

Progress in Reducing Premature Deaths in Wisconsin Counties, 2000-2010

Thomas Nonnweiler; Elizabeth A. Pollock, BS; Barbara Rudolph, PhD, MSSW; Patrick L. Remington, MD, MPH

ABSTRACT

Background: Measuring trends in a county's premature death rate is a straightforward method that can be used to assess a county's progress in improving the health of the population.

Methods: Age-adjusted premature death rate data from Wisconsin Interactive Statistics on Health for persons less than 75 years of age were collected for the years 2000-2010. Overall 10-year percent change was calculated, compared, and ranked for all Wisconsin counties during this time period. Progress was assessed as excellent (25.0% or greater decline), very good (20.0%-24.9% decline), good (10.0%-19.9% decline), fair (0.0%-9.9% decline), or poor (any increase).

Results: Overall, premature death rates in counties declined by 16.8% over the 10-year period 2000-2010 in Wisconsin. Trends varied by county, with 8, 15, 37, 9, and 3 counties having excellent, very good, good, fair, and poor progress, respectively. The most improvement was seen in Kewaunee County (decreasing 38.3%) and the least progress in Lafayette County (increasing 4.8%). Trends in premature death rates were not related to the county's initial death rate, population, rurality, or income.

Conclusions: Although premature death rates declined overall in Wisconsin during the 2000s, this progress varied across counties and was not related to baseline mortality rates or other county characteristics.

Wisconsin from 1999 to 2009, showing an average annual reduction of 1% per year in premature death rates.¹⁰ This report also showed that death rates have declined in all age groups under the age of 75 (declines of 0.3% for infants; 3.1% for ages 1-14; 1.2% for ages 15-24; 0.1% for ages 25-44; 1.1% for ages 45-64; and 2.9% for ages 65-74).¹⁰

Measuring trends in premature death rates is a direct way to assess progress in improving the overall health in Wisconsin, and for each of Wisconsin's counties. The purpose of this report is to assess trends in premature death rates in Wisconsin's counties and to allow comparisons across counties. This information can be used by communities to assess progress of past public health and health care interventions and set goals for future efforts.

INTRODUCTION

The goal of Healthiest Wisconsin 2020 is "Everyone Living Better, Longer."¹ One way to monitor progress toward this goal is to track death rates in Wisconsin, by cause of death, and by age, race, gender, or place. In the past, the *WMJ* has published numerous assessments of trends in death rates in Wisconsin.²⁻⁹ A recent report published by the University of Wisconsin Population Health Institute tracked progress in death rates in

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Author Affiliations: University of Wisconsin–Madison (Nonnweiler); UW Department of Population Health Sciences, Madison, Wis (Pollock); UW Population Health Institute, Madison, Wis (Rudolph); Population Health Sciences and Associate University of Wisconsin–Madison (Remington).

Corresponding Author: Patrick Remington, MD, MPH, School of Medicine and Public Health, 4263 Health Science Learning Center, 750 Highland Ave, Madison, WI, 53705; phone 608.263.1745; e-mail plreming@wisc.edu.

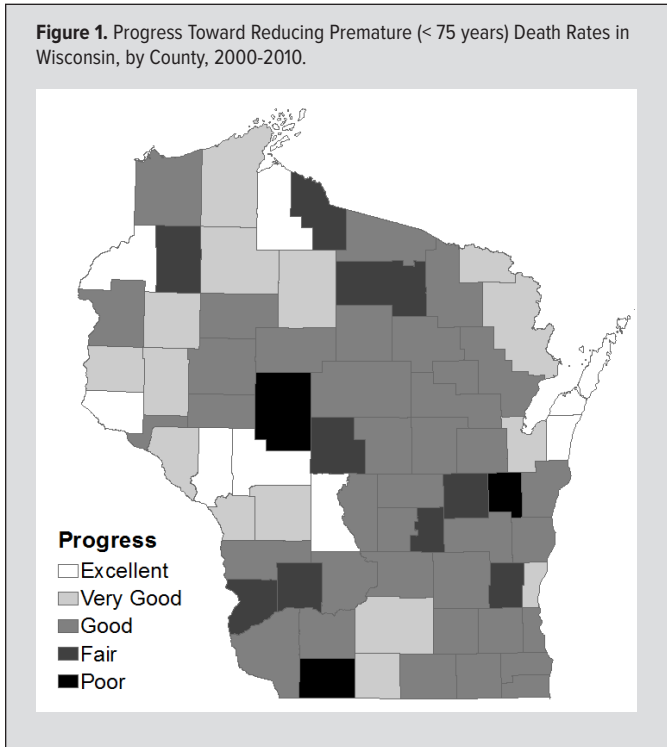
METHODS

Age-adjusted (to the 2000 US population) death rates for those less than 75 years of age were used as the measure of premature death for Wisconsin and each of its 72 counties. We measured changes in deaths only under the age of 75 in an attempt to understand trends in death rates that are ideally preventable, and we used overall age-adjusted death rates, as this measure shows less random year-to-year fluctuation than measures of "years of potential life lost," making it better suited for the measurement of trends over time. Data were obtained for the years 2000-2010 for all counties from the Wisconsin Interactive Statistics on Health (WISH) website.¹¹ Microsoft Excel¹² was used to create trend lines for the state and for each county. An exponential trend line was created for the state and for each county, which assumes a constant percent change in rate over time. To achieve more precise estimates and smooth the data to reduce errors, this regression line was used to calculate predicted premature death rates for 2000 and 2010. From these predicted rates, the 10-year

Table 1. Summary of Trends in Premature Death Rates (Age-adjusted <75 Years) in Wisconsin, 2000-2010

| 10-year percent change | Progress | Number of Counties (%) |
|---------------------------|-----------|------------------------|
| 25% or greater reduction | Excellent | 8 (11.1%) |
| 20% to 24.9% reduction | Very good | 15 (20.8%) |
| 10% to 19.9% reduction | Good | 37 (51.4%) |
| 0% to 9.9% reduction | Fair | 9 (12.5%) |
| +0.1% or greater increase | Poor | 3 (4.2%) |

Figure 1. Progress Toward Reducing Premature (< 75 years) Death Rates in Wisconsin, by County, 2000-2010.



percent reductions in premature mortality for each county were calculated, ranked (from 1-72), and rounded to the nearest decimal point.

A scale was developed to further describe and communicate a county's progress in reducing premature death rates. Healthy People 2020 has recommended that communities establish 10-year targets of a 10% improvement for measures of health outcomes and factors¹³—or approximately 1% per year. Different levels of progress were assigned the categories “excellent,” “very good,” “good,” “fair,” and “poor.” We defined inadequate population health progress as the percent of counties whose progress was only fair or poor (ie, did not meet the Healthy People 2020 goal of a 10% reduction in 10-year death rates).

Finally, baseline county characteristics used in this analysis (2000 premature death rates) and data from the 2000 US Census (population, percent rural, and median income) were correlated with overall percent change (2000-2010) in death rate in an attempt to detect any association between initial mortality rate and county characteristics and progress in mortality rate over the last 10 years.

RESULTS

The overall premature death rate for people under 75 years of age in Wisconsin declined by 16.8% over the 10-year period 2000-2010. Trends for each county, however, varied greatly across the state. A 4.8% overall increase in the premature death rate in Lafayette County was the highest for any county in Wisconsin, while Kewaunee County saw the largest reduction in the 10-year premature death rate with a decline of 38.3%. Of Wisconsin's 72 counties, 60 (83%) met the goal of a 10% or greater reduction in premature death rate during the 2000-2010 period. As shown in Table 1, 8 counties were rated as “excellent,” 15 counties were rated “very good,” and 37 counties were rated “good.” Twelve of the 72 counties did not meet the goal of at least a 10% decrease in 10-year premature mortality—with 9 counties rated “fair,” while 3 counties were rated “poor.” Table 2 displays a listing by county according to trend rank, and Figure 1 illustrates a map of county by 10-year percent change progress category.

The 8 counties with excellent progress—a 10-year decline of 25% or greater—were Kewaunee, Door, Trempealeau, Pierce, Jackson, Burnett, Ashland, and Juneau counties. Counties with only fair or poor progress—less than a 10% decrease or any increase—included Lafayette, Clark, Calumet, Washburn, Richland, Winnebago, Wood, Crawford, Oneida, Green Lake, Iron, and Washington counties.

In general, less healthy counties at baseline (in 2000) did slightly better in improving their premature mortality rates than did the more healthy counties at baseline, although this association was small (correlation coefficient of -0.244, $R^2=0.06$). No additional apparent association was found between baseline county characteristics (population of county, percent rural population, median income) and overall percent change in mortality rate between 2000 and 2010 (correlation coefficients -0.03, -0.05, and -0.07 respectively).

DISCUSSION

This report shows that overall Wisconsin is showing good progress in reducing premature death rates, with an overall reduction of 16.8% from 2000 to 2010. This exceeds the expectations of the Healthy People 2020 goal of a 10% improvement in 10 years.¹³ Of Wisconsin's 72 counties, 60 counties (83.3%) had good, very good, or excellent progress, meeting or exceeding the 2020 goal of 10% improvement in a decade. Our findings are consistent with national findings of declining death rates since 1935. The age-adjusted death rate (for the population under 75 years of age) has decreased 41% between 1969 and 2010 in the United States.¹⁴ This equates to an average decline of about 12% per decade; therefore, the 16.8% reduction in premature death rates observed over the past decade in Wisconsin has been slightly better than the average 10-year declines over the past 4 decades in the United States.

Table 2. Age-adjusted Premature (<75 Years) Death Rates, Ranks, Trends, and Progress in Wisconsin Counties, 2000-2010

| | 2000 Death Rate ^a | 2000 Rank | 2010 Death Rate ^a | 2010 Rank | Percent Change (2000- 2010) | Percent Change 95% CI | Trend Rank | | 2000 Death Rate ^a | 2000 Rank | 2010 Death Rate ^a | 2010 Rank | Percent Change (2000- 2010) | Percent Change 95% CI | Trend Rank |
|------------------|------------------------------------|--------------|------------------------------------|--------------|--------------------------------------|-----------------------------|---------------|-------------|------------------------------------|--------------|------------------------------------|--------------|--------------------------------------|-----------------------------|---------------|
| Wisconsin | 353 | | 294 | | -16.8% | (-16.7, -16.9) | | Fond du Lac | 337 | 34 | 287 | 30 | -14.9% | (-14.3, -15.5) | 37 |
| Kewaunee | 329 | 27 | 203 | 1 | -38.3% | (-35.0, -44.1) | 1 | Polk | 340 | 35 | 290 | 33 | -14.6% | (-14.2, -15.3) | 38 |
| Door | 326 | 25 | 212 | 2 | -35.0% | (-32.4, -35.0) | 2 | Vilas | 354 | 47 | 303 | 44 | -14.3% | (-13.4, -15.7) | 39 |
| Trempealeau | 391 | 57 | 271 | 22 | -30.6% | (-28.7, -30.6) | 3 | Waukesha | 276 | 2 | 236 | 7 | -14.2% | (-13.9, -14.5) | 40 |
| Pierce | 318 | 20 | 227 | 4 | -28.6% | (-27.3, -30.5) | 4 | Marquette | 435 | 68 | 374 | 70 | -14.0% | (-12.7, -16.2) | 41 |
| Jackson | 430 | 66 | 313 | 50 | -27.2% | (-25.4, -29.9) | 5 | Kenosha | 402 | 63 | 347 | 67 | -13.6% | (-13.5, -13.8) | 42 |
| Burnett | 391 | 58 | 287 | 32 | -26.5% | (-24.1, -30.4) | 6 | Waushara | 380 | 54 | 329 | 60 | -13.4% | (-12.8, -14.4) | 43 |
| Ashland | 458 | 70 | 341 | 65 | -25.6% | (-23.1, -29.5) | 7 | Adams | 405 | 64 | 351 | 68 | -13.3% | (-12.8, -13.9) | 44 |
| Juneau | 432 | 67 | 324 | 56 | -25.1% | (-24.0, -26.7) | 8 | Jefferson | 341 | 38 | 296 | 40 | -13.1% | (-13.0, -13.4) | 45 |
| Ozaukee | 282 | 3 | 212 | 3 | -24.9% | (-23.8, -26.4) | 9 | Waupaca | 397 | 60 | 346 | 66 | -12.7% | (-12.1, -13.6) | 46 |
| Florence | 320 | 21 | 244 | 8 | -23.9% | (-19.3, -36.6) | 10 | Vernon | 334 | 31 | 293 | 36 | -12.3% | (-11.8, -13.1) | 47 |
| Dane | 304 | 12 | 231 | 6 | -23.9% | (-23.6, -24.2) | 11 | Dodge | 357 | 50 | 313 | 52 | -12.3% | (-11.9, -12.9) | 48 |
| Sawyer | 445 | 69 | 339 | 64 | -23.9% | (-22.2, -26.6) | 12 | Marathon | 294 | 8 | 258 | 16 | -12.3% | (-12.0, -12.6) | 49 |
| Green | 346 | 41 | 264 | 20 | -23.8% | (-22.6, -25.4) | 13 | Columbia | 335 | 32 | 294 | 37 | -12.3% | (-12.0, -12.7) | 50 |
| Buffalo | 324 | 23 | 249 | 9 | -23.4% | (-20.8, -28.0) | 14 | Langlade | 337 | 33 | 297 | 41 | -12.0% | (-10.8, -13.9) | 51 |
| St. Croix | 301 | 11 | 231 | 5 | -23.3% | (-23.2, -23.4) | 15 | Sauk | 348 | 43 | 307 | 47 | -11.8% | (-11.7, -11.8) | 52 |
| Barron | 354 | 48 | 274 | 23 | -22.6% | (-21.3, -24.3) | 16 | Manitowoc | 314 | 18 | 278 | 26 | -11.5% | (-10.8, -12.3) | 53 |
| La Crosse | 346 | 40 | 269 | 21 | -22.3% | (-21.6, -23.2) | 17 | Portage | 284 | 4 | 251 | 10 | -11.4% | (-11.0, -12.0) | 54 |
| Marinette | 393 | 59 | 306 | 46 | -22.2% | (-20.7, -24.3) | 18 | Grant | 333 | 30 | 295 | 39 | -11.3% | (-10.7, -12.2) | 55 |
| Bayfield | 373 | 53 | 291 | 34 | -22.0% | (-20.1, -25.1) | 19 | Menominee | 612 | 72 | 543 | 72 | -11.3% | (-9.4, -15.5) | 56 |
| Brown | 322 | 22 | 253 | 12 | -21.5% | (-21.1, -22.0) | 20 | Forest | 365 | 51 | 325 | 58 | -11.0% | (-9.6, -13.4) | 57 |
| Price | 365 | 52 | 287 | 31 | -21.5% | (-18.7, -26.2) | 21 | Eau Claire | 288 | 7 | 257 | 14 | -10.7% | (-10.5, -11.1) | 58 |
| Monroe | 414 | 65 | 331 | 61 | -20.2% | (-19.4, -21.2) | 22 | Oconto | 329 | 26 | 295 | 38 | -10.2% | (-10.0, -10.5) | 59 |
| Dunn | 315 | 19 | 252 | 11 | -20.1% | (-19.3, -21.3) | 23 | Douglas | 390 | 56 | 351 | 69 | -10.0% | (-9.5, -10.6) | 60 |
| Racine | 389 | 55 | 313 | 51 | -19.6% | (-19.1, -20.2) | 24 | Washington | 286 | 5 | 258 | 15 | -9.8% | (-9.8, -9.9) | 61 |
| Rock | 399 | 62 | 325 | 59 | -18.6% | (-18.1, -19.1) | 25 | Iron | 350 | 46 | 317 | 54 | -9.4% | (-6.8, -15.4) | 62 |
| Rusk | 397 | 61 | 325 | 57 | -18.2% | (-16.1, -21.7) | 26 | Green Lake | 347 | 42 | 317 | 53 | -8.8% | (-8.0, -10.1) | 63 |
| Iowa | 340 | 36 | 280 | 28 | -17.7% | (-16.5, -19.6) | 27 | Oneida | 325 | 24 | 309 | 48 | -4.8% | (-4.4, -5.4) | 64 |
| Walworth | 332 | 29 | 274 | 24 | -17.5% | (-17.0, -18.0) | 28 | Crawford | 349 | 45 | 334 | 62 | -4.4% | (-3.8, -5.4) | 65 |
| Sheboygan | 343 | 39 | 283 | 29 | -17.3% | (-16.7, -18.1) | 29 | Wood | 287 | 6 | 275 | 25 | -4.1% | (-3.8, -4.6) | 66 |
| Milwaukee | 461 | 71 | 385 | 71 | -16.5% | (-16.2, -16.7) | 30 | Winnebago | 312 | 17 | 304 | 45 | -2.3% | (-2.2, -2.5) | 67 |
| Lincoln | 356 | 49 | 298 | 42 | -16.3% | (-15.0, -18.3) | 31 | Richland | 309 | 15 | 303 | 43 | -2.2% | (-2.0, -2.4) | 68 |
| Shawano | 349 | 44 | 292 | 35 | -16.1% | (-15.2, -17.4) | 32 | Washburn | 341 | 37 | 336 | 63 | -1.5% | (-0.9, -1.8) | 69 |
| Taylor | 309 | 14 | 260 | 19 | -15.8% | (-14.5, -18.1) | 33 | Calumet | 251 | 1 | 258 | 17 | 2.9% | (1.5, 5.0) | 70 |
| Outagamie | 306 | 13 | 260 | 18 | -15.2% | (-14.9, -15.5) | 34 | Clark | 310 | 16 | 322 | 55 | 4.1% | (3.4, 5.2) | 71 |
| Pepin | 298 | 9 | 253 | 13 | -15.1% | (-13.6, -19.4) | 35 | Lafayette | 298 | 10 | 313 | 49 | 4.8% | (4.0, 6.3) | 72 |
| Chippewa | 330 | 28 | 280 | 27 | -15.1% | (-14.9, -15.4) | 36 | | | | | | | | |

^aPredicted from the 10-year regression line.

While these results are certainly encouraging, it is of concern that 16.7% of counties failed to meet the goal. This is an area that needs attention, and the counties with less than satisfactory progress could perhaps consider this during their community health assessment process, in an effort to meet the goal for 2020. One potential approach to seek improvement for those counties that showed inadequate progress to meet the Healthy People 2020 goal could be to look to *County Health Rankings & Roadmaps* and the “Areas to Explore” component suggested specifically for their community.¹⁵ The “Areas to Explore” highlight potential health factors specific to each county that may have the greatest potential opportunity for improvement, or measures for which there are meaningful differences between their county’s values and the

state average or national benchmark. Subsequently, the county could utilize the “What Works for Health” database found on the *County Health Rankings & Roadmaps* website to examine and assess potential evidence-based policies and programs to implement in order to address the specific health-related challenges that face their community.¹⁵

It is also important to note the lack of any distinct association between mortality improvement and baseline mortality or county characteristics, indicating that any county at baseline can improve regardless of initial death rate, size, how rural they are, or income. In other words, counties have an equal opportunity to improve premature death rates. This is an encouraging result suggesting that any county can improve irrespective of their start-

ing point, and that counties should not be discouraged by these baseline characteristics in seeking progress. It should be noted, however, that correlations are not necessarily predictors of future results; rather, they are retrospective metrics. Future research will need to establish differences by county in approaches to lowering premature death rates and continue to monitor their relative successes, such as by conducting case studies examining the characteristics of counties that have great improvements in health outcomes over time.

It is important to recognize limitations of this study, including random error due to small population sizes. The use of 10 years of data for the trend analysis, however, tends to smooth out random variation found where death counts are small, and our use of an exponential trend methodology, which also holds the amount of change constant, suggests that the errors would be small. Finally, this study did not account for changes in health outcomes that may result from changes in population demographics, beyond changes in the age of the population.

This study provides Wisconsin counties with critical information on where they stand in terms of reducing premature deaths through trend analysis and comparison to the goals set by Healthy People 2020. This early look at how they are progressing will allow counties to adopt programs and policies that could potentially reduce premature death rates by 2020. Using an exponential trend methodology over a 10-year period provides empirical evidence of change or lack thereof, which can provide a strong marker for the future and could serve to ignite further action to reduce premature deaths in all counties.

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