

Premature Mortality Trends in Wisconsin , 1999-2006

Abstract (150)

Mortality is an important indicator of well-being and reduction of preventable death is a priority in Wisconsin's public health plan. One measure of premature mortality is years of potential life lost (YPLL), defined as the number of years of life lost among persons who die before age 75. Mortality conditions in Wisconsin are improving: the state age-adjusted YPLL rate declined 5.1% between the periods 1999-2002 and 2003-2006. The distribution of underlying causes of YPLLs in Wisconsin changed over the same period reflecting many of the national trends in mortality due to chronic disease, injuries, infectious disease, and perinatal conditions. Specifically, the major features of mortality in Wisconsin have been a sharp decrease in deaths due to heart disease and stroke, stable cancer rates, and increases in injury deaths. The proportion of YPLLs due to perinatal causes remained stable over the period at the state level.

Introduction

Mortality is an important indicator of well-being, access to health care, and economic prosperity. Deaths that occur during productive years can have important social and economic impacts on society and require scrutiny by public health officials. One measure of premature mortality is potential years of life lost (YPLL), defined as the number of years of life lost among persons who die before age 75(1). Reduction of preventable mortality is a leading priority in state health plans, including Healthiest Wisconsin 2010 and 2020 (2,3). Tracking trends in YPLL over time can yield important information for health officials to implement and evaluate programs and policies at the state and regional levels.

This paper describes changes in the overall YPLL rate in Wisconsin between the periods 1999-2002 and 2003-2006. Due to the small size of Wisconsin's population, data were pooled into 4 year spans in order to provide stable estimates by region and gender. Trends in premature mortality are reported for overall YPLL and YPLL attributed to general causes including chronic disease, injury, infectious disease, and perinatal conditions. The full version of this paper will present changes in underlying causes of death for each of these sources of mortality.

Methods

The Wisconsin Interactive Statistics on Health (WISH) is a query system maintained by the Wisconsin Department of Health Services. This paper includes ICD-10 coded mortality data for the state and geographical regions from 1999 to 2006 by broad and specific causes. In order to present YPLL rates by cause for state, regions, and by gender, the most recent 8 years of data were pooled into two periods, 1999-2002 and 2003-2006. All mortality data were coded consistently with the ICD-10 system, adopted in 1999.

YPLL rates reported in this paper are expressed per 100,000 person-years observed over the two periods described above. Rates are age-adjusted to the 2000 U.S. Census standard population for specific age groups. The numerator for YPLL rates calculated for chronic disease, injuries, and infectious disease deaths included all deaths to persons aged 0 to 74 during the four year periods. The denominator was all person-years lived between the ages 0 to 74 during the four year periods. YPLL rates for perinatal conditions were calculated using only deaths that occurred during the first year of life and person-years lived under the age of 1 during the four year periods.

All relevant sources of mortality were used to calculate the cause-specific YPLL rates, however, the majority of YPLL for each mortality source was accounted for by a few main causes of death. Chronic disease YPLL were primarily due to cancer, heart disease and stroke, and chronic lower respiratory diseases. YPLL due to injury were primarily accidents, suicide, and homicide. YPLL due to infectious diseases were primarily caused by influenza and pneumonia, septicemia, and HIV. YPLL due to perinatal causes were primarily conditions originating in the perinatal period and congenital malformations, deformations, and chromosomal abnormalities.

Trends in YPLLs in Wisconsin

Between the periods 1999-2002 and 2003-2006, the YPLL rate declined in Wisconsin from 6,361 per 100,000 to 6,038 per 100,000, a 5.1% reduction in premature mortality (Table 1). The greatest decline was in the Southern region where YPLL declined by 8.4% and the smallest decline was in the Southeast (3.6%). Among the types of mortality, YPLL due to chronic diseases declined by 10.5% between the two periods. The West region declined the most (11.9%) and the North region declined the least (8.1%). YPLL due to injuries increased by 6.0%, with the largest increase in observed in the Southeast region (9.1%) and the smallest increase in the Northern region (0.3%). Although deaths due to infectious causes are rare in Wisconsin, YPLL declined by 11.8%, with the largest decrease in YPLL due to infectious diseases in the West region (20.7%) and the Northeast region increased less than 1% (0.8%). YPLL due to perinatal conditions declined in some regions and increased in others, but overall was stable in Wisconsin over the periods, with a small decrease of 0.2%. The South region reduced YPLLs due to perinatal conditions by 21.1% and the Southeast region increased by 11.2%.

Disaggregation of YPLL by underlying causes of death

Chronic disease causes of death

- a) Cancer
- b) Heart disease and stroke
- c) Chronic lower respiratory diseases

Injury-related causes of death

The leading causes of injury deaths in Wisconsin were accidents, suicide, and homicide (Table 2). Although YPLLs due to injury increased between 1999 and 2006, the

proportion of YPLL due to each cause of death remained fairly stable over the periods with accidents accounting for 62.7% and 64.7% of injury YPLL in 1999-2002 and 2003-2006, respectively; suicide accounting for 25.1% and 24.4%, respectively; and homicide accounting for 11.4% and 10.1%, respectively. This apparent stability at the state level masks several important relative changes among regional levels. YPLL due to accidents increased by 19.1% in the South region, but decreased by 1.1% in the West region. YPLL due to suicide increased by 14.1% in the West region, but decreased by 7.2% in the North region. Homicide increased by 40.2% in the Southeast region, but increased by only 3.8% in the South region. Despite some large relative changes in regional YPLL due to the 3 major causes of injury-related premature mortality, none of the absolute changes in YPLL due to any cause changed more than 5%.

Infectious causes of death

- a) Influenza and pneumonia
- b) Septicemia
- c) HIV

Perinatal causes of death

- a) conditions originating in the perinatal period
- b) congenital malformations, deformations, and chromosomal abnormalities

Discussion and Conclusion

Improving mortality conditions in Wisconsin requires a balanced approach to allocating resources for emerging health problems. Considerable progress has been made over the past decade to reduce the impact of cardiovascular disease, however, cancer mortality rates have remained stagnant and injury mortality rates are increasing. Periodic assessments of premature mortality by cause, geographic region, and gender are necessary to give policy makers accurate information to evaluate and revise allocation of state public health resources.

References

- 1) Gardner JW, Sanborn JS. Years of Potential Life Lost (YPLL) – What does it measure? *Epidemiology* 1990;1:322-29.
- 2) Healthiest Wisconsin 2010: A Partnership Plan to Improve the Health of the Public. Wisconsin Department of Health and Family Services, Division of Public Health, 2001.
- 3) Healthiest Wisconsin 2020: A Plan to Improve the Health and Safety of the Public. Planning materials available accessed via the Wisconsin Department of Health and Family Services website, August 2008.

Table 1: Years of potential life lost rates (per 100,000) by cause and gender, Wisconsin, 1999-2006

Total years of potential life lost (YPLL) rates due to all causes (per 100,000)

| Region | 1999-2002 | 2003-2006 | % change | 1999-2002 | 2003-2006 | % change | 1999-2002 | 2003-2006 | % change |
|-----------|-----------|-----------|----------|-----------|-----------|----------|-----------|-----------|----------|
| | T | T | | M | M | | F | F | |
| Wisconsin | 6,361 | 6,038 | -5.1% | 7,978 | 7,517 | -5.8% | 4,755 | 4,550 | -4.3% |
| South | 6,105 | 5,594 | -8.4% | 7,536 | 6,931 | -8.0% | 4,665 | 4,226 | -9.4% |
| Southeast | 6,988 | 6,736 | -3.6% | 8,891 | 8,395 | -5.6% | 5,154 | 5,125 | -0.6% |
| Northeast | 5,882 | 5,587 | -5.0% | 7,353 | 7,057 | -4.0% | 4,392 | 4,081 | -7.1% |
| West | 6,052 | 5,724 | -5.4% | 7,539 | 7,079 | -6.1% | 4,563 | 4,332 | -5.1% |
| North | 5,886 | 5,614 | -4.6% | 7,366 | 6,985 | -5.2% | 4,380 | 4,205 | -4.0% |

YPLL rates due to Chronic Diseases (per 100,000)

| Region | 1999-2002 | 2003-2006 | % change | 1999-2002 | 2003-2006 | % change | 1999-2002 | 2003-2006 | % change |
|-----------|-----------|-----------|----------|-----------|-----------|----------|-----------|-----------|----------|
| | T | T | | M | M | | F | F | |
| Wisconsin | 3,266 | 2,923 | -10.5% | 3,963 | 3,490 | -11.9% | 2,600 | 2,375 | -8.7% |
| South | 3,165 | 2,823 | -10.8% | 3,797 | 3,366 | -11.4% | 2,555 | 2,291 | -10.3% |
| Southeast | 3,593 | 3,208 | -10.7% | 4,432 | 3,828 | -13.6% | 2,818 | 2,633 | -6.6% |
| Northeast | 3,033 | 2,744 | -9.5% | 3,646 | 3,359 | -7.9% | 2,438 | 2,134 | -12.5% |
| West | 3,112 | 2,742 | -11.9% | 3,734 | 3,257 | -12.8% | 2,503 | 2,231 | -10.9% |
| North | 2,942 | 2,704 | -8.1% | 3,573 | 3,114 | -12.9% | 2,315 | 2,298 | -0.8% |

YPLL rates due to injuries (per 100,000)

| Region | 1999-2002 | 2003-2006 | % change | 1999-2002 | 2003-2006 | % change | 1999-2002 | 2003-2006 | % change |
|-----------|-----------|-----------|----------|-----------|-----------|----------|-----------|-----------|----------|
| | T | T | | M | M | | F | F | |
| Wisconsin | 1,527 | 1,619 | 6.0% | 2,237 | 2,363 | 5.6% | 802 | 852 | 6.2% |
| South | 1,466 | 1,582 | 7.9% | 2,088 | 2,239 | 7.3% | 814 | 886 | 8.8% |
| Southeast | 1,557 | 1,699 | 9.1% | 2,343 | 2,556 | 9.1% | 776 | 838 | 8.1% |
| Northeast | 1,459 | 1,520 | 4.2% | 2,111 | 2,191 | 3.8% | 780 | 814 | 4.3% |
| West | 1,575 | 1,594 | 1.2% | 2,299 | 2,277 | -0.9% | 837 | 888 | 6.1% |
| North | 1,653 | 1,658 | 0.3% | 2,376 | 2,410 | 1.4% | 902 | 871 | -3.4% |

YPLL rates due to infectious diseases (per 100,000)

| Region | 1999-2002 | 2003-2006 | % change | 1999-2002 | 2003-2006 | % change | 1999-2002 | 2003-2006 | % change |
|-----------|-----------|-----------|----------|-----------|-----------|----------|-----------|-----------|----------|
| | T | T | | M | M | | F | F | |
| Wisconsin | 185 | 163 | -11.8% | 233 | 193 | -17.3% | 137 | 133 | -2.6% |
| South | 168 | 137 | -18.7% | 213 | 142 | -33.3% | 123 | 133 | 7.4% |
| Southeast | 255 | 220 | -13.6% | 335 | 257 | -23.1% | 178 | 185 | 3.9% |
| Northeast | 126 | 127 | 0.8% | 155 | 154 | -0.4% | 97 | 99 | 2.0% |

| | | | | | | | | | |
|-------|-----|-----|--------|-----|-----|--------|-----|----|--------|
| West | 147 | 116 | -20.7% | 172 | 149 | -13.2% | 122 | 83 | -32.0% |
| North | 123 | 138 | 12.4% | 140 | 199 | 42.6% | 105 | 74 | -29.7% |

YPLL rates due to perinatal conditions (per 100,000)

| Region | 1999-2002 | 2003-2006 | % change | 1999-2002 | 2003-2006 | % change | 1999-2002 | 2003-2006 | % change |
|-----------|-----------|-----------|----------|-----------|-----------|----------|-----------|-----------|----------|
| | T | T | | M | M | | F | F | |
| Wisconsin | 35,102 | 35,016 | -0.2% | 36,678 | 36,752 | 0.2% | 33,290 | 33,088 | -0.6% |
| South | 32,180 | 25,388 | -21.1% | 35,632 | 28,218 | -20.8% | 28,562 | 22,428 | -21.5% |
| Southeast | 39,573 | 44,011 | 11.2% | 40,997 | 45,689 | 11.4% | 37,824 | 42,258 | 11.7% |
| Northeast | 35,163 | 31,793 | -9.6% | 39,211 | 33,275 | -15.1% | 30,661 | 30,233 | -1.4% |
| West | 29,512 | 29,871 | 1.2% | 25,145 | 29,051 | 15.5% | 34,091 | 29,884 | -12.3% |
| North | 26,905 | 28,569 | 6.2% | 27,982 | 33,127 | 18.4% | 25,771 | 23,767 | -7.8% |

Source: Wisconsin Interactive Statistics on Health (WISH), accessed September, 2008.

Table 2: Cause-specific YPLL rates, relative changes in cause-specific YPLL, proportion of total injury YPLL rate due to underlying cause of death, and the percentage change in proportion of total injury-related YPLL due to changes in the underlying cause of death, Wisconsin, 1999-2006

| Region | Accidents | | | | | |
|-----------|------------------------------|------------------------------|-----------------------------|--|--|--|
| | Accident YPLL rate 1999-2002 | Accident YPLL rate 2003-2006 | Relative % Change 1999-2006 | Proportion of injury YPLL rate 1999-2002 | Proportion of injury YPLL rate 2003-2006 | % change in proportion of injury YPLL rate |
| Wisconsin | 960 | 1,048 | 9.1% | 62.7% | 64.7% | 2.0% |
| South | 1,018 | 1,112 | 9.3% | 69.3% | 70.5% | 1.2% |
| Southeast | 825 | 983 | 19.1% | 53.0% | 57.9% | 4.9% |
| Northeast | 971 | 1,016 | 4.6% | 66.5% | 66.8% | 0.3% |
| West | 1,125 | 1,112 | -1.1% | 71.6% | 69.9% | -1.8% |
| North | 1,132 | 1,153 | 1.9% | 68.4% | 69.8% | 1.4% |

| Region | Suicide | | | | | |
|-----------|-----------------------------|-----------------------------|-----------------------------|--|--|--|
| | Suicide YPLL rate 1999-2002 | Suicide YPLL rate 2003-2006 | Relative % Change 1999-2006 | Proportion of injury YPLL rate 1999-2002 | Proportion of injury YPLL rate 2003-2006 | % change in proportion of injury YPLL rate |
| Wisconsin | 412 | 426 | 3.6% | 25.1% | 24.4% | -0.6% |
| South | 383 | 382 | -0.3% | 26.5% | 24.0% | -2.5% |
| Southeast | 361 | 376 | 4.0% | 23.2% | 22.1% | -1.1% |
| Northeast | 415 | 432 | 4.1% | 28.6% | 28.6% | 0.0% |
| West | 358 | 408 | 14.1% | 22.5% | 25.6% | 3.2% |
| North | 423 | 393 | -7.2% | 25.8% | 24.0% | -1.8% |

| Region | Homicide | | | | | |
|-----------|------------------------------|------------------------------|-----------------------------|--|--|--|
| | Homicide YPLL rate 1999-2002 | Homicide YPLL rate 2003-2006 | Relative % Change 1999-2006 | Proportion of injury YPLL rate 1999-2002 | Proportion of injury YPLL rate 2003-2006 | % change in proportion of injury YPLL rate |
| Wisconsin | 174 | 165 | -5.5% | 11.4% | 10.1% | -1.3% |
| South | 58 | 81 | 40.2% | 3.8% | 5.1% | 1.4% |
| Southeast | 355 | 322 | -9.3% | 22.7% | 18.9% | -3.8% |
| Northeast | 65 | 66 | 1.8% | 4.3% | 4.2% | -0.2% |
| West | 78 | 63 | -19.2% | 5.0% | 3.9% | -1.1% |
| North | 85 | 96 | 13.9% | 5.0% | 5.2% | 0.2% |