

Monitoring Racial/Ethnic Mortality Disparities in Wisconsin: 1991-2000

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ABSTRACT

Background: Wisconsin has a goal to eliminate health disparities by 2010, but there is no consistent standard used to evaluate progress. Methodological debates persist regarding using individual group change or relative comparisons to monitor disparities.

Objectives: To examine mortality disparities among racial/ethnic populations in Wisconsin using statistically significant changes in individual population mortality rates and rate ratios as measures of disparity. These measures are proposed to monitor and evaluate progress in eliminating racial/ethnic health disparities.

Methods: The Wisconsin Interactive Statistics on Health database was queried to obtain Wisconsin all-cause mortality data by race and age for the 1991-1995 and 1996-2000 periods. Age-specific and age-adjusted rates were compared across 5 major racial/ethnic populations in Wisconsin.

Results: Age-adjusted mortality generally declined for all racial/ethnic populations in Wisconsin from 1991-

1995 to 1996-2000. However, disparities increased significantly for African American infants, African Americans 45-64 years old, and Hispanics/Latinos 25-44 years old. Using non-Hispanic whites as a referent resulted in a paradoxical increase in disparities for Hispanics/Latinos despite a significant reduction in mortality in this group.

Conclusion: A statistically significant percent change in mortality rates and rate ratios is a useful standard to monitor health disparities and foster communication and targeted action around Wisconsin's goal to eliminate racial/ethnic health disparities.

INTRODUCTION

Wisconsin's state health plan, *Healthiest Wisconsin 2010*, established a goal to eliminate health disparities (including racial/ethnic health disparities) by 2010, but the plan does not include a standard measure of disparities to evaluate progress toward this goal.¹ Monitoring racial/ethnic health disparities is further challenged by lack of state or national consensus for reporting measures of disparities and comparing disparities across populations. The reconceptualization of race, ethnicity, and minority status in the United States and the impact that such reframing will have on monitoring health disparities and setting priorities are emerging issues in public health and public policy.

Conceptual Considerations

Health disparities are "...differences in the incidence, prevalence, mortality, and burden of diseases and other adverse health conditions that exist among specific population groups in the United States."² Conceptually, health disparities embrace economic and social inequities and do not refer solely to medical health outcomes. Health disparities also have moral implications when they are framed as inequities.³ Disparities can also refer

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to non-specific conceptualizations of ‘poor health’ in groups that have experienced disparate health status related to persistent social and economic inequalities. In the United States, populations with a history of racial and ethnic subjugation are profoundly affected. These populations include African Americans, American Indians, Asians, and Hispanics/Latinos.

Although health disparities normatively refer to racial and ethnic populations, the attribution of health disparities to other distinct groups is occurring with increasing frequency. Accordingly, groups that experience health differences related to gender, disability status, geographic residence, or sexual orientation have also been the focus of health disparity elimination objectives.^{1,4} The pluralization of the health disparities agenda to encompass multiple population and subpopulation groups raises questions about the impending focus of health disparities policy and resources. Our present discussion, however, centers on methodological concerns with respect to measuring disparities in racial/ethnic groups.

Methodological Considerations

A quantitative definition of a health disparity is “...the quantity that separates a group from a specified reference point on a particular measure of health that is expressed in terms of a rate, percentage, mean, or some other quantitative measure.”⁵ Keppel, Percy, and Wagener of the Centers for Disease Control and Prevention proposed an “index of disparity” as a summary measure of disparities for 17 health status indicators included in *Healthy People 2000*.⁶ The index of disparity calculated the national average of minority group rates combined as a percentage of the US total population rate. The investigators also compared annual rates for each racial/ethnic group and reported rate ratios comparing the highest to the lowest population rate for each indicator—or a “best to worst” group comparison.

A limitation of the methods proposed by Keppel and colleagues is the inability to consistently track improvements or worsening of disparities for specific racial/ethnic populations. The practice of comparing minority population rates with total population rates results in non-independent comparisons of rates that can artificially attenuate the disparity gap for disparately-burdened minority populations or widen the gap for minority populations that may have more favorable documented health outcomes than the majority racial population. Using the rate ratio as a gold standard measure of disparities also becomes flawed in the absence of a consistent reference population, which makes it difficult to track disparities in specific populations. It is

generally recommended when monitoring racial/ethnic populations that a comparison population be explicitly-stated and differences acknowledged both within and across populations.^{5,7} Failure to do so can obscure important information needed for identifying priority populations with disparate health status and justifying decisions regarding monitoring disparities and reporting data.³

This paper proposes simple measures to monitor Wisconsin’s progress in eliminating racial/ethnic health disparities. The rate ratio—comparing the individual racial/ethnic minority group rate to the Wisconsin white population rate—is recommended as a standard measure of disparity in Wisconsin. Consistent with the justification provided by several methodologists^{3,5,7} and adopted in the 2004 Wisconsin Minority Health Report,⁸ this standard is proposed because the white population provides a statistically stable reference group, and using the total population rate to compare with minority population rates can minimize disparities. We also recommend that both absolute and relative measures of disparity be used. Accordingly, we propose that statistically significant percent changes in individual population mortality rates and the mortality rate ratios over 2 consecutive 5-year periods be accepted as minimum standards for monitoring racial and ethnic health disparities in Wisconsin.

METHODS

The Wisconsin Interactive Statistics on Health (WISH) query system was used to obtain Wisconsin all-cause mortality by race and age for the 1991-1995 and 1996-2000 periods. Mortality was aggregated over 5 years to increase the reliability of data collected on minority populations that are small compared to the white population. Data were requested separately for non-Hispanic black, non-Hispanic American Indian, non-Hispanic Asian, and non-Hispanic white racial groups and for Hispanic/Latino ethnicity. Racial and ethnic groups were designated according to the federal minimum standards for collection of data on race and ethnicity.⁹

Seven age intervals were selected for analysis: <1 year, 1-14 years, 15-24 years, 25-44 years, 45-64 years, 65-74 years, and ≥75 years. The denominator population for each racial/ethnic and age-group combination was obtained from bridged-race population estimates from the National Center for Health Statistics.¹⁰

Age-specific mortality rates were calculated for each racial/ethnic group, stratified by the 7 age intervals. In addition, overall age-adjusted mortality rates were calculated for each racial/ethnic group using the year 2000

Table 1. Mortality Rates by Race and Age, Wisconsin, 1991-1995 to 1996-2000

Age	Mortality Rate*		% Change 1991-1995 to 1996-2000
	1991-1995	1996-2000	
African American (non-Hispanic)			
<1	15.8	16.3	2.8
1-14	46.3	41.5	-10.5
15-24	176.8	140.9	-20.3‡
25-44	297.5	277.0	-6.9‡
45-64	1112.9	1058.3	-4.9‡
65-74	3477.1	3428.4	-1.4
75+	8412.0	8352.9	-0.7
Age-Adjusted†	1132.7	1102.1	-2.7‡
American Indian (non-Hispanic)			
<1	11.7	8.9	-23.5
1-14	53.8	29.0	-46.0‡
15-24	134.5	147.8	9.9
25-44	231.2	219.5	-5.1
45-64	1062.0	992.5	-6.5
65-74	4082.6	3857.0	-5.5
75+	10,380.5	9967.1	-4.0
Age-Adjusted†	1244.1	1180.7	-5.1‡
Asian (non-Hispanic)			
<1	5.4	5.4	0.4
1-14	33.6	25.9	-23.1
15-24	46.6	58.0	24.4
25-44	79.8	86.6	8.6
45-64	376.0	334.0	-11.2
65-74	1377.4	1321.0	-4.1
75+	4970.7	4908.0	-1.3
Age-Adjusted†	518.8	504.1	-2.9
Hispanic/Latino			
<1	8.7	8.5	-2.4
1-14	18.7	16.8	-10.1
15-24	55.8	52.7	-5.5
25-44	98.0	65.5	-33.2‡
45-64	366.9	292.9	-20.2‡
65-74	1447.8	1328.2	-8.3
75+	3605.1	3336.7	-7.5
Age-Adjusted†	443.6	391.1	-11.8‡
White (non-Hispanic)			
<1	6.7	5.7	-16.1
1-14	23.5	20.4	-13.1
15-24	71.2	66.7	-6.3
25-44	112.4	113.2	0.7
45-64	602.5	537.6	-10.8
65-74	2370.8	2293.7	-3.3
75+	8252.5	8241.8	-0.1
Age-Adjusted†	846.5	824.0	-2.7

* Rates are per 100,000 population; the infant rate is per 1000 live births.

† Age-adjusted to the 2000 US standard population.

‡ P<.05

US population standard. All mortality rates were reported as deaths per 100,000 population except for the infant mortality rates, which were presented as infant deaths per 1000 live births.

The summary measure of disparity used was the rate ratio that was computed by dividing the mortality rate in a minority population by the mortality rate in the non-Hispanic white population. Also, the percent changes in mortality rates and rate ratios between 1991-1995 and 1996-2000 were computed for each racial/ethnic group. The Chi-square test was used to test for statistically significant differences in mortality between a racial/ethnic population and the white population, and the Breslow-Day statistic was used to evaluate the significance of changes in the rate ratios between the 2 5-year periods. Cross-tabulations and statistical analyses in the current study were performed with Microsoft Excel and SAS statistical software packages.

RESULTS

Age-Adjusted Findings

Age-adjusted mortality from all causes generally declined for racial/ethnic populations in Wisconsin from 1991-1995 to 1996-2000 (see Table 1). The age-adjusted mortality rate decreased 2.7% for African Americans, 5.1% for American Indians, and 11.8% for Hispanics/Latinos. Mortality declined 2.9% for Asians and 2.7% for non-Hispanic whites, but these changes were not statistically significant.

Age-Specific Findings

Age-specific rates in each population showed more substantial declines (see Table 1). The largest magnitude decline in the mortality rate across the 2 5-year periods was 46% for American Indians age 1-14 years. Mortality declined 33% for Hispanics/Latinos age 25-44 years and 20% for Hispanics/Latinos age 45-64 years. African Americans aged 15-24 showed a 20% decline in mortality. Mortality declined 23% for Asians aged 1-14 years, but this was not statistically significant (Figure 1). There were no statistically significant increases or decreases in the mortality rates for non-Hispanic whites in Wisconsin from 1991-1995 to 1996-2000, although there was a downward trend for most age groups in this population.

Disparity Trends

Except in the African American and Hispanic/Latino populations, there was no statistically significant narrowing or widening of the mortality rate ratios between minority racial/ethnic groups and the non-Hispanic white population from 1991-1995 to 1996-2000 (see

Table 2). The largest positive increase in the disparity ratio occurred in African American infants. The ratio increased 22% across the 2 periods—from 2.3 during 1991-1995 to 2.9 during 1996-2000. Also, disparities increased 7% for blacks aged 45-64 years and decreased 15% for blacks aged 15-24 years.

From 1991-1995 to 1996-2000, mortality among Hispanics/Latinos 25-44 years declined 33%—a significant decrease relative to non-Hispanic whites of that same age. The reduction in mortality among Hispanics/Latinos increased the rate ratio by 34%, but this widening disparity resulted from the rate ratio moving further from “1” on the negative axis. Among American Indians 1-14 years, the rate ratio declined 38%, but this was not statistically significant. For Asians, the percent change in the disparity ratio in different age groups ranged from <1% to 33%. However, none of these changes were statistically significant (Figure 2).

Summary

In summary, a statistically significant percent change standard for the mortality rate and/or rate ratio can be used to monitor group-specific and age-specific trends in mortality and disparities for racial/ethnic populations in Wisconsin. From 1991-2000, mortality rates and disparities decreased dramatically for African American teens and young adults, but showed negligible change among middle age and elderly blacks. The disparity ratio between African American and white infants increased 22% over the time period. For American Indians, the most significant change occurred in the 1-14 age group, with a 46% decline in mortality.

Consistent with past trends, mortality among Asians remained significantly less than non-Hispanic whites. However, the percent changes over time in the mortality rates and rate ratios for Asians did not attain statistical significance. Similarly, overall and age-specific mortality was lower among Hispanics/Latinos than non-Hispanic whites. The disparity ratio must be interpreted cautiously for Asian and Hispanic/Latino populations. Both populations have declining mortality, but show increasing disparities when non-Hispanic whites are used as the reference group.

DISCUSSION

In contrast to a previous study in the *Wisconsin Medical Journal* that found a general increase in minority population mortality rates and rate ratios during 1980-2000,¹¹ the present study shows an opposite trend of an overall reduction in minority group mortality and narrowing of the mortality gap for many age groups—although with limited statistical significance. Disparities did increase

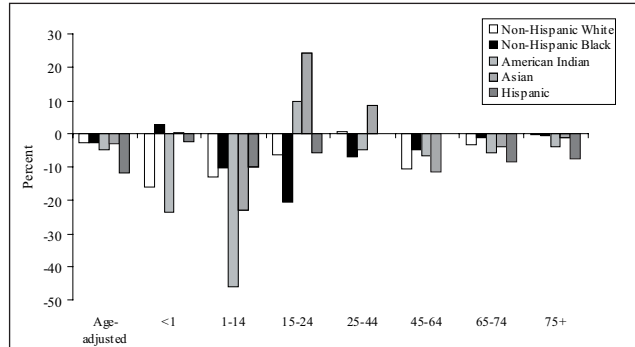


Figure 1. Percent change in mortality rates by race and age group from 1991-1995 to 1996-2000, Wisconsin.

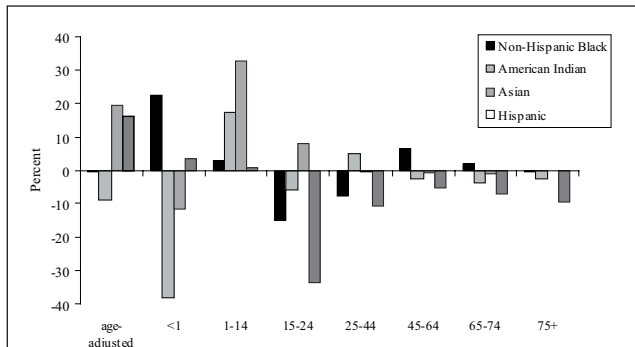


Figure 2. Percent change in mortality rate ratios by race and age group from 1991-1995 to 1996-2000, Wisconsin.

significantly for African American infants (22%) and African Americans 45-64 years (7%). The 34% increase in the disparity ratio for Hispanics/Latinos 25-44 years was due to a significant decline in the Hispanic/Latino mortality rates relative to non-Hispanic whites.

Further investigation is warranted to help explain what factors contributed to specific mortality changes in respective groups and develop policies and programs to reverse negative trends or buttress favorable changes. For example, the significant decrease in mortality and the disparity ratio among African Americans ages 15-24 may be associated with reductions in unintentional injuries and homicides—the leading causes of death for black males and females in this age group. Low birthweight is a known risk factor contributing to black infant mortality that has not improved over the study periods. The increasing disparities for black infants should sound an alarm for maternal-child health advocates to expand evidence-based programs that address fundamental causes and comprehensive, community-centered approaches to improve family and community health and not solely address the individual health of mothers and infants. The 46% decline in mortality for American

Table 2. Mortality Rate Ratios by Race and Age, Wisconsin, 1991-1995 to 1996-2000

Age	Mortality Rate Ratios*				% Change 1991-1995 to 1996-2000
	91-95	95% CI	96-00	95% CI	
African American (non-Hispanic)					
<1	2.3‡	2.1 - 2.6	2.9‡	2.6 - 3.2	22.5‡
1-14	2.0‡	1.7 - 2.3	2.0‡	1.8 - 2.4	2.9
15-24	2.5‡	2.2 - 2.8	2.1‡	1.9 - 2.4	-14.9‡
25-44	2.7‡	2.5 - 2.8	2.5‡	2.3 - 2.6	-7.6
45-64	1.9‡	1.8 - 1.9	2.0‡	1.9 - 2.1	6.6‡
65-74	1.5‡	1.4 - 1.6	1.5‡	1.4 - 1.6	1.9
75+	1.0	0.9 - 1.1	1.0	1.0 - 1.1	-0.6
Age-Adjusted†	1.3‡	1.2 - 1.5	1.3	1.2 - 1.5	-0.1
American Indian (non-Hispanic)					
<1	1.7‡	1.3 - 2.3	1.6‡	1.1 - 2.2	-8.9
1-14	2.3‡	1.6 - 3.2	1.4	0.9 - 2.2	-37.9
15-24	1.9‡	1.4 - 2.5	2.2‡	1.7 - 2.8	17.2
25-44	2.1‡	1.8 - 2.4	1.9‡	1.7 - 2.3	-5.7
45-64	1.8‡	1.6 - 2.0	1.9‡	1.7 - 2.0	4.7
65-74	1.7‡	1.5 - 1.9	1.7‡	1.5 - 1.9	-2.4
75+	1.3‡	1.1 - 1.4	1.2‡	1.1 - 1.3	-3.9
Age-Adjusted†	1.5‡	1.4 - 1.6	1.4‡	1.3 - 1.6	-2.5
Asian (non-Hispanic)					
<1	0.8	0.6 - 1.1	1.0	0.7 - 1.3	19.7
1-14	1.4‡	1.0 - 2.0	1.3	0.9 - 1.8	-11.6
15-24	0.7‡	0.5 - 0.9	0.9	0.7 - 1.2	32.8
25-44	0.7‡	0.6 - 0.9	0.8	0.6 - 0.9	7.8
45-64	0.6‡	0.5 - 0.7	0.6	0.5 - 0.7	-0.5
65-74	0.6‡	0.5 - 0.7	0.6	0.5 - 0.7	-0.9
75+	0.6‡	0.5 - 0.7	0.6	0.5 - 0.7	-1.1
Age-Adjusted†	0.6	0.6 - 0.7	0.6	0.6 - 0.7	-0.2
Hispanic/Latino					
<1	1.3‡	1.1 - 1.6	1.5‡	1.3 - 1.8	16.3
1-14	0.8	0.6 - 1.1	0.8	0.6 - 1.1	3.4
15-24	0.8	0.6 - 1.0	0.8‡	0.6 - 1.0	0.8
25-44	0.9	0.8 - 1.0	0.6‡	0.5 - 0.7	-33.6‡
45-64	0.6‡	0.5 - 0.7	0.5‡	0.5 - 0.6	-10.5
65-74	0.6‡	0.5 - 0.7	0.6‡	0.5 - 0.7	-5.2
75+	0.4‡	0.4 - 0.5	0.4‡	0.4 - 0.5	-7.3
Age-Adjusted†	0.5‡	0.5 - 0.6	0.5‡	0.4 - 0.5	-9.4

* The rate ratio is the minority group rate divided by the white population rate. Rates are per 100,000 population; the infant rate is per 1000 live births.

† Age-adjusted to the 2000 US standard population.

‡ P<.05

Indians ages 1-14 may be related to reductions in unintentional injuries, which was the leading cause of death in this age group. Although no statistically significant mortality changes were observed among Asians, aggregated data obscure health status trends that may be different within the Hmong population. These hypotheses are speculative, and further studies are welcomed to investigate relative similarities and differences in mortal-

ity and morbidity trends in the 2001-2004 period and beyond.

Racial and ethnic health disparities are associated with a myriad of individual, socioeconomic, environmental, and health care factors. However, we did not access individual-level or neighborhood-level demographic, economic, or other health-related data for the current study, and therefore we are limited from confidently attributing related factors or causes for the observed mortality group disparities and trends. Socioeconomic status is a compelling, but inconclusive reason for the noted disparities. Racial discrimination has also been highlighted as a fundamental cause of health disparities linked to multiple outcomes through multiple pathways.¹² Nonetheless, one must be cautious to infer links between ecologic indicators (e.g., neighborhood income, civil rights laws) and mortality trends for the diverse populations and brief period under study. Unequal treatment in health care is a documented cause of health care disparities¹³ for which medical professionals can make positive contributions to reversing unintentional patient-professional biases or institutional regulations that harm health. Overall, interdisciplinary approaches that address both proximal health outcomes and distal factors in the social and economic environment appear most likely to facilitate understanding and resolution of health disparities.

Implications for Public Health and Medical Practice

Health disparities command significant interest in public health, public policy, and medical circles, but the issues are complex and the data are often inconsistent and misinterpreted. This paper proposes simple statistical methods using percent changes in rates and rate ratios to assess progress in eliminating racial/ethnic health disparities over 5-year intervals. The emphasis on statistical significance in this paper provides a scientific standard for reporting and monitoring health disparities that can influence community health assessment, intervention, research, and policy activities in Wisconsin and improve communication around minority health. However, non-significant changes in rates or rate ratios may still have relevant implications for health practitioners, policymakers, and communities most impacted by the burden of disparities. Based on prior experiences, we suggest a minimum 5% change in the rate or rate ratio for any population or age group as a meaningful finding, regardless of statistical significance.

CONCLUSION

This study helps to fill a gap for more empirical findings on racial/ethnic mortality disparity trends in Wisconsin.

Results of the decade-long period under study may serve as a baseline for the goal to eliminate disparities for racial and ethnic populations in Wisconsin by 2010, and the proposed methods may be used to estimate progress. We have highlighted specific populations where the disparities are observed to be increasing or decreasing and provided direction to practitioners and researchers for more detailed study to understand underlying causes of mortality. Retroactive and longitudinal monitoring of mortality and other health indicators is encouraged to elicit more informed perspectives about health disparities in Wisconsin. Proactive attempts should also be made to reinforce positive contributing factors and galvanize community support around positive health trends.

Government, health care, and community institutions can assist in the goal to eliminate racial and ethnic health disparities by producing sound racial/ethnic-specific data that reflect diverse segments of the population. Acceptance of standardized disparity measures and improved availability and accessibility of data can help minority health advocates move beyond discussions of basic surveillance issues and focus more substantive attention on intervention research and programs to reduce and ultimately eliminate racial/ethnic health disparities in Wisconsin.

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