blacks and 1980-1999 for whites and to predict these rates for the next decade.⁴ The decision to use the span 1991-1998 to predict mortality among blacks was that those rates had a consistent trend, compared to the period prior to 1991. The predicted rates will then help assess whether the national mortality objective in this age group is likely to be met by Wisconsin if the current trends continue.

RESULTS

Mortality rates in Wisconsin were consistently below the US average from 1980 to 1999 (Figure 1). Wisconsin's average rate decreased significantly from 87.8 to 72.8 per 100,000 between 1980-1984 and 1995-1999, which corresponds to a decrease of 17% from the 1980-1984 baseline rate. Although a similar overall pattern is observed nationally, the United States experienced a slightly smaller, but significant, decrease of 16% over the same period. Therefore, there were approximately 110 fewer adolescents and young adults dying annually in 1995-1999 compared to 1980-1984.

Different patterns emerge when the mortality rates are stratified by race (Figure 2). Mortality rates are higher among blacks than whites in both the United States and Wisconsin. Although Wisconsin blacks experienced lower rates than their national peers during the period 1980-1984, this relative advantage did not affect the overall mortality rate in the state due to its smaller black population during the period. Thus, Wisconsin's lower overall mortality rates in adolescents

Table 1. Older Adolescent and Young Adult, Ages 15-24, Mortality Rates in the United States and Wisconsin for the Periods 1980-1984 and 1995-1999

	1980-1984		1995-1999*		Percentage Change	# of Lives Saved (Lost) Annually
	Average Annual Rates	Average Annual Deaths	Average Annual Rates	Average Annual Deaths		
Region						
WI	87.8	774	72.8	537	-17%	110
US	103.0	42,801	86.8	31,903	-16%	5,945
Gender						
Male	131.1	580	104.4	391	-20%	100
Female	44.2	194	40.1	146	-9%	15
Race						
White	87.4	722	66	438	-24%	140
Black	82.8	35	143.6	75	73%	(-32)
Age						
15-19	79.8	342	61.6	245	-23%	72
20-24	95.4	432	86.1	292	-10%	31
Causes						
MV Injuries†	38.9	343	26.4	193	-32%	91
Suicide	15.0	133	13	95	-13%	14
Other Unintentional Injuries	11.3	100	7.1	52	-37%	31
Homicide	4.5	40	9.3	68	107%	(-35)
Other causes	18.0	159	16.5	121	-9%	11
Causes/Black						
MV Injuries	8.5	4	10.1	5	19%	(-1)
Suicide	5.6	2	8.7	5	55%	(-1)
Other Unintentional Injuries	10.4	4	13	7	25%	(-1)
Homicide	27.3	12	76.9	40	182%	(-26)
Other causes	31.1	13	34.6	18	11%	(-2)
Causes/White						
MV Injuries	40.1	332	27.5	181	-31%	83
Suicide	15.3	126	12.9	85	-16%	16
Other Unintentional Injuries	11.3	94	6.5	43	-42%	31
Homicide	3.3	27	3.9	26	18%	(-4)
Other causes	17.4	144	15.0	98	-14%	16
Causes/Male						
MV Injuries	59.1	262	35.2	131	-40%	89
Suicide	25.4	113	21.9	81	-14%	13
Other Unintentional Injuries	19	84	12	45	-37%	26
Homicide	5.7	25	15.2	57	167%	(-35)
Other causes	21.9	97	19.3	72	-12%	9
Causes/Female						
MV Injuries	18.5	81	17.3	62	-6%	4
Suicide	4.6	20	3.8	14	-17%	3
Other Unintentional Injuries	3.6	16	2	7	-44%	6
Homicide	3.4	15	3.3	12	-3%	0
Other causes	14.2	62	13.6	49	-4%	2

* Rates are restricted to the period 1995-1998 for the causes of deaths. Note that rates based on less than 20 deaths are unreliable.

† MV Injuries=Motor vehicle injuries

and young adults are due to much lower rates among whites rather than an advantage in black rates.

The mortality rate among blacks in Wisconsin increased 73% from 1980-1984 to 1995-1999, compared to a 24% decrease among whites. Therefore, in 1995-1999, there were 32 more deaths among blacks and 140 fewer deaths among white adolescents and young adults in Wisconsin than expected (i.e., if the rates in 1980-1984 had continued).

When the data are examined by gender, the mortality rate for males decreased 20% (from 131 to 104 per 100,000) whereas female rates only decreased 9% (from 44 to 40 per 100,000) from 1980-1984 to 1995-1999. These declining mortality rates led to 500 fewer deaths each year among men in 1995-1999 than expected, compared with only 74 fewer deaths annually among females. When the age category 15-24 is split into age groups 15-19 and 20-24, the mortality drop is more noticeable in the younger age group, declining 18% (from 79.8 to 61.6), compared to a 9% decline (from 95.4 to 86.1 per 100,000) among the older age group. (See Table 1.)

To further understand the decrease in the mortality rates among adolescents and young adults, data were analyzed by cause of death, cause of death and race, and cause of death and gender. Death rates due to motor vehicle injuries dropped 32% (from 38.9 to 26.4 per 100,000) from 1980-1984 to 1995-1998, a 32% decline. This is mostly attributed to a 31% drop in the rates of whites (from 40.1 to 27.5). Rates for blacks from motor vehicle injuries increased by 19% (from 8.5 to 10.1 per 100,000).

Death rates attributed to suicide also dropped 13% (from 15.0 to 13.0 per 100,000) in Wisconsin among adolescents and young adults. Despite this overall improvement, blacks experienced a 55% increase (from 5.6 to 8.7 per 100,000) compared to a 16% decrease (from 15.3 to 12.9 per 100,000) for whites. However, the difference observed in the mortality rates attributed to suicide among blacks throughout the period 1980-1998 is based on a small number of deaths, and could therefore be due to chance.

The mortality attributed to homicide rose 107% (4.5 to 9.3 per 100,000) from 1980-1984 to 1995-98. This increase in the mortality rates attributed to homicide is due to a 182% increase in the rates for blacks (from 27.3 to 76.9 per 100,000). The rates for whites have remained stable over the same period. There were approximately 141 more deaths each year among black adolescents and young adults in Wisconsin during the period 1994-1998 than expected.

Mortality rates due to other unintentional injuries decreased by 37% (11.3 to 7.1 per 100,000) from 1980-1984 to 1995-1998. This decrease can also be attributed to a 42% decrease in the rate for whites (11.3 to 6.5 per 100,000). The rate for blacks for other unintentional injuries increased by 25% (10.4 to 13.0 per 100,000) during this period. Due to the reduction of the rate among whites, there were 179 fewer deaths each year than expected in Wisconsin.

For "other" causes of deaths, the same decreasing pattern is observed throughout the period 1980-1998 (18.0 to 16.5 per 100,000). This decrease is mostly attributable to whites (17.4 to 15.0 per 100,000). Blacks experienced an increase (31.1 to 34.6 per 100,000). When the causes of death are stratified by gender, the reduction in rates of deaths attributed to motor vehicle injuries is due to males (59.1 to 35.2). The rate for women for this cause of death went from 18.5 to 17.3 per 100,000 over the period 1980-1998.

When using annual death rates in this age group to rank states, Wisconsin ranked 8th in the nation, with Rhode Island having the lowest rate and Alaska the highest rate during the period 1980-1984. In 1995-1999, Wisconsin dropped to 11th among the states, with Massachusetts having the lowest rate, and the District of Columbia having the highest rate. How will Wisconsin fare in 2010? While we cannot predict the ranking, we can predict the mortality rates for whites and blacks in the year 2010. Our prediction for whites in this age group is that mortality will continue to decrease and will reach the level of 52 per 100,000 by 2010. On the other hand, if the current mortality trend continues for blacks, a level of 119 per 100,000 would be expected in 2010.

DISCUSSION

Wisconsin has made significant progress in reducing adolescent and young adult mortality. However, disparities still exist, especially between blacks and whites. While the death rate has declined in both race groups recently, the disparity between the 2 groups has not shown any decline. From the 1998 and 1999 data, it appears that the mortality trend for blacks may be on the rise. This is certainly not good news for Wisconsin, which has proposed to eliminate these racial disparities by 2010. Based on our statistical predictions, if the current mortality trends for each race continue, reducing the racial disparity in this age group in Wisconsin by 2010 would require a 64% relative decrease in the black mortality rates from their 1999 level (144.9 per 100,000). However, based on the 2010 national target,

which is about 44 per 100,000 for the age group 15-24 (no Wisconsin's objectives for death rates have been set for 2010 in this age group), reducing the racial disparity in this age group in Wisconsin by 2010 would require a 70% relative decrease in the black mortality rates from their 1999 level.

There has also been more progress in reducing the male death rate than the female death rate overall. Significant progress has also been made for leading causes of deaths including motor vehicle injuries, suicide, other unintentional injuries, and "other" causes. Despite these improvements, rates attributed to homicides have increased over the 20-year period. Some research has shown an association between homicide and poverty and unemployment.⁵ Thus, the homicide trends could be explained by the fact that Wisconsin poverty rates rose in the early 1990s before returning to their 1989 levels by 1998.⁶ State unemployment rates among blacks also followed a similar pattern, although by 1998 they had fallen well below 1989 levels.

Wisconsin has ranked among the lowest 15 states for mortality within this age group since the early 1970s.⁷ While these are all significant accomplishments, Wisconsin needs to challenge itself by meeting and even surpassing the national goals for the year 2010. One way the state can achieve this is by focusing on issues related to violent behaviors and risks for unintentional injuries. Specifically, for violent behaviors, the state should focus on issues related to handgun access, weapon carrying, physical fighting, substance abuse, and violent behaviors on school property. For unintentional injuries, the state should focus on safety belt use, helmet use while riding motorcycles and bicycles. All these can be achieved if law enforcement, social services, families, and health care systems are active in promoting an environment that is supportive of adolescent health. The state should also implement primary prevention strategies that have been proven to work in states with relatively low mortality rates in older adolescents and young adults. While early prevention efforts are essential, secondary prevention that involves realistic safety strategies is even more important in reducing mortality among older adolescents and young adults. These strategies include efforts targeted at adolescents who use alcohol to discourage them from drinking and driving.⁷

Finally, future analyses should further investigate underlying factors responsible for mortality in this age group in the state. For example, it would be interesting to study differences in risky behaviors in school and out of school among adolescents. Many studies of

health risks among adolescents do not reflect youth not in school, which points to the fact that certain risky behaviors are probably underestimated.

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