



UNIVERSITY OF WISCONSIN

Population Health Institute

*Translating Research into Policy and Practice*

# Brief Report

## Measuring the Burden of Non-Fatal Illness in Wisconsin

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**To improve the health of Wisconsin, we need measures of disease burden for both fatal and non-fatal illnesses.**

*This is the fifth in a series of brief reports from work on the “Making Wisconsin the Healthiest State” project. With funding from the UW School of Medicine and Public Health Wisconsin Partnership Program, our goal for this 4-year project is to identify the most effective investments for Wisconsin to become the nation’s healthiest state with less health disparity. This report examines the availability of data on the morbidity of Wisconsin’s residents and estimates the burden of nonfatal illness.*

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As part of the monitoring and assessment phase of our “Making Wisconsin the Healthiest State” project, we analyzed mortality data to determine the distribution and burden of mortality overall (Kempf et al, 2006) and by cause and life stage across Wisconsin (Booske, Remington et al, 2006). However, mortality data can only provide information about conditions that cause death. These data do not address the many non-fatal health conditions that impact people’s health-related quality of life without being life-threatening.

In our attempt to identify strategies to make Wisconsin “the healthiest state,” we selected unhealthy days as our measure of quality of life and noted that unhealthy days are increasing over time (Booske, Kindig et al, 2006). Ideally we would examine the distribution and burden of quality of life by condition and life stage but unfortunately, information on morbidity is not as readily accessible as mortality data. In this report, we discuss the sources of information that are available on non-fatal health conditions among Wisconsin’s residents. Where necessary, we supplement these data with other information that address morbidity and health-related quality of life among the entire U.S. population. We examine these data in order to identify the conditions with the greatest impact on quality of life for Wisconsin residents across each life stage.

## Availability of data

Table 1 describes the main sources of data on morbidity for the U.S. and specifically, for Wisconsin. As this table shows, there are four main data sources: surveys of individuals relying on self-reported health information, surveys of individuals involving clinical interviews and examinations, surveys of providers regarding conditions treated and services provided, and mandatory provider reporting of specific conditions encountered.

Over the years, data on the incidence and prevalence of some health conditions have become available on a national and regional level from population surveys such as the National Health Interview Survey. However, most national datasets based on survey data do not include sufficient sample size to derive state-specific estimates. Wisconsin does collect some morbidity data but these data are often not comparable to national data. Other state-level estimates of the incidence or prevalence of different conditions depend primarily on state-specific surveys such as the Wisconsin Family Health Survey and the optional modules of the Behavioral Risk Surveillance Survey System. However, these surveys tend to focus on more limited and

sporadic collection of prevalence data on a few chronic conditions. With funding from the Wisconsin Partnership Fund, the Department of Population Health Sciences at the University of Wisconsin-Madison is developing its own health survey, the Survey of the Health of Wisconsin (SHOW). The survey will be based on a similar, but not identical, model of the National Health and Nutrition Examination Survey but data will not be available for several more years.

One of the main sources of information on the incidence of more acute conditions are healthcare utilization statistics, collected directly from providers. However, such statistics only capture information on people who seek care and are at best a proxy for determining the incidence of conditions across the entire population. Furthermore, although such information is readily available on a national level for health care services provided in inpatient (Healthcare Cost and Utilization Project) and ambulatory (National Ambulatory Care Survey) settings, state-level utilization is only available for inpatient care and ambulatory surgery. Other provider-specific surveys generate a limited amount of information on utilization of services and prevalence of conditions served in other long term care settings such as nursing facilities, hospices, and homes. Wisconsin is one of a handful of states that is pursuing the collection of administrative data (including health care utilization and charges) from health insurers and providers, effectively extending across more health care settings, but these data are not yet available.

Mandatory provider reporting of conditions is limited to cancers and a distinct set of communicable conditions specified on a state basis and on a federal basis by the Centers for Disease Control. For example, extensive data on the incidence of all types of cancers are available for Wisconsin and nationally ([wonder.cdc.gov/cancer.html](http://wonder.cdc.gov/cancer.html)). Estimates for other specific conditions may be derived from disease-specific registries (such as the US Renal Data System) or epidemiological studies conducted on a local, state or national level.

## Estimating burden of conditions

Estimating the burden of conditions on health-related quality of life (HRQOL) is not as straightforward as estimating the burden of conditions on death. Identifying the conditions that cause the greatest reduction in HRQOL requires combining information from multiple sources and developing best estimates.

Table 1: Availability of Data on Health Conditions

Source of Data	National	Wisconsin
Population-wide surveys of individuals relying on self-report	<p><i>National Health Interview Survey</i><sup>1</sup> includes information on extensive list of conditions.</p> <p><i>Behavioral Risk Factor Surveillance System (BRFSS)</i> – includes overall health-related quality of life and selected chronic conditions.<sup>2</sup></p> <p><i>Medical Expenditure Panel Survey</i><sup>3</sup> – includes information on services received and associated conditions.</p> <p><i>Survey of Income and Program Participation</i> conducted in 1999 addressed prevalence of disabilities and associated health conditions<sup>4</sup></p>	<p><i>Wisconsin Family Health Survey</i><sup>5</sup> includes selected chronic conditions but conditions vary from year to year. Results are not comparable to US rates.</p> <p><i>Wisconsin BRFSS</i><sup>6</sup></p>
Surveys of individuals relying on interviews and clinical examinations	<i>The National Health and Nutrition Examination Survey</i> <sup>7</sup>	Not currently available but data collection for the newly funded <i>Survey of the Health of Wisconsin (SHOW)</i> will begin by 2008.
Surveys of providers regarding provision of services and conditions treated	<i>National Health Care Surveys</i> (physician office/ambulatory care, hospital, ambulatory surgery, nursing home, home health and hospice care)	<p>Wisconsin Home Health Agency Survey<sup>8</sup></p> <p>Wisconsin Hospice Survey<sup>9</sup></p> <p>Wisconsin Nursing Home Survey<sup>10</sup></p> <p>Wisconsin Facilities Serving People with Developmental Disabilities<sup>11</sup></p>
Mandatory provider reports	<p>Cancer incidence (National Program of Cancer Registries established in 1992)<sup>12</sup></p> <p>Communicable/infectious disease surveillance<sup>13</sup></p> <p>Other disease-specific surveillance, e.g., US Renal Data system</p> <p>Hospital stays by diagnosis and procedure number, length, and charges)—available annually since 1993.<sup>14</sup></p>	<p>Cancer incidence (since 1976)</p> <p>Selected communicable diseases<sup>15</sup></p> <p>Hospital stays by diagnosis and procedure (number, length, and charges)—available annually since 1989.<sup>16</sup></p> <p>Outpatient surgeries (number and charges)<sup>17</sup></p> <p>Emergency room visits<sup>18</sup></p>

<sup>1</sup> <http://www.cdc.gov/nchs/nhis.htm>

<sup>2</sup> The Behavioral Risk Factor Surveillance System (BRFSS) contains core questions that are asked in all states and optional modules. Includes selected chronic conditions but selection varies by state and by year (<http://www.cdc.gov/brfss/>)

<sup>3</sup> <http://www.meps.ahrq.gov/mepsweb/>

<sup>4</sup> Centers for Disease Control and Prevention (US). Prevalence of disabilities and associated health conditions among adults—United States, 1999. MMWR Morb Mortal Wkly Rep 2001; 50(07):120-5.

<sup>5</sup> Conditions periodically covered the Department of Health and Family Services' Family Health Survey include hay fever/allergies, arthritis, chronic back problems, asthma, emphysema/chronic bronchitis, diabetes, heart disease, cancer, high blood pressure, osteoporosis (<http://dhfs.wisconsin.gov/stats/familyhealthsurvey.htm>)

<sup>6</sup> The Wisconsin BRFSS only includes questions on a subset of chronic conditions each year (<http://dhfs.wisconsin.gov/stats/BRFS.htm>)

<sup>7</sup> [http://www.cdc.gov/nchs/data/nhanes/OverviewBrochureEnglish\\_May05.pdf](http://www.cdc.gov/nchs/data/nhanes/OverviewBrochureEnglish_May05.pdf)

<sup>8</sup> <http://dhfs.wisconsin.gov/provider/pdf/04hh&p.pdf>

<sup>9</sup> <http://dhfs.wisconsin.gov/provider/pdf/05hospice.pdf>

<sup>10</sup> <http://dhfs.wisconsin.gov/provider/pdf/05nh&r.pdf>

<sup>11</sup> <http://dhfs.wisconsin.gov/provider/pdf/05FDDreport.pdf>

<sup>12</sup> <http://www.cdc.gov/cancer/npcr/>

<sup>13</sup> <http://www.cdc.gov/epo/dphsi/phs/infdis.htm>

<sup>14</sup> <http://hcupnet.ahrq.gov/>

<sup>15</sup> See <http://dhfs.wisconsin.gov/communicable/diseasereporting/index.htm> for complete listing of reportable diseases in Wisconsin (accessed February 7, 2007)

<sup>16</sup> <http://hcupnet.ahrq.gov/>, [http://www.wipricepoint.org/Basic\\_INP.aspx](http://www.wipricepoint.org/Basic_INP.aspx), and <http://www.wicheckpoint.org/>

<sup>17</sup> [http://www.wipricepoint.org/Basic\\_OPS.aspx](http://www.wipricepoint.org/Basic_OPS.aspx)

<sup>18</sup> <http://dhfs.wisconsin.gov/wish/main/InjEmergencyDeptVisits/EDvisitsHome.htm>

Recognizing that the leading causes of death are not the only sources of health burden, the Centers for Disease Control recently went through a similar exercise (Thacker et al, 2006). To identify the leading causes of public health burden in the United States, in addition to data on causes of death, they compiled lists of conditions that lead to the most hospital admissions and days in the hospital, the most common causes of disability, and the costliest conditions. They also included information on conditions resulting in the most disability-adjusted life years, based on information compiled for the World Health Organization's Global Burden of Disease project. However, the CDC did not specifically incorporate any data on conditions based on reductions in HRQOL.

While several population-based surveys capture measures of HRQOL, such as the average number of unhealthy days per month or perceived health status, there is no consistent collection of data regarding the underlying conditions that contribute to these levels of health. However, using a unique set of data collected from a subset of states that participated in the Behavioral Risk Factor Surveillance System in 2000 and 2001, we were able to develop some national estimates of the frequency and impact of selected non-fatal conditions with respect to their impact on HRQOL. The subset of states (not including Wisconsin) gathered data on the extent of health problems among their populations. Table 2 lists the percent of adult respondents, who reported having health problems that limited their activities or required the use of special equipment.

**Table 2: Reports of health problems that limit activities or require use of special equipment**

Age	Percent reporting health problems
18-24	8.3%
25-44	11.5%
45-64	22.0%
65+	29.7%

Source: Analysis of BRFSS data for selected states, 2001-2002.

For respondents who reported having a health problem, they were asked to select their primary underlying condition, providing estimates of the frequency of certain non-fatal conditions. Since the same states also collected reports of HRQOL from each respondent, we were able to estimate the mean number of unhealthy days in a month for each of these non-fatal conditions. These data are presented in Table 3, giving us an estimate of both the frequency and relative impact of some non-fatal conditions that cause health problems.

**Table 3: Types of problems reported by people with health problems**

Type of health problems	Frequency (percent of people with health problems)	Impact (mean unhealthy days per month)
Back or neck problems	18.0	14.1
Arthritis/rheumatism	15.5	13.5
Fractures, bone/joint injury	11.0	12.1
Lung/breathing problem	7.0	14.5
Heart problem	6.6	15.2
Walking problem	6.1	12.1
Depression/anxiety/emotional problem	4.0	20.1
Eye/vision problem	2.6	9.5
Diabetes	2.1	17.2
Stroke problem	1.6	16.4
Cancer	1.4	22.1
Hypertension	1.1	9.4
Hearing problem	0.7	11.2
Other impairment/problem	22.5	13.1
Total	100.0	

Source: UWPHI analysis of BRFSS data for selected states, 2000-2001

Table 3 highlights the frequency and impact of several non-fatal conditions: back or neck problems, arthritis and rheumatism, and fractures and other joint injuries. Also worth noting is the impact of depression and cancer, with respondents reporting either of these problems indicating that they experience over 20 unhealthy days per month.

By combining the data on frequency of these problems with the estimate of their impact (mean unhealthy days per month), we were able to rank order these non-fatal conditions in terms of the burden on unhealthy days. Table 4 lists the top 10 conditions in terms of the burden of unhealthy days, along with the top 10 conditions in terms of four other measures of burden: disability, disability-adjusted life years, hospital days, and total health care costs.

While the listing of conditions in Table 4 is a useful starting point for identifying conditions with the greatest impact on HRQOL, a number of pieces of information are missing:

- 1) the only data that are specific to Wisconsin are the conditions resulting in the most days in hospital,
- 2) life-stage specific data are only available for some of these measures of burden (we provide available life-stage specific information in Appendix A),
- 3) the listings do not reflect trends in the incidence and prevalence of conditions, and

**Table 4: Leading conditions using measures of burden of disease besides mortality**

Conditions	Unhealthy days <sup>a</sup> (US)	Disabilities <sup>b</sup> (US)	Disability-adjusted life years <sup>c</sup> (DALY)	Hospital days <sup>d</sup> (WI)	Health care costs <sup>e</sup> (US)
Back problems	2	2			9
Osteoarthritis	3	1	10	7	7
Injuries	4		5	3	3
Chronic lower respiratory disease/asthma	5	4	3	10	5
Diseases of heart	6	3	1	2	1
Depression/mood/other mental disorders	7	7	6	9	4
Walking problems/limb stiffness	8	6			
Diabetes mellitus	9	8	9		8
Malignant neoplasms	10		2	4	2
Cerebrovascular diseases		10	4	8	
Blindness or vision difficulties		9			
Hypertension					6
Deafness or hearing difficulties		5			
Chronic liver disease/alcohol use			7		
HIV/AIDS			8		
Childbirth/perinatal conditions				1	10
Disorders of upper gastrointestinal system				5	
Influenza and pneumonia				6	
Other impairment problems	1				

<sup>a</sup> UWPHI analysis of Behavioral Risk Factor Surveillance System data for selected states, 2000-2001.

<sup>b</sup> Prevalence of disabilities and associated health conditions among adults-United States, 1999 MMWR 50(07); 120-5.

<sup>c</sup> McKenna MT, Michaud CM, Murray CJL, Marks JS. Assessing the burden of disease in the US using disability-adjusted life years. *Am J Prev Med* 2005; 28:415-23.

<sup>d</sup> Agency for Healthcare Research and Quality, HCUPNet

<sup>e</sup> Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey

- 4) conditions may appear on some lists but not others due to the manner in which condition information is gathered and coded for each data source.

## Conclusion

It might seem that it would be relatively easy to figure out which conditions impose the greatest burden in terms of frequency and impact on the population's health. Unfortunately, while we have relatively extensive and reliable information on the causes of death, similar information on the causes of ill health or impaired health-related quality of life (HRQOL) are more difficult to obtain. Trying to identify which conditions have the greatest impact on HRQOL requires piecing together information from multiple sources. Focusing specifically on the impact of conditions on the health-related quality of life of Wisconsin's residents presents an even greater challenge. Making comparisons to the incidence or prevalence of conditions elsewhere in the US presents almost a virtually insurmountable challenge.

We reviewed available sources of data on the health of the population (of the US and Wisconsin) and compiled a list of conditions that appear to result in the greatest impact on HRQOL, disability, hospitalizations, and health care costs. Some of the conditions that appear on these lists also appear on lists of life-threatening conditions but several conditions impact the quality of life to a much greater extent than length of life. These conditions that are notable for their frequency and impact include back problems, osteoarthritis, asthma, and depression and other mental disorders. Any efforts to improve the health of Wisconsin must not only consider ways to reduce the number of preventable deaths but also should seek out ways to prevent or ameliorate conditions such as these that have a significant impact on quality of life.

## References

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## Appendix A: Conditions By Age Group

Table A1: Types of Problems Reported by People with Health Problems by Age group (Ranked By Frequency)			
1-17	18-44	45-64	65+
Not available	Back or neck problems Fractures, bone/joint injury Depression/anxiety/ emotional problems Lung/breathing problem Arthritis/rheumatism Walking problem Eye/vision problem Heart problem Diabetes Hearing problem	Back or neck problems Arthritis/rheumatism Fractures, bone/joint injury Heart problem Lung/breathing problem Walking problem Depression/anxiety/ emotional problems Diabetes Eye/vision problem Cancer	Arthritis/rheumatism Heart problem Walking problem Back or neck problems Lung/breathing problem Fractures, bone/joint injury Eye/vision problem Stroke problem Diabetes Cancer

Source: Analysis of data from Behavioral Risk Factor Surveillance System, selected states (2000-1001)

Table A2: Wisconsin Hospital Discharges by Age Group (2004)			
1-17	18-44	45-64	65-84
Injuries GI disorders Pregnancy complications Asthma Depression Influenza and pneumonia	Pregnancy/childbirth Injuries GI disorders Heart disease Depression Back problems Alcohol use	Heart disease Malignant neoplasms GI disorders Osteoarthritis Injuries Back problems Alcohol use/liver disease Stroke Influenza and pneumonia COPD/asthma	Heart disease Malignant neoplasms Osteoarthritis GI disorders Influenza and pneumonia Stroke Injuries COPD/asthma Back problems Complications of medical care

Source: Agency for Healthcare Research and Quality, HCUPNet.

Table A3: Health Care Expenditures by Age Group(2004)			
1-17	18-44	45-64	65-84
COPD/asthma Injuries Mental disorders Acute bronchitis/URI Otitis media Infectious diseases	Pregnancy/childbirth Mental disorders Injuries Back problems Female genital disorders/contraception COPD/asthma Heart conditions	Heart conditions Cancer Injuries COPD/asthma Hypertension Gallbladder, pancreatic and liver disease Mental disorders Arthritis Diabetes Back problems	Heart conditions Cancer Hypertension Injuries COPD/asthma Arthritis Diabetes Circulatory conditions Mental disorders Stroke

Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel