

# Wisconsin Versus Minnesota: A Border Battle for the Healthiest State

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## ABSTRACT

**Background:** Measuring and ranking the health of counties helps raise awareness of health disparities based on where people live. Recently, there has been increasing interest in comparing the health of counties across state lines, to potentially measure the impact of local and state-level policies.

**Methods:** The counties in Minnesota (n=87) and Wisconsin (n=72) were combined into a single 2-state region, and all 159 counties were ranked according to the *County Health Rankings* methods, with summary ranks for health outcomes and health factors. Multivariable regression analysis was then used to examine the potential impact of state-based programs and policies on health outcomes.

**Results:** Minnesota was healthier overall than Wisconsin, with lower rates of premature death and better quality of life. Minnesota also performed better than Wisconsin for all 9 health behavior measures, 4 of 7 clinical care measures, 7 of 8 social and economic factors, and 3 of 5 physical environment measures. Furthermore, counties in Wisconsin were more likely to have lower (worse) ranks than counties in Minnesota for both health outcomes and health factors, as well as for the subcategories that make up these summary ranks. Regression analysis showed that Minnesota's better health status was explained primarily by healthier behaviors and more desirable social and economic factors.

**Conclusions:** Minnesota's better health outcomes are largely explained by better social, economic, and behavioral factors. These findings suggest a need for examination of policies and strategies that may be influencing the observed differences across these 2 states.

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## INTRODUCTION

The ultimate goal of public health is to assure conditions so that all people can live long and healthy lives.<sup>1,2</sup> Achieving this goal requires a public health approach that brings together community leaders to work collaboratively to promote evidence-based policies and programs.<sup>3</sup> Health has multiple determinants, including health care, health behaviors, and the socioeconomic and physical environment, and therefore improving the health of a population cannot be achieved by a single sector. The health care system recently has embraced this public health approach in the “Triple Aim” of better care, lower costs, and improved population health.<sup>4</sup> Improved population health can be achieved only with the purposeful involvement of leaders in education, business, governmental agencies, academics, the media, nonprofits, and more, in addition to leaders in health care.

More than a decade ago, the University of Wisconsin Population Health Institute

developed a model to measure and rank health outcomes and health factors in Wisconsin counties.<sup>5</sup> Ranking the health of a county helps to raise awareness and to see where the county stands in terms of the health of its community members. In 2010, with support from the Robert Wood Johnson Foundation, the *County Health Rankings* were expanded to measure the health of nearly every county in all 50 states in the nation.<sup>6</sup> Published online at [countyhealthrankings.org](http://countyhealthrankings.org), the *Rankings* help counties understand what factors affect the length and quality of life of their residents. The *Rankings* examine a variety of measures that affect health, such as access to healthy foods, physicians, and safe and affordable housing, as well as rates of smoking, high school graduation, and uninsured, among others. The *Rankings* have been used to garner support for local health improvement initiatives among

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**Table 1.** Health Outcomes and Health Factors for Minnesota and Wisconsin, 2014

	State of Minnesota	MN Best County	MN Worst County	State of Wisconsin	WI Best County	WI Worst County
<b>Health Outcomes</b>						
<b>Length of Life</b>						
Premature death rate <sup>a</sup>	<b>5,126</b>	<b>3,536</b>	11,979	5,878	3,692	<b>15,929</b>
<b>Quality of Life</b>						
Poor or fair health	<b>11%</b>	<b>6%</b>	<b>22%</b>	12%	7%	21%
Poor physical health days	<b>2.8</b>	<b>1.2</b>	4.4	3.2	1.9	<b>4.8</b>
Poor mental health days	<b>2.6</b>	<b>1.2</b>	5.7	3.0	1.7	<b>6.3</b>
Low birthweight	<b>6.5%</b>	<b>4.0%</b>	8.1%	7.0%	4.6%	<b>9.3%</b>
<b>Health Factors</b>						
<b>Health Behaviors</b>						
Adult smoking	<b>16%</b>	<b>7%</b>	35%	18%	8%	<b>46%</b>
Adult obesity	<b>26%</b>	<b>22%</b>	34%	29%	24%	<b>40%</b>
Food environment index	<b>8.5</b>	<b>10</b>	6	8.3	9	<b>5</b>
Physical inactivity	<b>20%</b>	<b>17%</b>	31%	22%	18%	<b>32%</b>
Access to exercise opportunities	<b>80%</b>	<b>100%</b>	22%	78%	98%	<b>1%</b>
Excessive drinking	<b>19%</b>	<b>9%</b>	<b>42%</b>	24%	17%	36%
Alcohol-impaired driving deaths	<b>32%</b>	0%	<b>100%</b>	39%	0%	68%
Sexually transmitted infections <sup>a</sup>	<b>316</b>	<b>42</b>	531	431	43	<b>1794</b>
Teen births <sup>a</sup>	<b>25</b>	10	87	29	<b>7</b>	<b>114</b>
<b>Clinical Care</b>						
Uninsured	10%	6%	16%	10%	<b>6%</b>	<b>18%</b>
Primary care physicians	<b>1116:1</b>	<b>418:1</b>	9219:1	1233:1	546:1	<b>15439:1</b>
Dentists	<b>1602:1</b>	1195:1	9525:1	1703:1	<b>936:1</b>	<b>11074:1</b>
Mental health providers	<b>766:1</b>	<b>407:1</b>	<b>21722:1</b>	1050:1	440:1	13427:1
Preventable hospital stays <sup>a</sup>	<b>49</b>	29	<b>110</b>	55	<b>28</b>	87
Diabetic screening	88%	<b>97%</b>	<b>57%</b>	<b>90%</b>	95%	85%
Mammography screening	68%	<b>84.6%</b>	<b>54.8%</b>	<b>70%</b>	79.3%	56.0%
<b>Social and Economic Factors</b>						
High school graduation	77%	<b>97%</b>	<b>56%</b>	<b>87%</b>	96%	57%
Some college	<b>73%</b>	<b>81.2%</b>	47.4%	65%	80.8%	<b>44.9%</b>
Unemployment	<b>5.6%</b>	<b>3.7%</b>	11.2%	6.9%	4.7%	<b>15.3%</b>
Children in poverty	<b>15%</b>	<b>5%</b>	34%	18%	6%	<b>47%</b>
Inadequate social support	<b>14%</b>	<b>2%</b>	19%	17%	8%	<b>29%</b>
Children in single-parent households	<b>27%</b>	16%	50%	30%	<b>15%</b>	<b>55%</b>
Violent crime <sup>a</sup>	<b>234</b>	<b>0</b>	<b>780</b>	248	30	751
Injury deaths <sup>a</sup>	<b>54</b>	<b>35</b>	101	62	37	<b>111</b>
<b>Physical Environment</b>						
Air pollution-particulate matter	12.0	<b>10.4</b>	<b>13.3</b>	<b>11.5</b>	10.5	12.6
Drinking water violations	<b>1%</b>	0%	<b>63%</b>	6%	0%	56%
Severe housing problems	<b>14%</b>	<b>7%</b>	19%	15%	8%	<b>21%</b>
Driving alone to work	<b>78%</b>	<b>66%</b>	84%	80%	72%	<b>86%</b>
Long commute-driving alone	29%	<b>10%</b>	<b>53%</b>	<b>26%</b>	12%	45%
<b>Total Best/Worst</b>	<b>28</b>	<b>27</b>	<b>11</b>	<b>5</b>	<b>4</b>	<b>23</b>

Bold indicates best state or best/worst county in the region for that category (does not include ties).

Abbreviations: MN, Minnesota; WI, Wisconsin.

<sup>a</sup> Years of potential life lost before age 75 (rate per 100,000 population, age-adjusted to the 2000 US population).

environmental factors that may contribute to differences in health. The purpose of this paper is to compare the counties of the states of Minnesota and Wisconsin by ranking all of the counties as a single 2-state region. Minnesota and Wisconsin share many attributes, with similar culture, climate, geography, total population (5.3 and 5.7 million people in 2010, respectively), and diversity of residents (16.9% and 16.7% minority population, respectively). (See <http://www.indexmundi.com/facts/united-states/quick-facts/compare/wisconsin.minnesota>.) However, it has been fairly well established in reports such as *America's Health Rankings* that the state of Minnesota as a whole is healthier than the state of Wisconsin.<sup>7,8</sup> Therefore, the data for Minnesota counties were combined with the data for Wisconsin counties to re-rank Minnesota and Wisconsin counties together in 1 combined dataset in order to understand the relative health of the 2 states and to compare communities that some feel may be more similar than the dividing state line implies. Information ascertained from a Minnesota/Wisconsin comparison could be used to improve the health of both states and provide insights for the rest of the country.

## METHODS

### Study Population

In this study, the counties in Minnesota and Wisconsin were examined as one 159-county region in order to compare and contrast health outcomes and factors across state lines.

### Data Sources and Measures

The data and measures used in this study come from the 2014 *County Health Rankings*. Thirty-four different measures are available including 5 health outcome

governmental agencies, health care providers, community organizations, business leaders, policymakers, and the public.

The *Rankings* rank counties within their own states to allow geographically relevant comparisons, aligning with state-level public health departments and governments. However, there has been increasing interest in comparing counties across state lines to potentially determine the policy, system, programmatic, and

and 29 health factor measures. As in the *Rankings*, 2 summary rankings for the counties in these states were provided: the health outcomes (based on an equal weighting of measures of length and quality of life) and the health factors (based on weighted scores for measures of health behaviors, clinical care, social and economic factors, and the physical environment). Methods on the calculations of all health measures as well as the data sources

and years can be found on the *County Health Rankings* website at [www.county-healthrankings.org](http://www.county-healthrankings.org).

### Data Analysis

The 87 counties in Minnesota were combined with the 72 counties in Wisconsin into a single 159-county region, and the *Rankings* were reanalyzed using the same approach for individual states.<sup>6</sup> Once all 159 counties were ranked according to this method, the counties were split into deciles (about 16 counties in each decile) for both health outcomes and health factors in order to examine where counties in each state fell according to their rankings. Wilcoxon rank-sum tests were performed to find the average differences in ranks between the 2 states for all categories of health. Multivariable OLS regression was then used to examine the association between state and health outcomes.

### RESULTS

Table 1 includes the health outcome and health factor measures for Wisconsin, as well as the value of the counties in each state that performed best for each measure and worst for each measure. The state of Minnesota ranked better than Wisconsin for 28 of the 34 health measures included in the study, Wisconsin ranked better for 5 measures, and they had the same value for 1 measure. Of the top-ranked counties in the region, 27 were Minnesota counties and 5 were Wisconsin counties (for 2 measures the best counties were tied). Of the bottom-ranked counties in the region, 11 were Minnesota counties and 23 were Wisconsin counties.

Tables 2 and 3 show the health outcomes and health factors ranks for Minnesota and Wisconsin counties when combined and ranked together, listed alphabetically by state and county. Figure 1 and Figure 2 then depict the decile (10th percentile) in which the ranks fell for each county in Minnesota and Wisconsin for health outcomes and health factors, respectively. Lighter colors indicate better performance in the respective summary rankings. Wisconsin counties were, on average, less healthy than Minnesota counties. Wisconsin counties were more likely to have lower ranks and to be in lower deciles for both health outcomes and health factors.

**Table 2.** Health Outcomes and Health Factors Ranks for Minnesota Counties (Within Minnesota and Wisconsin Counties Combined), Based on Data From the 2014 *County Health Rankings*

County	Outcomes Rank	Factors Rank	County	Outcomes Rank	Factors Rank
Carver	1	4	Martin	70	84
McLeod	2	48	Isanti	72	82
Waseca	4	68	Jackson	73	15
Nobles	6	71	Chippewa	74	114
Redwood	7	94	Faribault	75	102
Steele	8	20	Clay	79	30
Nicollet	9	5	Hennepin	80	32
Washington	10	3	Murray	81	54
Dodge	11	28	Todd	82	119
Fillmore	12	42	Crow Wing	83	72
Scott	13	6	Polk	84	110
Wright	14	18	Benton	85	60
Olmsted	15	2	Pope	87	34
Dakota	16	11	Hubbard	88	111
Yellow Medicine	17	74	Koochiching	89	108
Le Sueur	19	40	Kanabec	94	131
Kandiyohi	20	85	Marshall	97	61
Stearns	23	22	Freeborn	98	112
Winona	24	23	Itasca	101	97
Lac qui Parle	29	45	Ramsey	104	80
Brown	32	53	Rock	108	27
Rice	33	17	Pennington	110	37
Douglas	35	19	Stevens	111	38
Meeker	36	95	Becker	112	98
Blue Earth	40	26	Norman	113	86
Sherburne	41	49	Big Stone	115	59
Lincoln	43	44	Grant	116	92
Wilkin	44	31	Cottonwood	118	64
Red Lake	46	93	Clearwater	119	157
Cook	47	56	Aitkin	121	127
Lake of the Woods	49	90	St. Louis	122	73
Roseau	51	39	Beltrami	125	153
Sibley	52	88	Pine	126	135
Lyon	54	36	Carlton	130	75
Chisago	55	77	Pipestone	131	81
Mower	56	103	Morrison	138	116
Kittson	57	62	Renville	140	87
Otter Tail	58	50	Lake	141	52
Swift	59	83	Wadena	146	130
Goodhue	62	33	Traverse	148	47
Watonwan	63	120	Mille Lacs	152	146
Houston	64	14	Cass	156	150
Anoka	66	55	Mahnomen	158	159
Wabasha	69	10			

For instance, as shown in Table 4, for the overall distribution of ranks, the average differences in ranks between Minnesota counties and Wisconsin counties after the 2 states were combined into 1 region were statistically significant for all health categories, favoring the state of Minnesota, with the exception of clinical care and the physical environment. The average difference in rank between the 2 states for health outcomes was 22 ( $P < 0.01$ ), and the average difference in rank for health factors was 32 ( $P < 0.001$ ). The largest differences within health factors were seen in the categories of social and economic factors and health behaviors (average difference in rank 35 and 27,  $P < 0.0001$  and  $< 0.001$ , respectively).

**Table 3.** Health Outcomes and Health Factors Ranks for Wisconsin Counties (Within Minnesota and Wisconsin Counties Combined), Based on Data From the 2014 *County Health Rankings*

County	Outcomes Rank	Factors Rank	County	Outcomes Rank	Factors Rank
Ozaukee	3	1	Sauk	99	96
Kewaunee	5	46	Sawyer	100	152
Portage	18	35	Manitowoc	102	89
Taylor	21	113	Winnebago	103	58
Door	22	65	Ashland	105	121
Pierce	25	24	Crawford	106	129
Calumet	26	13	Bayfield	107	138
St. Croix	27	16	Buffalo	109	101
Pepin	28	57	Dodge	114	104
Washington	30	12	Monroe	117	122
Iowa	31	51	Waupaca	120	105
Eau Claire	34	43	Douglas	123	124
Dunn	37	70	Iron	124	142
Vernon	38	118	Langlade	127	143
Waukesha	39	7	Oneida	128	67
Green	42	29	Waushara	129	140
Dane	45	8	Richland	132	123
Wood	48	21	Vilas	133	126
La Crosse	50	9	Oconto	134	109
Grant	53	69	Burnett	135	151
Florence	60	134	Rusk	136	132
Outagamie	61	25	Lincoln	137	117
Price	65	91	Washburn	139	133
Marathon	67	66	Jackson	142	139
Barron	68	137	Shawano	143	136
Sheboygan	71	41	Marinette	144	128
Chippewa	76	100	Green Lake	145	115
Clark	77	145	Rock	147	144
Jefferson	78	79	Juneau	149	149
Columbia	86	106	Kenosha	150	141
Fond du Lac	90	63	Racine	151	147
Trempealeau	91	107	Marquette	153	148
Lafayette	92	78	Adams	154	155
Polk	93	125	Forest	155	154
Brown	95	76	Milwaukee	157	156
Walworth	96	99	Menominee	159	158

Linear regression techniques were then used to confirm these overall results and to explore whether there was still an independent state-level effect on health outcomes after controlling for health factors. All models were controlled for demographic variables, including population, age distribution, racial structure, and urban/rural status (data not shown). Before adjustment, state (ie, whether the county belonged in Minnesota vs Wisconsin) was independently associated with health outcomes z-score ( $P < 0.001$ ). However, after accounting for overall health factors z-score, the relationship between state and health outcomes was attenuated by 77% and no longer statistically significant. Social and economic factors z-score and health behaviors z-score accounted most for this attenuation (97%) and also independently attenuated the relationship (by 76% and 57%, respectively). Within these categories, the measures of unemployment (69%), children in poverty (52%), sexually transmitted infections (35%), some college education (32%), and adult obesity

(21%) most attenuated the relationship (nearly 100% when all included in the model).

## DISCUSSION

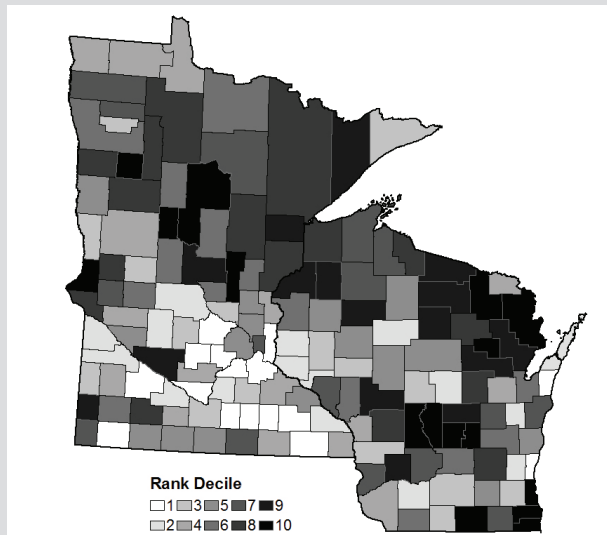
The *County Health Rankings* provide data on the health of communities in order to stimulate conversations and mobilize communities toward action.<sup>5</sup> Ranking all the counties in Minnesota and Wisconsin provides an opportunity to explore how measured and unmeasured factors might explain the observed differences in the health outcomes between the 2 states. Overall, this analysis reinforced what has been shown in the past: that overall, Minnesota has better health outcomes than Wisconsin, with lower premature death rates, better self-reported quality of life, and better birth outcomes. These better health outcomes are experienced by numerous counties within Minnesota, with its major metropolitan counties (Hennepin [80th] and Ramsey [104th]) ranking significantly better than Milwaukee County (157th). This finding also has been reported in America's Health Ranking, with Minnesota ranking 4 and Wisconsin ranking 24 in 2015.<sup>8</sup> More concerning is the finding that the gap between the 2 states is also widening. Wisconsin's health has been getting worse compared to other states over the past few years while

Minnesota's health has been getting slightly better, according to America's Health Rankings.<sup>8</sup>

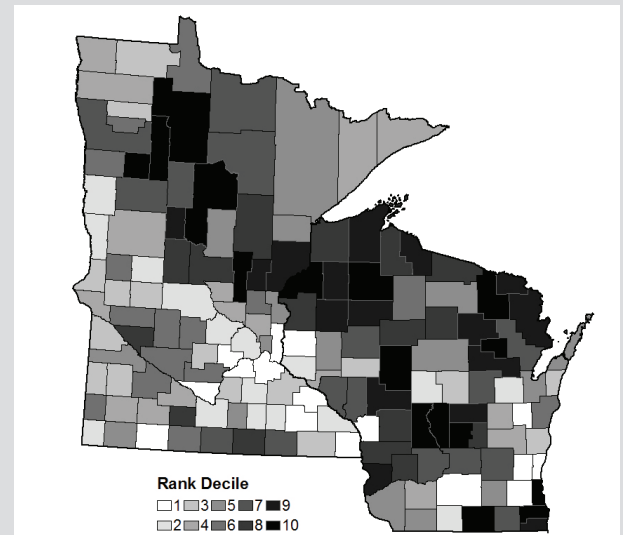
Our study also demonstrated that the better health outcomes in Minnesota is mostly explained by better rates of the factors that affect health—including rates of education, unemployment, poverty, obesity, and sexually transmitted infections. This finding can stimulate further research to examine specific reasons why these social, economic, and behavioral factors are better in Minnesota. For example, are there specific public health or health care policies in place in Minnesota and not in Wisconsin that are driving these differences that the state of Wisconsin could consider adopting?

Differences in educational and economic policies between the 2 states may explain the differences in rates of poverty, unemployment, and educational attainment—major “upstream” determinants of the health of populations. The relationship between these social and economic factors and health is undisputed—as

**Figure 1.** Health Outcomes Ranks by Decile for Minnesota and Wisconsin Combined



**Figure 2.** Health Factors Ranks by Decile for Minnesota and Wisconsin Combined



**Table 4.** Average Difference in Health Outcomes, Health Factors, and Subcategory Ranks Between Minnesota Counties and Wisconsin Counties (Within Minnesota and Wisconsin Counties Combined), Based on Data From the 2014 *County Health Rankings*

	Health Outcomes	Length of Life	Quality of Life	Health Factors	Health Behaviors	Clinical Care	Social and Economic Factors	Physical Environment
Average Difference In Rank <sup>a</sup>	22	21	17	32	27	2	35	2
P-value	0.004	0.009	0.026	0.0001	0.0008	0.85	< 0.0001	0.80

<sup>a</sup>A positive difference indicates that counties in Minnesota had better ranks, on average, than counties in Wisconsin.

individuals with more education and better jobs experience longer, healthier lives.<sup>9</sup> Minnesota traditionally has had an advantage over Wisconsin in key economic growth sectors, including education, health services, and professional and business services. In contrast, Wisconsin has a bigger stake in manufacturing, which has been in steady decline for years as a jobs creator.<sup>10</sup> Although it is clear that governmental policies can affect economic development,<sup>11</sup> significant controversy exists today about which policies are more effective.<sup>12</sup>

Differences in the public health or health care system organization and financing also could explain some of these observed differences in unhealthy behaviors, such as those related to obesity and sexually transmitted diseases.<sup>13</sup> For example, integrated health systems are important in the health care landscape of both Minnesota and Wisconsin, but integration evolved sooner and is perhaps more developed in Minnesota. In addition, between the states, there may be differences in private business engagement in community health and whether employers go beyond worker wellness to address the health of the families of employees as well as the health of the entire community.

This comparison of the health of Minnesota and Wisconsin counties has substantive strengths and is based on a model of

population health that emphasizes the many factors that, if improved, can help make communities healthier places. This approach could be used as a model or protocol for states in which there may be sufficient border communities, to better understand the health of their counties. While this discussion is framed as a “border battle” in order to encourage competition and raise awareness, it is also important to think of this as a comparison to understand what works and what doesn’t in each state in order for both states to achieve optimal health for all of their residents. It is also important to recognize limitations of this study. For instance, a few of the measures used in the *County Health Rankings* are not readily comparable across states. When compiled for the *Rankings*, some measures are modeled to produce the estimates, and some of these models include a state-level effect to inform the county-level estimates, which could impose a larger difference in counties across states than there is in reality. Additionally, while the *Rankings* draw upon the most reliable data available, there is uncertainty in the underlying data, especially for small areas. This, in turn, affects the certainty of the ranks, which should not be considered as fixed numbers but rather as summary scores, and therefore this analysis simply focuses on looking for patterns between the 2 states. Lastly, there may still be some factors that

are important to health and to the differences in health between these 2 states that are unmeasured or not captured in the *County Health Rankings* model.

This analysis provides insight into the differences between the health status of Minnesota and Wisconsin and some of the factors that affect these health differences. However, there is a further need for in-depth examination of state and local policies and strategies, not only in the governmental sector but in the health care and business sectors as well, that may be influencing these observed disparities. Using the strengths of both states may open the door for building a research and learning collaborative both in terms of community-level action and cross-sector data collection and analysis from which both states could benefit. Establishing a learning community across Minnesota and Wisconsin for communities to share aims, activities, learnings, outcomes, process, and best practices may increase the likelihood for even greater impact.

**Acknowledgments:** The authors would like to thank the reviewers for their time and thoughtful suggestions.

**Funding/Support:** The work of Dr Remington and Ms Pollock was supported in part by a grant from the Robert Wood Johnson Foundation (ID 69835) for the County Health Rankings.

**Financial Disclosures:** None declared.

**Planners/Reviewers:** The planners and reviewers for this journal CME activity have no relevant financial relationships to disclose.

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