



UNIVERSITY OF WISCONSIN

Population Health Institute

Translating Research into Policy and Practice

Brief Report

Using Measures of Disparities as Indicators of the Health of Wisconsin

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Assessments of health disparities between U.S. states and within Wisconsin can serve as indicators of the overall health of Wisconsin. The Healthiest State project will use relative measures of mortality and non-mortality outcomes to describe these disparities.

This is the fourth of a series of brief reports from work on the “Making Wisconsin the Healthiest State” project, funded by the Wisconsin Partnership Fund for a Healthy Future. This report outlines the project’s framework for assessing health disparities and highlights current disparities in Wisconsin across multiple categories of population subgroups.

Vol. 1, Number 5
August 2006

Background: Our goal for the 4-year “Making Wisconsin the Healthiest State” project is to identify the most effective investments for Wisconsin to become the nation’s healthiest state with less health disparity.

Purpose: To outline the project’s framework for assessing disparities and highlight current disparities in Wisconsin across multiple categories; to identify methods to measure health disparities in Wisconsin.

Methods: We reviewed terminology, measurement options, methodological issues, and domains of health disparities, along with existing disparities in Wisconsin and across the United States.

Results: Health disparities exist throughout Wisconsin by race, education, and county. Wisconsin does not perform well in terms of health disparities when compared to other U.S. states.

Conclusion: Assessments of health disparities between U.S. states and within Wisconsin can serve as indicators of the overall health of Wisconsin. The Healthiest State project will use relative measures of mortality and non-mortality outcomes to describe these disparities.

Introduction

In Wisconsin’s state health plan, *Healthiest Wisconsin 2010: A Partnership Plan to Improve the Health of the Public*, as well as in the U.S. Department of Health and Human Services’ *Healthy People 2010*, the elimination of health disparities is stated as a major policy objective. As the *Making Wisconsin the Healthiest State* project focuses on improving the health of Wisconsin, a broad population perspective elicits concern not only for improving the health of Wisconsin residents on average, but also for erasing the large gaps that continue to exist in health between population subgroups across the state. Therefore, health disparities are a primary focus of the Healthiest State project’s goal to guide policy efforts toward making Wisconsin the healthiest state—for all of its residents.

We are using two complementary strategies to examine health disparities. First, we are measuring and comparing the extent of disparities between Wisconsin and other states around the nation. Determining Wisconsin’s position relative to other states will help us identify examples of success as well as a way of benchmarking our progress. The second strategy involves measuring disparities within Wisconsin, to identify areas and population groups that are in greatest need. This information could inform the targeting of resources in the state.

The purpose of this brief report is twofold. The first part will provide background on health disparities and disparity measurement; it will also contain a description of this project’s broad conceptualization of health disparities and the dimensions of disparity that we will initially address. The remainder of this report will describe specific disparities among groups defined by race, educational attainment, and geography.

While this report will focus on these three specific examples, our project will maintain a broad view of disparities, including the examination of disparities related to overall mortality, specific mortality outcomes such as age- or cause-specific mortality, general non-mortality outcomes such as unhealthy days, and specific non-mortality outcomes such as cancer rates. Health determinant measures such as prevalence of smoking, obesity, or lack of health insurance will be examined as the Healthiest State project continues. Attention will also be paid to other dimensions of health disparity – as available data allow. By focusing on health disparities—in addition to average population health—this project aims to identify opportunities to make Wisconsin a healthier state for *all* of its residents.

Terminology

The term *disparity* is often used to describe any difference in health between groups or individuals. Such disparities in health outcomes are often reflective of existing social, cultural, and economic variations that are related to the multiple determinants of health. *Inequality* and *inequity* are other terms used to represent differences in health, but a distinction is usually drawn between them. *Inequality* is used to describe any difference between groups; on the other hand, *inequity* refers to an inequality in health which is viewed as unfair or unjust (Kawachi et al 2002). Although the term *disparity* is widely used, it has been used inconsistently; sometimes more in line with *inequality* and other times more like *inequity* (Carter-Pokras 2002).

Some variation in health among individuals is expected and may be due to basic biology and genetics, random chance, or well-informed and freely-chosen health-related activities. For example, young adults on average tend to have better health than the elderly. Although this difference represents an inequality, and we may want to design programs to help improve the health of the elderly, this difference would likely not be considered entirely, or even mostly, inequitable.

For the purposes of this project, we have adopted a broad view of health disparities as differences in health outcomes (mortality or morbidity) or health determinants (e.g., health behaviors, access to quality health care, physical environment, etc.) among individuals or groups of individuals. We will, therefore, use the term *disparity* to refer to any inequality in health outcomes or determinants. While in many cases these disparities will be obvious inequities because of their association with widely recognized injustices, in other cases the link between inequality and fairness may not be quite as obvious.

We will focus on disparities among groups defined by a variety of characteristics. For example, the State Health Plan Committee of the Wisconsin Public Health Council has adopted a definition of disparities that identifies multiple groups of concern, including those defined by “gender, age, race, ethnicity, social class, education, income, disability, geographic location, or sexual orientation” (State Health Plan Committee minutes of May 11, 2006 meeting). For an examination of disparities in general, and Wisconsin disparities in health in particular, the assessment of disparities for some groups is more feasible than for others because of issues such as data availability.

Domains of health disparities

An examination of existing disparities across different groups of people is a first step towards identifying potential causes of disparities. For example, the fact that racial disparities in health exist does not imply that race itself is the root cause of observed differences in health. Many health determinants which are associated with race in the United States – such as employment, income, housing, and discrimination – are likely the most pertinent causes. It is these underlying causes which should be targeted by resources, policies, and interventions. Although the characteristics used to define disparity domains below are related both to each other and to additional determinants of health, they are used in their unadjusted form to provide a snapshot of existing disparities. Even without drilling down to the root causes of disparities, simply the existence of health disparities can serve as an indicator of the overall health of a population.

Race and ethnicity

Longstanding racial and ethnic disparities in health persist in Wisconsin. According to *The Health of Racial and Ethnic Populations in Wisconsin* (2004), African Americans and American Indians have

higher age-adjusted mortality rates than whites, while Asians and Hispanics/Latinos have the lowest (best) mortality rates in the state. The mortality rate for African American infants in Wisconsin is nearly three times the rate of white infants. Such variation may be related, in part, to other socioeconomic disparities, but disparities by race can also provide valuable information when race is examined as an independent construct (Kawachi 2005, LaVeist 2005).

Socioeconomic factors

Disparities in health exist among groups defined by a variety of socioeconomic indicators, including education, income, wealth, and occupation. In most instances socioeconomic disparities in health demonstrate a gradient effect with continued health impact observed with each increase in the indicator, although the details of the relationship may vary depending on the specific socioeconomic variable examined (Backlund et al 1999). Across all Wisconsin counties, the mortality rate of those with a high school education or less is at least 50% greater than the rate for those with more than a high school education (Peppard et al 2004). Illumination of the relationship between socioeconomic factors and health outcomes can often help to draw direct links to determinants of health disparities and potential targeted interventions. However, data on all types of socioeconomic factors are often not available in health many data sets; for the Healthiest State project we will focus on education as a proxy for other socioeconomic determinants, since it is highly correlated with income and is available for both mortality and non-mortality outcomes.

Geography

An examination of geographic disparities in health can also shed important light on determinants of inequalities by allowing for the comparison of populations under differing physical, social, and political environments. Potential geographic

domains include examinations of variation in health across states, counties, or rural and urban populations. Not surprisingly, disparities are found at all of the levels listed above. Premature mortality rates (years of potential life lost under age 75) across the United States range almost two-fold, from a low of 5,725 years/100,000 in Vermont to a high of 10,981 years/100,000 in Mississippi (United Health Foundation 2005). Among Wisconsin counties this measure varies more than three-fold from 4,231 to 14,855 years/100,000 (Zank et al 2005). Linking geographic disparities to economic, physical, political, and cultural environments may not only highlight successful policies to serve as benchmarks for other areas but also identify jurisdictions at which programs and policies can be targeted and implemented.

Gender and age

Inequalities in health are often observed between men and women and between individuals of different ages. While a portion of these differences is due to biological characteristics and the effects of aging, variations in other factors such as health behaviors and health care access are also likely responsible. Many of the analyses for this project will be stratified by age and gender, since these factors interact with a number of other domains of disparities and determinants of health. For example, white males in Wisconsin aged 15-24 have a mortality rate 2.8 times that of white women of the same age. The gender disparity for African Americans in this age group is even larger, with young African American males dying at a rate that is four times higher than that of young African American females (data from DHFS, WISH database). A unique set of gender and racial disparities exist for each age group.

Disability and sexual orientation

The remaining two domains of disparities included in the Wisconsin State Health Plan subcommittee definition are groups defined by disability and

sexual orientation. The Healthiest State project recognizes the importance of addressing and describing disparities by disability and sexual orientation and, when possible, will include such assessments. However, in many cases data limitations severely restrict the opportunity to explore these disparities in the state of Wisconsin. These data limitations have been recognized on a national level, and steps are being taken to improve existing and create new monitoring systems in order to more appropriately track these important disparities (Sell and Becker 2001; USDHHS 2000).

Measures and methods

In addition to the domains across which disparities are examined, another important factor is the measure which is used to quantify disparities. While disparities are often described in terms of mortality outcomes, inequalities exist and should also be considered in terms of quality of life, morbidity, and health determinants. The successful translation of research into policy is of special interest to this project and the UW Population Health Institute as a whole. Therefore, disparity domains and measures have been selected for this project to be both policy-relevant and feasible in terms of data availability. The measurement and reporting of the magnitude of disparities presents an additional set of concerns on top of decisions regarding how to define the subgroups and outcomes of interest. One way health disparities can be assessed is by using the absolute difference observed between two groups. For example, the age-adjusted mortality rate for African Americans under 75 years of age in Wisconsin is 613 and for whites it is 339 / 100,000; the absolute disparity is a difference of 274 deaths per 100,000 people. In contrast, a relative disparity measure presents the ratio of a value between two groups. For the example above, the relative disparity is 1.8, indicating that the death rate for African Americans is 1.8 times the rate for whites in the state. Relative and absolute measures of

disparities can sometimes paint differing pictures regarding the extent of inequalities, especially when examining change in disparities over time (Keppel, Percy, et al 2005; Harper and Lynch 2005), and at times one measure is preferred over the other. For the Healthiest State project, we will most often present quantitative summaries of health disparities through relative measures as seen in Figures 1 and 2. However, as needed we will also employ absolute measures and summary measures of disparities across many groups.

A comprehensive discussion of the variety of disparities measurements used as well as their advantages and disadvantages can be found in a report on the measurement of cancer disparities published by the National Cancer Institute of the National Institutes of Health (Harper and Lynch 2005). Other methodological issues include whether disparities are evaluated across groups or individuals and the selection of a reference population. As described above for Wisconsin, it is not always the case that all minority groups have worse health outcomes than the overall population. In some measures minority groups perform better than the average and others fall below. This can introduce some methodological concerns for the selection of a reference group in disparity measurement. The Centers for Disease Control and Prevention (CDC) also released a report addressing these and other methodological concerns, which provides guidance on making measurement decisions that are well thought out and backed up by the purpose of the project (Keppel, Pamuk, et al 2005).

Reference groups have been initially selected by the Healthiest State project for each of the health disparity domains that we will examine. For examinations of health disparities by socioeconomic status, the group with the highest level of education or income will be used as the reference group. For racial and ethnic disparities in

health, we will use the white rate for comparison. Although other alternatives exist, these reference groups are frequently used and often exhibit values that are the most statistically reliable. When looking at geographic disparities in health, the group with the best (healthiest) value will be used as the reference group. However, if there are concerns regarding the reliability of an estimate, the group with the best *stable* estimate (based on population size) will be used for comparing geographic disparities in health.

An overview of current disparities

Having summarized the major measurement and methodological issues surrounding health disparities, the second part of this report will describe the current state of disparities in Wisconsin. Disparities among the groups outlined above – racial, socioeconomic, and geographic – are examined. Because making Wisconsin the healthiest state for all of its residents necessarily includes reducing health disparities, it can be helpful to compare disparities in Wisconsin to those found in other states as a way of benchmarking our progress. Therefore, we have presented Wisconsin's disparities in a comparative context with other U.S. states. Although health disparities can be observed for many different outcomes, the examples presented here are for the two primary health outcomes we have adopted for this project: mortality and a measure of health-related quality of life.

Racial disparities

Figure 1 plots African-American vs. white mortality rates among U.S. states. In almost every state, the mortality rate for African Americans is higher than the rate for whites. However, there is substantial variation in the degree of these racial disparities among states. The diagonal lines indicate mortality rate ratios (the mortality rate for African Americans divided by the rate for whites). In some states (e.g., Illinois, Michigan), the

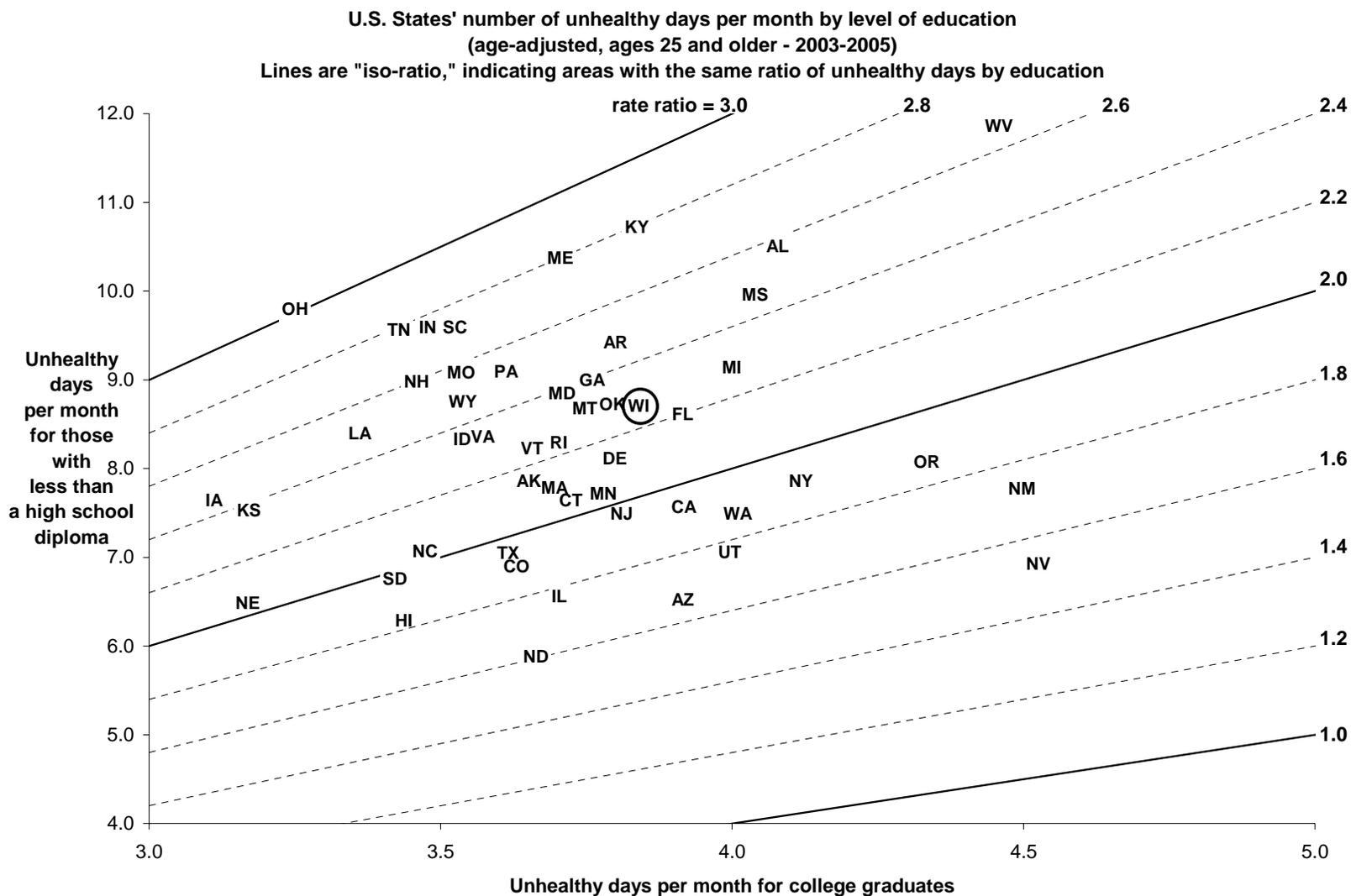
mortality rate for African Americans is nearly twice the mortality rate of whites. There is much less disparity in other states where the rates are almost equal (e.g., Hawaii, Vermont). Wisconsin has a relatively large disparity in African American and white mortality rates, with African Americans having an approximately 80% greater rate than whites. Even among other states with comparable mortality rates for whites (e.g., Washington, Massachusetts), Wisconsin has greater racial disparity.

Disparities also exist for other racial and ethnic groups in Wisconsin, as documented in *The Health of Racial and Ethnic Populations in Wisconsin* (2004). However, these differences are often more difficult to accurately depict because of small sample sizes or unreliable data. Mortality rates are calculated using the number of deaths from death certificates and population size numbers from the U.S. Census. Because race is self-reported on the Census but not on the death certificate, misclassification problems may lead to estimates of questionable validity for some groups.

Socioeconomic disparities

Figure 2 depicts disparities in the number of unhealthy days reported by those who did not finish high school compared to those who have graduated from college. Unhealthy days are a measure of self-reported health status which provides an appropriate complement to mortality statistics by incorporating information on morbidity and quality of life. The Behavioral Risk Factor Surveillance Survey asks respondents to report for how many days in the past month their physical health was poor and for how many their mental health was poor. The total number of unhealthy days for a respondent is the sum of the numbers reported for these two questions. More detailed information on the measure of unhealthy days can be found in an earlier Brief Report from this series (Booske et al 2006).

Figure 2. Disparities in unhealthy days by level of education. Data from the Behavioral Risk Factor Surveillance System, 2003-2005.



Across all states, those who did not finish high school report a minimum of 50% more unhealthy days in a month, with most states demonstrating values that are at least twice as large. In Wisconsin, the number of unhealthy days reported in this group is 2.3 times that reported by college graduates. The median rate ratio for unhealthy days across all states is 2.3, with a range from 1.5 (Nevada) to 3.0 (Ohio).

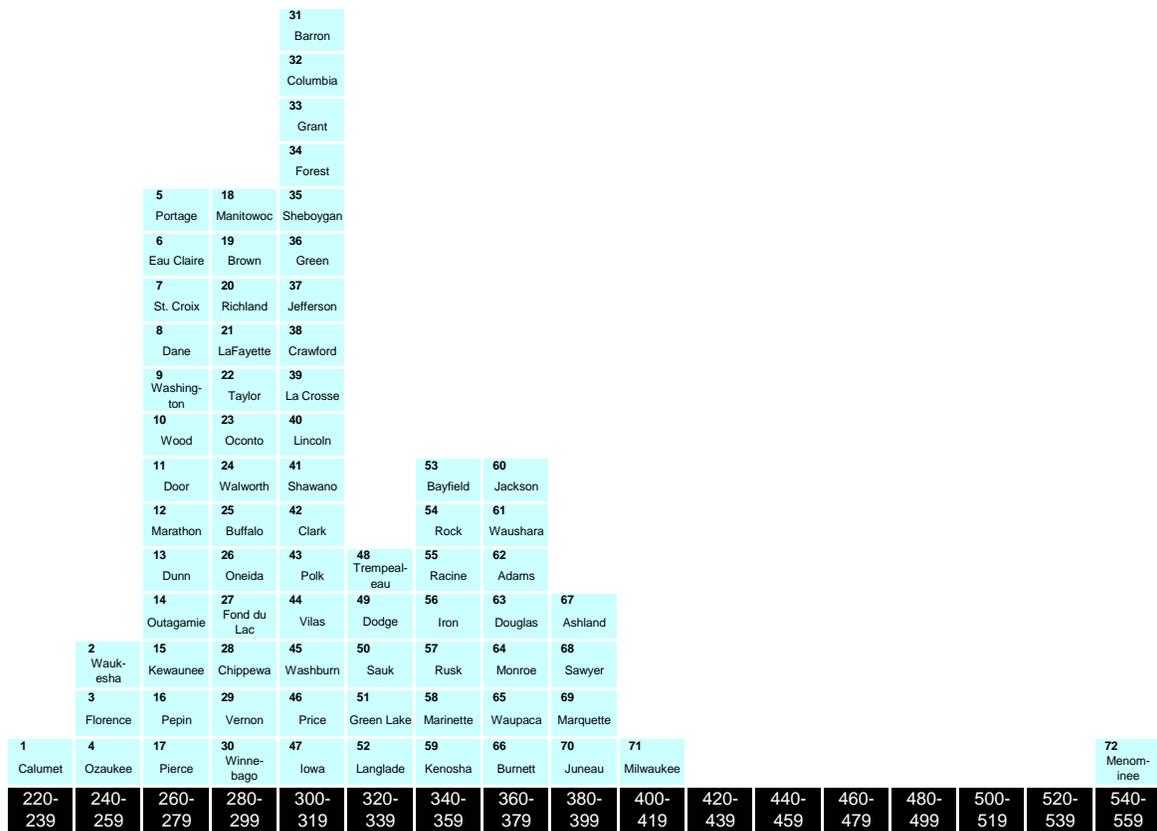
Geographic disparities

Figure 3 illustrates disparities among Wisconsin counties in age-adjusted under-75 mortality rates. There is great variation observed among Wisconsin counties for this measure. The highest mortality

rate, in Menominee County, is more than 2-fold that of the lowest, Calumet County. The histogram also depicts a clustering of counties with relatively low mortality rates in the range of 260-319 deaths per 100,000, but a third of Wisconsin’s counties still have rates of 320 or greater. Even among more “urban” counties there is substantial variation—Milwaukee County has a 50% higher mortality rate than Dane County, indicating important differences among counties in which most of the population lives in large communities. Although not presented here, geographic disparities (either by county, rural and urban, etc.) can also be examined for other states and compared to Wisconsin.

Figure 3. Disparities in mortality among Wisconsin counties. Data from WISH, 2001-2004.

Histogram of Wisconsin counties' age-adjusted under age 75 mortality rates per 100,000 with county rank (2001-2004)



Age-adjusted under-75 mortality rate (per 100,000)

Conclusion

High overall levels of health in a population do not necessarily lead to low levels of disparities, and so indicators of both disparities and average health contribute important information to assessments of population health. The ultimate goal of the Healthiest State project is to outline the most effective and efficient policies and programs to help move Wisconsin toward becoming the healthiest state with less disparity. A closer examination of the unequal distribution of health within the state will identify the population subgroups of greatest need where particular interventions may have the greatest impact.

As we seek to move towards our dual targets of maximum health and minimal disparities, we recognize that these might be competing goals. Population-based interventions which depend on voluntary involvement or behavior change may serve to initially increase disparities because they tend to be adopted most frequently by those who are healthier and not in greatest need of the effects of the intervention; in other instances, interventions which bring the biggest gains to the disadvantaged group may not be the most efficient method for decreasing disparities (Mechanic 2002). Therefore, both the level of health and magnitude of disparities should simultaneously be examined, as illustrated in Figures 1 and 2.

The Healthiest State project will focus initially on measuring relative disparities by race, socioeconomic status, and geographic location. We will examine disparities across these three domains for the two health outcomes measures that serve as

overall indicators of the health of a population: rates of mortality and unhealthy days. We will examine disparities within Wisconsin using these measures, and we will also use these same measures to compare disparities in health in Wisconsin to those in other states and to identify top-performing states which can serve as benchmarks.

Although race, socioeconomic status, and geography have been described as three separate domains in this report, these determinants of health are closely related. For example, observed differences in health among counties in Wisconsin also likely reflect aspects of other determinants of health because of differences in the socioeconomic and racial composition of counties across the state. This overlap between domains is in part why it is difficult to provide a single overall measure of disparities in a large population such as a state. The creation of such a summary measure is also complicated by the fact that disparities can be described for many different domains and each may indicate varying levels of disparity. One possibility would be to create a disparity index which incorporates the inequalities observed in many different domains. Such a disparities index and a deeper look at the underlying causes of health disparities in Wisconsin are some of many perspectives that the Healthiest State project will investigate as we move forward in our goal of monitoring the health needs of the state of Wisconsin and identifying the most appropriate policies and programs which will help make Wisconsin the healthiest state for all of its residents.

Data Sources:

- Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2004.
- United States Department of Health and Human Services (US DHHS), Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS), Compressed Mortality File (CMF) compiled from CMF 1999-2002, Series 20, No. 2H 2004 on CDC WONDER On-line Database.
- Wisconsin Department of Health and Family Services (DHFS), Division of Public Health, Bureau of Health Information and Policy, WISH On-line Database.

Citations:

- Backlund E, Sorlie PD, Johnson NJ. A comparison of the relationships of education and income with mortality: the national longitudinal mortality study. *Social Science & Medicine*. 1999;49:1373-1384.
- Booske BC, Kindig DA, Remington PL, Kempf AM, Peppard PE. How should we measure health-related quality of life in Wisconsin? *University of Wisconsin Population Health Institute Brief Report*. Vol 1, No 1, March 2006.
- Carter-Pokras O, Baquet C. What is a "health disparity"? *Public Health Reports*. 2002;117(5):426-434.
- Harper S, Lynch J. *Methods for Measuring Cancer Disparities: Using Data Relevant to Healthy People 2010 Cancer-Related Objectives*. A report of the Surveillance Research Program and the Applied Research Program of the Division of Cancer Control and Population Sciences of the National Cancer Institute, 2005.
- Kawachi I, Subramanian SV, Almeida-Filho N. A glossary for health inequalities. *Journal of Epidemiology and Community Health*. 2002;56(9):647-652.
- Kawachi I, Daniels N, Robinson DE. Health disparities by race and class: why both matter. *Health Affairs*. 2005;24(2):343-352.
- Keppel K, Pamuk E, Lynch J, et al. Methodological issues in measuring health disparities. National Center for Health Statistics. *Vital Health Statistics*. 2005;2(141).
- Keppel KG, Percy JN, Weissman JS. Trends in racial disparities in care (letter). *New England Journal of Medicine*. 2005;353(19):2082-2083.
- LaVeist TA. Disentangling race and socioeconomic status: A key to understanding health. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*. 82(2; Suppl 3):iii26-iii34.
- Mechanic D. Disadvantage, inequality, and social policy. *Health Affairs*. 2002;21(2):48-59.
- Peppard PE, Kempf A, Dranger E, Kindig D, Remington PL. *Wisconsin County Health Rankings, 2004*. Wisconsin Public Health and Health Policy Institute, 2004.
- Sell RL, Becker JB. Sexual orientation data collection and progress toward Healthy People 2010. *American Journal of Public Health*. 2001;91(6):876-882.
- State Health Plan Committee of the Wisconsin Public Health Council. Minutes of May 11, 2006 meeting. Available online at <http://publichealthcouncil.dhfs.wi.gov/shp/schedule/>.
- United Health Foundation. *America's Health Rankings – 2005 Edition*. Minnetonka, MN: 2005.
- United States Department of Health and Human Services. *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: U.S. Government Printing Office, November 2000.
- Wisconsin Department of Health and Family Services (DHFS), Division of Public Health, Minority Health Program. *The Health of Racial and Ethnic Populations in Wisconsin: 1996-2000 (PPH 0281 07/04)*. Madison, Wisconsin: Department of Health and Family Services.
- Wisconsin Department of Health and Family Services (DHFS). *Healthiest Wisconsin 2010: A Partnership Plan to Improve the Health of the Public*.
- Zank DC, Kaufman SK, Peppard PE, Remington PL, Kindig DA. *Wisconsin County Health Rankings, 2005*. University of Wisconsin Population Health Institute, 2005.