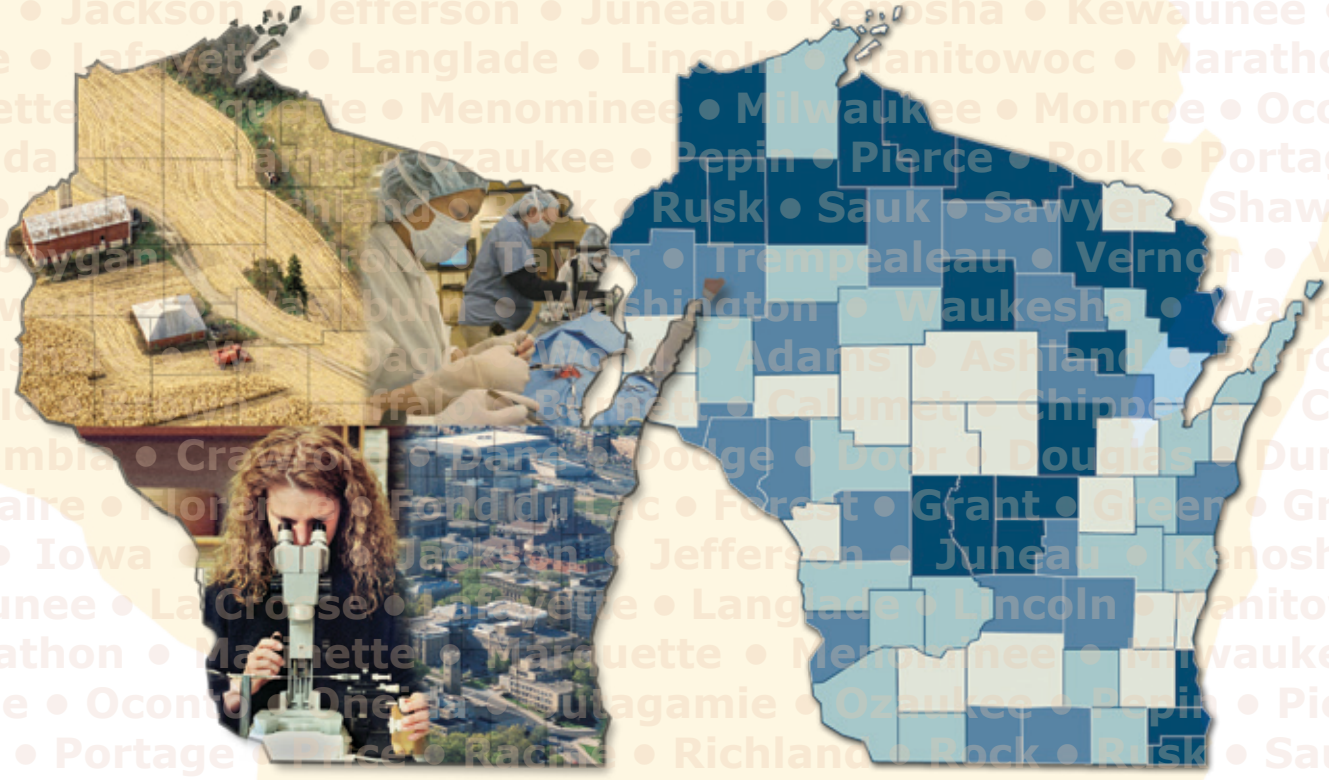
Wisconsin County Health Rankings 2005

socioeconomic • environment • health care
mortality • health status • behaviors



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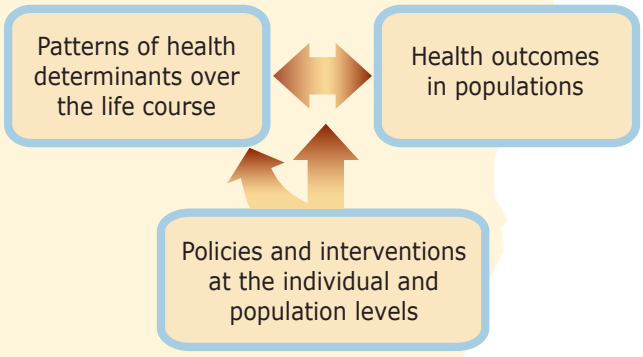
Introduction

In keeping with our mission to stimulate, create, and communicate useful public health and health policy research and analysis, the University of Wisconsin Population Health Institute is pleased to present the 2005 issue of the Wisconsin County Health Rankings. This report is an annual publication intended to summarize the current health of each county's population and the current distribution of key factors that determine future health.

The University of Wisconsin Population Health Institute recognizes that creating rankings of counties is controversial, as counties represent varying populations, environments, and resources. Each individual group has particular strengths, weaknesses, and public health challenges. We hope that our efforts to summarize and communicate this information to a broad audience will add value to Wisconsin's public health and health policy discussions. In addition, it is our hope that this report will provide an opportunity for every county to identify an area of potential health improvement and aid in drawing additional resources to improve public health.

Through the ranking of Wisconsin's counties, high performers in each area are identified. It is not our desire that these counties rest on their laurels. Strong performers are intended to serve as role models for lower ranked counties and provide insight in program planning and refinement. However, it remains important for every county to consider the unique challenges presented by its population in program implementation.



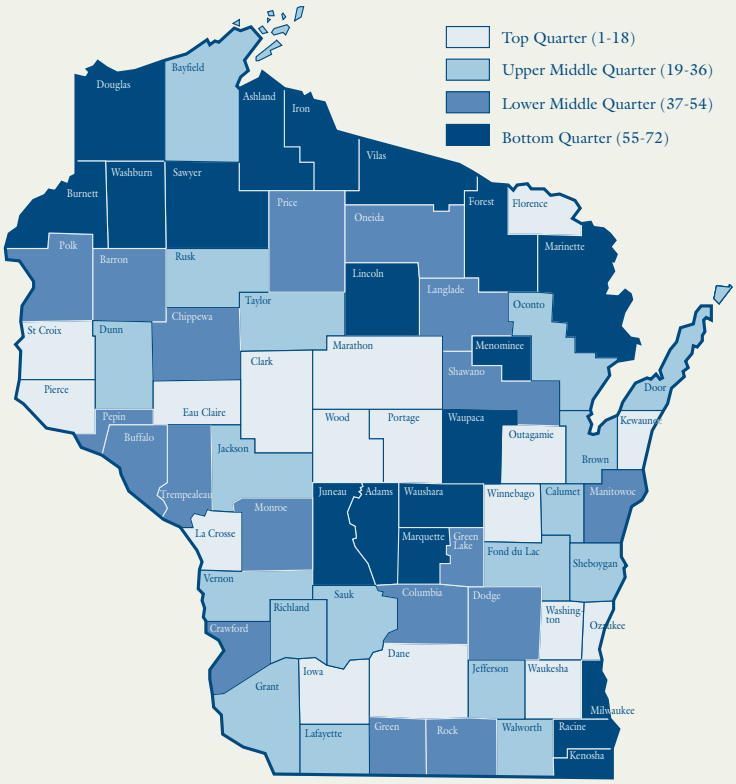
The *Wisconsin County Health Rankings, 2005* is based upon the preceding model of population health improvement proposed by Kindig and Stoddart. This conceptual framework shows that health outcomes in a population are the result of a set of health determinants and the distribution of these determinants across the population. These determining factors may be positively or negatively affected by interventions or policies that alter their distribution in the community. Thus, public health leaders have the ability to improve the health of their communities through the implementation of effective policies.

Health outcomes in populations are often reported in terms of mortality statistics such as life expectancy and years of potential life lost since these statistics are relatively easy to track. However, models of individual and population health do not merely include measures of longevity, but also quality of life. For this reason, we have created an outcomes component that gives equal weight to the number and the quality of life years.

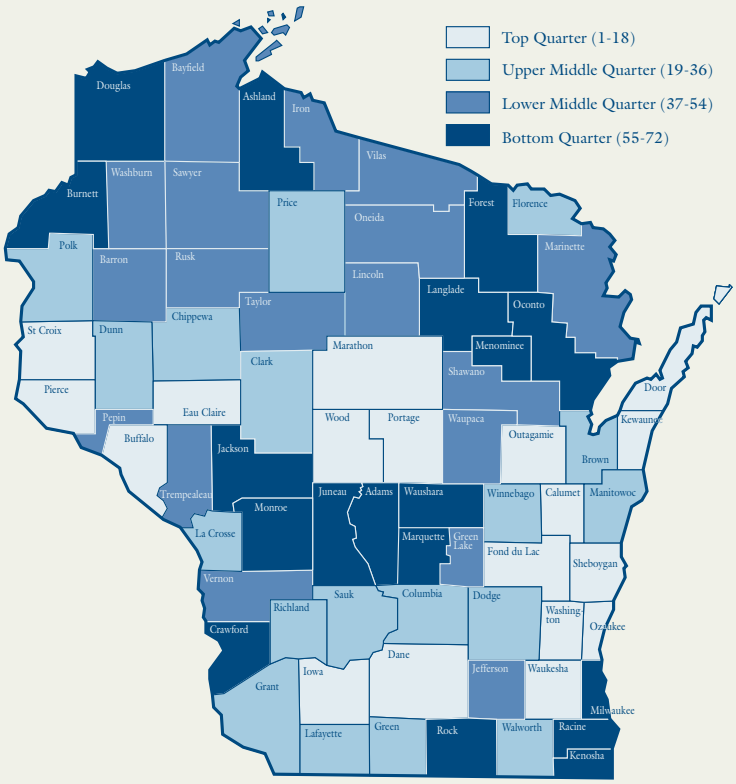
It would be impossible to include all of the determinants of a population's health in this ranking. Instead, we have selected a finite number of population health determinants for inclusion in this component. This selection was based upon the health priorities of the Wisconsin state health plan, scientific relevance, importance, and availability of data at the county level.

In addition to the county health rankings, this year's report highlights two additional topics. The first examines trends in age-adjusted mortality over the previous ten years in order to project future mortality. This discussion is timely because it details one method of setting objectives that may be used by counties in helping the state meet *Healthiest Wisconsin 2010* goals. The second examines in depth the reliability of survey data, using county rates of obesity to illustrate this point.

Health Outcomes by Quartile



Health Determinants by Quartile



The maps on this page display Wisconsin's counties divided into quartiles by rank. The lighter colors indicate higher performance in the respective summary rankings. The map in the upper right corner shows the distribution of summary health outcomes. The map in the lower right corner displays the distribution of summary health determinants.

Maps are useful in identifying regional issues affecting multiple counties. Neighboring counties facing similar challenges can then join efforts to improve health in both areas. By mapping the quartiles, we can begin to visually identify patterns in the health rankings and speculate as to why these patterns exist.

For instance, why is there a cluster of counties ranked in the bottom quarter of health outcomes along Wisconsin's northern border? As an observation, all but one of these dark blue counties ranked in the bottom quartile for YPLL, suggesting higher than average mortality rates. The health determinants map shows that the majority of these counties ranked in the middle quartiles, which may mark future improvement in outcomes. However, counties with both lower health outcomes and determinants are areas that could highly benefit from cogent program planning and collaboration with neighboring counties.

In accordance with the underpinning model of the Wisconsin County Health Rankings, we expect high performing counties in the health outcomes map to be currently or historically high performing counties in the health determinants map. This trend is evident since 13 of the 18 counties in the top quarter of health outcomes are also ranked in the top quarter of health determinants.

The Rankings

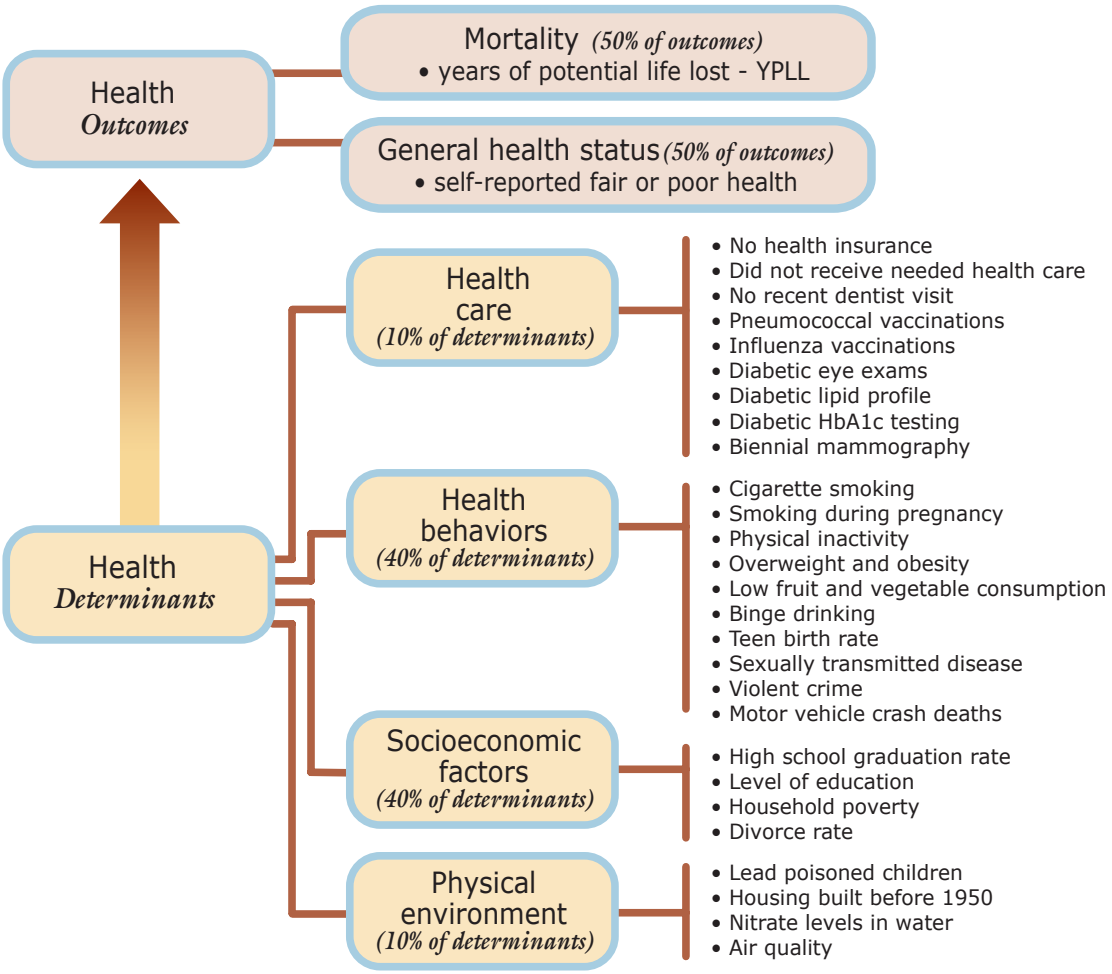
This report ranks Wisconsin counties according to their summary measures of **health outcomes** and **health determinants** as well as by the components of outcomes and determinants. The figure below depicts the structure of the rankings. Counties receive a ranking for each population health component shown in a box. Counties having high rankings (e.g., 1 or 2) are estimated to be the "healthiest."

Overall summary **health outcomes** rankings are based on an equal weighting of two measures: mortality and general health status. **Health determinants** are based on weighted scores of four major components: health care, health behaviors, socioeconomic factors and the physical environment. The weights (shown in parentheses in the figure) are based upon a review of the literature regarding how these measures combine. Each of these four health determinant components is based, in turn, on multiple population health measures listed to the right of the determinant components.

Estimates for health measures were calculated from the most recently available data. For many measures, an average of several years of recent data was used to obtain more stable estimates. However, estimates of county health are not measured perfectly and minor differences in the rankings among counties should be interpreted cautiously. For example, the data used for these rankings are not precise enough to indicate that a county ranked 40th is meaningfully healthier than a county ranked 45th.

As a result of user feedback, this year's rankings improve upon the health care dimension by adding new measures. We continue to welcome feedback and advice as this document evolves. Our goal is to improve this effort so that it is truly useful in helping to make Wisconsin communities as healthy as possible.

Additional information regarding rankings data and methodology is available at http://www.pophealth.wisc.edu/uwphi/

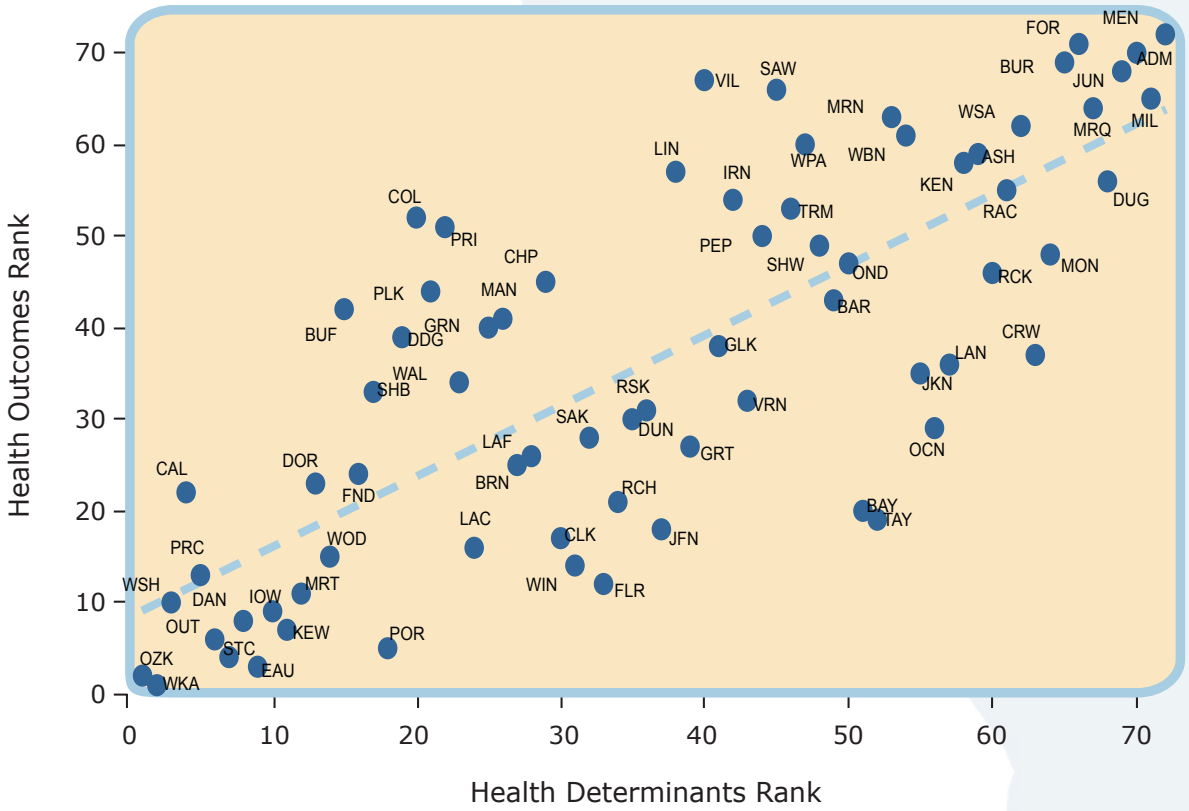


Summary Health Outcomes and Determinants Rankings

The table on the facing page presents the overall summary population health ranking for **health outcomes** and **health determinants**. Each of these rankings represents a weighted summary of a number of individual health measures.

As expected, the rankings of current health outcomes and current health determinants are related. This can be seen in the figure below where each county's outcomes rank is plotted against its determinants rank (each county is represented by an intuitive three letter code). While these two ranks are not perfectly related, the correlation remains strong (correlation coefficient = 0.73).

There are no counties that rank very high in one aspect but very low in the other; however, there is some variation in the rankings. Buffalo County ranks in the top quarter (#15) in determinants, but in the bottom half (#42) in outcomes. Since health determinants are indicators of future health, Buffalo County, and other counties above the regression line, may see an improvement in health outcomes. This lag may be a result of recently instituted policies and programs that are yet to deliver their expected improvements in community well-being. Likewise, counties that rank low in health determinants may experience declining population health outcomes in the future.



Summary 2005 Population Health Rankings for the 72 Wisconsin Counties
Ranks for Health Outcomes and Determinants

RANK	HEALTH OUTCOMES	HEALTH DETERMINANTS
1	Waukesha	Ozaukee
2	Ozaukee	Waukesha
3	Eau Claire	Washington
4	St. Croix	Calumet
5	Portage	Pierce
6	Outagamie	Outagamie
7	Kewaunee	St. Croix
8	Dane	Dane
9	Iowa	Eau Claire
10	Washington	Iowa
11	Marathon	Kewaunee
12	Florence	Marathon
13	Pierce	Door
14	Winnebago	Wood
15	Wood	Buffalo
16	La Crosse	Fond du Lac
17	Clark	Sheboygan
18	Jefferson	Portage
19	Taylor	Dodge
20	Bayfield	Columbia
21	Richland	Polk
22	Calumet	Price
23	Door	Walworth
24	Fond du Lac	La Crosse
25	Brown	Green
26	Lafayette	Manitowoc
27	Vernon	Brown
28	Sauk	Lafayette
29	Oconto	Chippewa
30	Grant	Clark
31	Dunn	Winnebago
32	Rusk	Sauk
33	Sheboygan	Florence
34	Walworth	Richland
35	Jackson	Grant
36	Langlade	Dunn
37	Crawford	Jefferson
38	Green Lake	Lincoln
39	Dodge	Vernon
40	Green	Vilas
41	Manitowoc	Green Lake
42	Buffalo	Iron
43	Barron	Rusk
44	Polk	Pepin
45	Chippewa	Sawyer
46	Rock	Trempealeau
47	Oneida	Washburn
48	Monroe	Shawano
49	Shawano	Barron
50	Pepin	Oneida
51	Price	Bayfield
52	Columbia	Taylor
53	Trempealeau	Marinette
54	Iron	Waupaca
55	Racine	Jackson
56	Douglas	Oconto
57	Lincoln	Langlade
58	Kenosha	Kenosha
59	Ashland	Ashland
60	Washburn	Rock
61	Waupaca	Racine
62	Waushara	Waushara
63	Marinette	Crawford
64	Marquette	Monroe
65	Milwaukee	Burnett
66	Sawyer	Forest
67	Vilas	Marquette
68	Juneau	Douglas
69	Burnett	Juneau
70	Adams	Adams
71	Forest	Milwaukee
72	Menominee	Menominee

Outcomes Components Ranking

The summary outcomes rankings are based on two components: mortality and general health status. The county rank and actual values for each county for those components are displayed here.

Mortality is measured as years of potential life lost prior to age 75 (YPLL). This is an indicator of county mortality that accounts for the age at which a person dies—persons who die at a younger age are considered to have lost more "potential" years of life. For example, persons who die at age 65 are considered to have lost 10 "potential" years of life. YPLL is age-adjusted and estimated on a "per 100,000 persons" basis. The entire state's years of potential life lost from 1999-2002 was 6,340 years per 100,000 persons.

General Health Status is measured as the percent of the population that reports fair or poor health. The data are based on answers to the telephone survey question, "In general, would you say that your health is excellent, very good, good, fair, or poor?" The age-adjusted percentage of persons reporting less-than-good health (i.e., fair or poor) is detailed here. These data are gathered by the Wisconsin Department of Health and Family Services and the U.S. Centers for Disease Control and Prevention. The entire state average reporting fair or poor health is 12.0%.

RANK	MORTALITY: YEARS OF POTENTIAL LIFE LOST			GENERAL HEALTH STATUS: % WITH FAIR/POOR HEALTH	
1	Calumet	4,231	years	Ozaukee	7.9 %
2	Waukesha	4,247	years	Eau Claire	8.2 %
3	Ozaukee	4,498	years	Waukesha	8.3 %
4	Eau Claire	4,791	years	Iowa	8.4 %
5	Washington	5,007	years	Bayfield	8.6 %
6	Pierce	5,039	years	Florence	8.9 %
7	Wood	5,119	years	Rusk	9.0 %
8	St. Croix	5,161	years	Portage	9.2 %
9	Portage	5,202	years	St. Croix	9.3 %
10	Kewaunee	5,234	years	Outagamie	9.4 %
11	Outagamie	5,240	years	Kewaunee	9.6 %
12	Dane	5,338	years	Dane	9.8 %
13	Winnebago	5,401	years	Clark	10.0 %
14	Marathon	5,460	years	Marathon	10.1 %
15	Taylor	5,467	years	Richland	10.2 %
16	Green Lake	5,600	years	La Crosse	10.5 %
17	Dunn	5,626	years	Jefferson	10.6 %
18	Brown	5,668	years	Washington	10.6 %
19	Price	5,687	years	Jackson	10.7 %
20	Fond du Lac	5,722	years	Door	10.7 %
21	Walworth	5,799	years	Sauk	10.8 %
22	Sheboygan	5,848	years	Iron	10.9 %
23	La Crosse	5,934	years	Lafayette	11.0 %
24	Pepin	6,018	years	Vernon	11.3 %
25	Chippewa	6,022	years	Winnebago	11.4 %
26	Jefferson	6,031	years	Oconto	11.7 %
27	Manitowoc	6,057	years	Taylor	11.7 %
28	Crawford	6,069	years	Pierce	11.8 %
29	Green	6,144	years	Grant	11.8 %
30	Langlade	6,184	years	Buffalo	11.9 %
31	Oconto	6,185	years	Fond du Lac	11.9 %
32	Grant	6,200	years	Monroe	11.9 %
33	Vernon	6,232	years	Wood	11.9 %
34	Dodge	6,252	years	Dodge	12.1 %
35	Door	6,264	years	Langlade	12.1 %
36	Clark	6,267	years	Polk	12.2 %
37	Iowa	6,279	years	Brown	12.2 %
38	Barron	6,324	years	Crawford	12.3 %
39	Lafayette	6,353	years	Sheboygan	12.5 %
40	Oneida	6,378	years	Green	12.5 %
41	Trempealeau	6,400	years	Walworth	12.7 %
42	Richland	6,425	years	Manitowoc	12.7 %
43	Sauk	6,607	years	Dunn	12.8 %
44	Florence	6,625	years	Rock	13.1 %
45	Washburn	6,645	years	Barron	13.2 %
46	Lincoln	6,661	years	Green Lake	13.2 %
47	Shawano	6,734	years	Racine	13.4 %
48	Buffalo	6,777	years	Douglas	13.5 %
49	Rock	6,841	years	Shawano	13.5 %
50	Kenosha	6,935	years	Columbia	13.6 %
51	Columbia	6,952	years	Oneida	14.0 %
52	Jackson	6,973	years	Sawyer	14.0 %
53	Polk	7,010	years	Calumet	14.1 %
54	Racine	7,059	years	Chippewa	14.4 %
55	Ashland	7,090	years	Lincoln	14.4 %
56	Douglas	7,130	years	Trempealeau	14.5 %
57	Bayfield	7,233	years	Kenosha	14.7 %
58	Marinette	7,385	years	Waushara	14.8 %
59	Waupaca	7,506	years	Pepin	14.9 %
60	Monroe	7,574	years	Milwaukee	14.9 %
61	Adams	7,609	years	Waupaca	15.1 %
62	Rusk	7,812	years	Ashland	15.4 %
63	Vilas	7,959	years	Marquette	15.5 %
64	Marquette	8,030	years	Price	15.7 %
65	Waushara	8,056	years	Marinette	16.1 %
66	Juneau	8,311	years	Burnett	16.4 %
67	Iron	8,457	years	Washburn	16.5 %
68	Milwaukee	8,692	years	Juneau	17.1 %
69	Burnett	8,764	years	Vilas	17.6 %
70	Forest	9,284	years	Menominee	18.2 %
71	Sawyer	9,452	years	Adams	18.8 %
72	Menominee	14,855	years	Forest	18.8 %

Determinants Components Ranking

RANK	HEALTH CARE	HEALTH BEHAVIORS	SOCIO-ECONOMICS	PHYSICAL ENVIRONMENT
1	Wood	Ozaukee	Ozaukee	Menominee
2	Portage	Waukesha	Waukesha	Vilas
3	Eau Claire	Sawyer	Calumet	Florence
4	Marathon	Iron	Washington	Burnett
5	Outagamie	Washington	Pierce	Sawyer
6	Ozaukee	Iowa	St. Croix	Oneida
7	Waukesha	Dane	Kewaunee	Bayfield
8	Sheboygan	Richland	Outagamie	Oconto
9	Door	Florence	Dodge	Washburn
10	Rusk	Pierce	Portage	Lincoln
11	Trempealeau	Vernon	Fond du Lac	Marinette
12	Washington	Bayfield	Sheboygan	Marquette
13	Calumet	Polk	Columbia	Price
14	Winnebago	Green	Marathon	Polk
15	Manitowoc	Buffalo	Grant	Forest
16	Fond du Lac	Walworth	Lafayette	Dunn
17	Oneida	Price	Iowa	Taylor
18	La Crosse	Calumet	Door	Rusk
19	Buffalo	Rusk	Manitowoc	Ashland
20	Brown	Eau Claire	Buffalo	Jackson
21	Jefferson	Columbia	Eau Claire	Juneau
22	Price	Door	Pepin	Douglas
23	Lincoln	Chippewa	Wood	Brown
24	Vilas	Clark	Green Lake	Barron
25	Sauk	Washburn	Dane	Eau Claire
26	Dane	Wood	Jefferson	Adams
27	Columbia	Sauk	La Crosse	Waushara
28	Dodge	Marathon	Dunn	Clark
29	Green	Oneida	Green	Washington
30	Rock	Sheboygan	Brown	St. Croix
31	Clark	Vilas	Walworth	Crawford
32	Forest	La Crosse	Shawano	Door
33	Green Lake	Fond du Lac	Winnebago	Wood
34	Barron	Outagamie	Taylor	Ozaukee
35	Florence	Kewaunee	Polk	Trempealeau
36	Langlade	Portage	Chippewa	Calumet
37	Polk	Jackson	Lincoln	Outagamie
38	St. Croix	Lafayette	Waupaca	Waukesha
39	Chippewa	Rock	Price	Vernon
40	Taylor	Dodge	Sauk	Buffalo
41	Washburn	Brown	Oconto	Iowa
42	Walworth	Milwaukee	Clark	Marathon
43	Racine	Barron	Trempealeau	Iron
44	Kewaunee	Winnebago	Marinette	Langlade
45	Douglas	Langlade	Richland	Fond du Lac
46	Monroe	Racine	Barron	Sauk
47	Marinette	Manitowoc	Vernon	Pierce
48	Kenosha	Kenosha	Crawford	Jefferson
49	Jackson	Waupaca	Ashland	Green Lake
50	Bayfield	St. Croix	Kenosha	Grant
51	Waushara	Juneau	Vilas	Kewaunee
52	Dunn	Burnett	Monroe	Walworth
53	Lafayette	Lincoln	Jackson	Richland
54	Shawano	Waushara	Langlade	Shawano
55	Menominee	Trempealeau	Rock	Dodge
56	Grant	Marinette	Iron	Manitowoc
57	Richland	Dunn	Washburn	Monroe
58	Waupaca	Grant	Florence	Winnebago
59	Vernon	Ashland	Racine	Dane
60	Pepin	Shawano	Waushara	La Crosse
61	Marquette	Pepin	Oneida	Waupaca
62	Iowa	Douglas	Marquette	Chippewa
63	Pierce	Monroe	Burnett	Kenosha
64	Milwaukee	Forest	Rusk	Sheboygan
65	Oconto	Jefferson	Forest	Racine
66	Adams	Green Lake	Bayfield	Lafayette
67	Crawford	Crawford	Sawyer	Portage
68	Ashland	Oconto	Juneau	Pepin
69	Sawyer	Taylor	Douglas	Columbia
70	Juneau	Adams	Adams	Green
71	Iron	Marquette	Milwaukee	Milwaukee
72	Burnett	Menominee	Menominee	Rock

Here, counties are ranked according to measures representing four major categories of health determinants.

Each of these categories reflects a composite of one or more individual health measures that are summarized to create the component-level rankings (see the figure on page 3 for a list of the health measures corresponding to the major components ranked here). For example, the health behaviors ranking is calculated from data on maternal smoking during pregnancy, physical activity, overweight and obesity, diet, binge drinking, teen pregnancy, sexually transmitted diseases, violent crime, and deaths from motor vehicle accidents (the last is a proxy for other risk-taking behaviors)

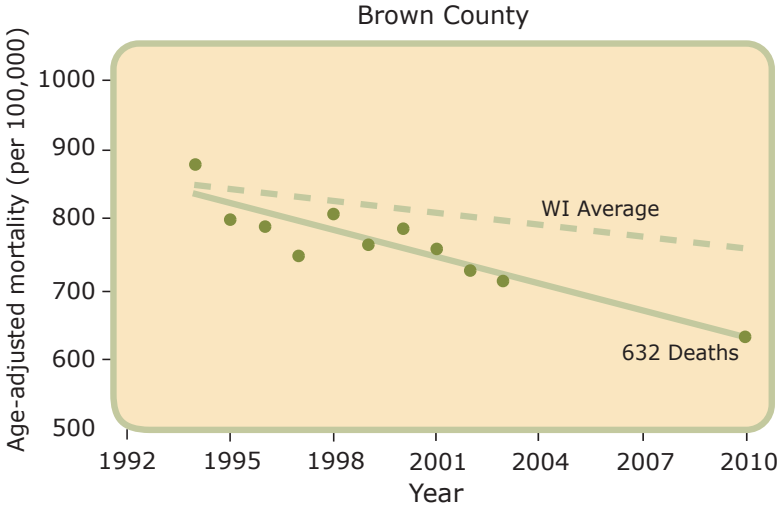
The greatest changes from previous ranks are expected in the health care component. This year, six measures were added to this component in an effort to provide a more complete picture of health care in each county. These measures are rates of receiving recommended care for Medicare patients. Comparisons to previous year's health care component rank should be made with caution. The effect on the **health determinants ranking** (page 5) is mitigated since the health care component comprises only 10% of total determinants.

The ranks for the remaining components are comparable with those from previous issues. Most measures have been maintained from year to year for this reason.

Examining Trends in County Mortality

Monitoring systems such as vital statistics, survey data, and health care reporting are in place, which allow tracking of performance at the county level. These systems should be used to identify trends and to set future goals. Each county should lay out its own goals based upon the various needs of its population, and there are many valid methods of identifying targets. Among other options, counties could adopt *Healthy People 2010* goals, attempt to become better than the current best performing county, or demonstrate a certain percent improvement.

As shown below using Brown County data as an example, the method used to create the goals in this table is to first project current trends into the future and then attempt to maintain or improve upon the projected 2010 mortality rate. The solid line shows Brown County's trend, while the dashed line shows the average trend for the entire state. The table displays Wisconsin's counties ranked by projected percent change in mortality from 2000-2010. To create this projection, 1994-2003 age-adjusted mortality rates were analyzed and a regression line was fitted for each county. The data show that while all but six counties are trending toward improved mortality, the rate of change varies considerably. Not surprisingly, counties with greater reduction trends tend to have much lower projected mortality rates in the year 2010, which raises one concern with the use of this method. Despite stable trends over the past 10 years, some counties may not be able to maintain these impressive rates of improvement. Goals should be set at a level that is challenging but attainable.



RANK	COUNTY	ESTIMATED 2000 MORTALITY RATE	PROJECTED 2010 MORTALITY RATE	PROJECTED % CHANGE 2000-2010
1	Florence	801	340	-58%
2	Iron	820	488	-40%
3	Door	786	554	-29%
4	Lafayette	776	553	-29%
5	Bayfield	816	591	-28%
6	Portage	730	532	-27%
7	Forest	842	629	-25%
8	Crawford	818	614	-25%
9	Wood	722	553	-23%
10	Washburn	841	654	-22%
11	Vilas	797	622	-22%
12	Eau Claire	728	569	-22%
13	Oneida	782	612	-22%
14	Kewaunee	734	581	-21%
15	Chippewa	797	635	-20%
16	Oconto	805	665	-17%
17	Jefferson	779	644	-17%
18	Brown	758	632	-17%
19	Pierce	772	645	-16%
20	Calumet	671	564	-16%
21	Taylor	765	644	-16%
22	Ozaukee	723	611	-16%
23	Columbia	837	715	-15%
24	Dane	746	639	-14%
25	Vernon	811	701	-14%
26	Richland	748	648	-13%
27	Waukesha	780	676	-13%
28	Burnett	876	762	-13%
29	Lincoln	827	723	-13%
30	Douglas	885	774	-12%
31	St. Croix	805	705	-12%
32	Polk	798	699	-12%
33	Racine	826	728	-12%
34	La Crosse	815	719	-12%
35	Manitowoc	774	685	-12%
36	Dunn	719	636	-12%
37	Sauk	782	692	-11%
38	Monroe	893	791	-11%
39	Iowa	811	724	-11%
40	Rusk	827	739	-11%
41	Green	792	708	-11%
42	Fond du Lac	772	692	-10%
43	Grant	805	726	-10%
44	Langlade	773	706	-9%
45	Waupaca	942	863	-8%
46	Trempealeau	814	748	-8%
47	Winnebago	767	708	-8%
48	Milwaukee	916	846	-8%
49	Outagamie	753	696	-8%
50	Marathon	702	652	-7%
51	Clark	746	694	-7%
52	Marinette	851	793	-7%
53	Price	822	767	-7%
54	Pepin	768	717	-7%
55	Walworth	804	753	-6%
56	Juneau	896	847	-5%
57	Rock	835	791	-5%
58	Shawano	824	782	-5%
59	Ashland	902	857	-5%
60	Washington	749	713	-5%
61	Waushara	826	787	-5%
62	Kenosha	866	829	-4%
63	Barron	809	789	-2%
64	Sawyer	899	884	-2%
65	Adams	853	841	-1%
66	Sheboygan	789	779	-1%
67	Dodge	857	858	0%
68	Buffalo	772	781	1%
69	Menominee	1288	1314	2%
70	Jackson	872	891	2%
71	Green Lake	830	870	5%
72	Marquette	866	913	5%

Survey Research and Reliable Obesity Rates

RANK	COUNTY	SAMPLE SIZE	PREVALENCE OF OBESITY (%)	95% CONFIDENCE INTERVAL
1	Bayfield	107	10	(4, 15)
2	Pierce	157	11	(6, 15)
3	Iron	46	14	(4, 25)
4	Dane	2090	16	(14, 17)
5	Green	185	16	(11, 22)
6	Burnett	84	16	(8, 24)
7	Marquette	66	16	(8, 25)
8	Waukesha	1216	17	(15, 20)
9	La Crosse	515	17	(14, 20)
10	Kewaunee	99	17	(10, 24)
11	Brown	1211	18	(16, 20)
12	Outagamie	710	18	(15, 21)
13	Washington	390	18	(14, 21)
14	Barron	232	18	(13, 23)
15	Oneida	177	18	(13, 24)
16	Richland	84	18	(10, 27)
17	Lafayette	71	18	(9, 27)
18	Forest	61	18	(8, 28)
19	Florence	22	18	(2, 34)
20	Milwaukee	6586	19	(18, 20)
21	Winnebago	684	19	(16, 22)
22	Ozaukee	279	19	(15, 24)
23	Sauk	260	19	(14, 24)
24	Calumet	194	19	(14, 25)
25	Dunn	182	19	(13, 25)
26	Lincoln	138	19	(12, 25)
27	Eau Claire	399	20	(16, 24)
28	Polk	196	20	(15, 26)
29	Sawyer	75	20	(11, 29)
30	Racine	890	21	(19, 24)
31	Kenosha	423	21	(17, 24)
32	Manitowoc	414	21	(17, 24)
33	Iowa	97	21	(13, 29)
34	Rock	670	22	(19, 25)
35	Marathon	639	22	(19, 25)
36	Sheboygan	516	22	(18, 25)
37	Walworth	318	22	(17, 26)
38	Waupaca	244	22	(17, 28)
39	Vernon	148	22	(16, 29)
40	Trempealeau	133	22	(15, 29)
41	Crawford	90	22	(14, 31)
42	Ashland	81	22	(13, 31)
43	Wood	431	23	(19, 27)
44	Fond du Lac	430	23	(19, 26)
45	Dodge	381	23	(19, 28)
46	Chippewa	305	23	(18, 27)
47	Portage	305	23	(18, 27)
48	St. Croix	277	23	(18, 28)
49	Columbia	243	23	(18, 28)
50	Waushara	151	23	(16, 30)
51	Shawano	206	24	(18, 30)
52	Douglas	199	24	(19, 30)
53	Clark	170	24	(17, 30)
54	Door	144	24	(17, 31)
55	Vilas	123	24	(16, 31)
56	Rusk	84	24	(15, 33)
57	Marinette	196	25	(19, 32)
58	Jefferson	297	26	(21, 32)
59	Adams	116	26	(18, 33)
60	Green Lake	103	26	(18, 35)
61	Jackson	83	26	(17, 36)
62	Grant	239	27	(21, 32)
63	Oconto	175	28	(22, 35)
64	Juneau	97	28	(19, 37)
65	Price	97	28	(19, 36)
66	Washburn	82	28	(18, 38)
67	Buffalo	80	28	(18, 38)
68	Monroe	189	29	(22, 35)
69	Taylor	114	29	(20, 37)
70	Langlade	91	29	(20, 38)
71	Pepin	33	31	(15, 46)
72	Menominee	15	40	(15, 65)

While telephone survey data is very informative in conducting community needs assessments, program planning, and monitoring the population, careful attention should be paid to the reliability of these rates. Reliability can be affected by many factors including sampling design, non-response, and biases related to self-reported data. This example is intended to illustrate the effects of sample size on the reliability of survey data.

The Centers for Disease Control and Prevention consider county rates to be **reportable** when based upon a sample size of at least 50. In a recent Wisconsin Medical Journal article, researchers from the University of Wisconsin Population Health Institute suggested a sample size standard for **reliable** county obesity prevalences based upon survey data. Obesity prevalence estimates based upon a sample size of at least 300 have narrow enough confidence intervals (approximately ±4–5%) to be meaningful estimates for program planners and policy makers. This standard does not extend to other measures that have smaller average prevalence estimates.

One method of circumventing small sample sizes for annual surveys is to combine multiple years of data and calculate rates from this aggregate sample. The table shows prevalence estimates of obesity for each county based upon ten years of Behavioral Risk Factor Surveillance System survey data.

Using the above reportability and reliability standards, counties are divided into those with reliable 10-year prevalence estimates (green), those with reportable but not reliable estimates (yellow), and those with unreportable estimates (red). Even with 10 years of combined data, four counties continue to have unreportable prevalence estimates, and 47 counties have obesity prevalences that should be interpreted with caution. Sample size should be taken into consideration when using survey data in program planning.

The prevalence rate of obesity in Wisconsin in 2003 was 21%, but rates vary considerably from county to county.

Please see the Overview of Methods for citation.

Health Outcomes Ranks Sorted by County

This table lists the county health outcomes presented on the previous pages, but in a format that provides summaries by county.

COUNTY	SUMMARY	MORTALITY (YPLL)			HEALTH STATUS (% REPORTING FAIR/POOR HEALTH)	
	Rank	Rank	Value		Rank	Value
Adams	70	61	7,609	years	71	18.8%
Ashland	59	55	7,090	years	62	15.4%
Barron	43	38	6,324	years	45	13.2%
Bayfield	20	57	7,233	years	5	8.6%
Brown	25	18	5,668	years	37	12.2%
Buffalo	42	48	6,777	years	30	11.9%
Burnett	69	69	8,764	years	66	16.4%
Calumet	22	1	4,231	years	53	14.1%
Chippewa	45	25	6,022	years	54	14.4%
Clark	17	36	6,267	years	13	10.0%
Columbia	52	51	6,952	years	50	13.6%
Crawford	37	28	6,069	years	38	12.3%
Dane	8	12	5,338	years	12	9.8%
Dodge	39	34	6,252	years	34	12.1%
Door	23	35	6,264	years	20	10.7%
Douglas	56	56	7,130	years	48	13.5%
Dunn	31	17	5,626	years	43	12.8%
Eau Claire	3	4	4,791	years	2	8.2%
Florence	12	44	6,625	years	6	8.9%
Fond du Lac	24	20	5,722	years	31	11.9%
Forest	71	70	9,284	years	72	18.8%
Grant	30	32	6,200	years	29	11.8%
Green	40	29	6,144	years	40	12.5%
Green Lake	38	16	5,600	years	46	13.2%
Iowa	9	37	6,279	years	4	8.4%
Iron	54	67	8,457	years	22	10.9%
Jackson	35	52	6,973	years	19	10.7%
Jefferson	18	26	6,031	years	17	10.6%
Juneau	68	66	8,311	years	68	17.1%
Kenosha	58	50	6,935	years	57	14.7%
Kewaunee	7	10	5,234	years	11	9.6%
La Crosse	16	23	5,934	years	16	10.5%
Lafayette	26	39	6,353	years	23	11.0%
Langlade	36	30	6,184	years	35	12.1%
Lincoln	57	46	6,661	years	55	14.4%
Manitowoc	41	27	6,057	years	42	12.7%
Marathon	11	14	5,460	years	14	10.1%
Marinette	63	58	7,385	years	65	16.1%
Marquette	64	64	8,030	years	63	15.5%
Menominee	72	72	14,855	years	70	18.2%
Milwaukee	65	68	8,692	years	60	14.9%
Monroe	48	60	7,574	years	32	11.9%
Oconto	29	31	6,185	years	26	11.7%
Oneida	47	40	6,378	years	51	14.0%
Outagamie	6	11	5,240	years	10	9.4%
Ozaukee	2	3	4,498	years	1	7.9%
Pepin	50	24	6,018	years	59	14.9%
Pierce	13	6	5,039	years	28	11.8%
Polk	44	53	7,010	years	36	12.2%
Portage	5	9	5,202	years	8	9.2%
Price	51	19	5,687	years	64	15.7%
Racine	55	54	7,059	years	47	13.4%
Richland	21	42	6,425	years	15	10.2%
Rock	46	49	6,841	years	44	13.1%
Rusk	32	62	7,812	years	7	9.0%
Sauk	28	43	6,607	years	21	10.8%
Sawyer	66	71	9,452	years	52	14.0%
Shawano	49	47	6,734	years	49	13.5%
Sheboygan	33	22	5,848	years	39	12.5%
St. Croix	4	8	5,161	years	9	9.3%
Taylor	19	15	5,467	years	27	11.7%
Trempealeau	53	41	6,400	years	56	14.5%
Vernon	27	33	6,232	years	24	11.3%
Vilas	67	63	7,959	years	69	17.6%
Walworth	34	21	5,799	years	41	12.7%
Washburn	60	45	6,645	years	67	16.5%
Washington	10	5	5,007	years	18	10.6%
Waukesha	1	2	4,247	years	3	8.3%
Waupaca	61	59	7,506	years	61	15.1%
Waushara	62	65	8,056	years	58	14.8%
Winnebago	14	13	5,401	years	25	11.4%
Wood	15	7	5,119	years	33	11.9%

Health Determinants Ranks Sorted by County

COUNTY	SUMMARY	HEALTH CARE	HEALTH BEHAVIORS	SOCIO-ECONOMICS	PHYSICAL ENVIRONMENT
Adams	70	66	70	70	26
Ashland	59	68	59	49	19
Barron	49	34	43	46	24
Bayfield	51	50	12	66	7
Brown	27	20	41	30	23
Buffalo	15	19	15	20	40
Burnett	65	72	52	63	4
Calumet	4	13	18	3	36
Chippewa	29	39	23	36	62
Clark	30	31	24	42	28
Columbia	20	27	21	13	69
Crawford	63	67	67	48	31
Dane	8	26	7	25	59
Dodge	19	28	40	9	55
Door	13	9	22	18	32
Douglas	68	45	62	69	22
Dunn	36	52	57	28	16
Eau Claire	9	3	20	21	25
Florence	33	35	9	58	3
Fond du Lac	16	16	33	11	45
Forest	66	32	64	65	15
Grant	35	56	58	15	50
Green	25	29	14	29	70
Green Lake	41	33	66	24	49
Iowa	10	62	6	17	41
Iron	42	71	4	56	43
Jackson	55	49	37	53	20
Jefferson	37	21	65	26	48
Juneau	69	70	51	68	21
Kenosha	58	48	48	50	63
Kewaunee	11	44	35	7	51
La Crosse	24	18	32	27	60
Lafayette	28	53	38	16	66
Langlade	57	36	45	54	44
Lincoln	38	23	53	37	10
Manitowoc	26	15	47	19	56
Marathon	12	4	28	14	42
Marinette	53	47	56	44	11
Marquette	67	61	71	62	12
Menominee	72	55	72	72	1
Milwaukee	71	64	42	71	71
Monroe	64	46	63	52	57
Oconto	56	65	68	41	8
Oneida	50	17	29	61	6
Outagamie	6	5	34	8	37
Ozaukee	1	6	1	1	34
Pepin	44	60	61	22	68
Pierce	5	63	10	5	47
Polk	21	37	13	35	14
Portage	18	2	36	10	67
Price	22	22	17	39	13
Racine	61	43	46	59	65
Richland	34	57	8	45	53
Rock	60	30	39	55	72
Rusk	43	10	19	64	18
Sauk	32	25	27	40	46
Sawyer	45	69	3	67	5
Shawano	48	54	60	32	54
Sheboygan	17	8	30	12	64
St. Croix	7	38	50	6	30
Taylor	52	40	69	34	17
Trempealeau	46	11	55	43	35
Vernon	39	59	11	47	39
Vilas	40	24	31	51	2
Walworth	23	42	16	31	52
Washburn	47	41	25	57	9
Washington	3	12	5	4	29
Waukesha	2	7	2	2	38
Waupaca	54	58	49	38	61
Waushara	62	51	54	60	27
Winnebago	31	14	44	33	58
Wood	14	1	26	23	33

This table lists the county health determinants presented on the previous pages, but in a format that provides summaries by county.

Overview of Methods

I. Selection of population health measures

We focus on two categories of health measures—health outcomes and health determinants. Outcomes are intended to measure the current state of health in a county, while determinants are viewed as predictors of future health outcomes. Twenty-nine measures of health outcomes and determinants were selected using the following criteria:

- the measure is a direct or proxy measure of an important aspect of population health
- the data are reasonably valid
- the data are publicly available
- the data are available at the county level
- the data are current and updated periodically

Health Outcomes: two components were used to represent health outcomes: mortality and health status while alive. Death and health status are each assessed with a single measure (years of potential life lost and self-reported health status). While much more specific health outcomes could be included here, these two address both length and quality of life.

Health Determinants: the selection of determinant measures was largely guided by the Wisconsin state health plan priorities. However, we do not include measures that represent specific diseases. We divided the 27 health determinant measures into four major components: health care, health behaviors, socioeconomic factors related to health, and the physical environment. Each of these four major components is comprised of multiple health measures.

II. Data sources

The figure on page 3 lists the outcomes and determinants components and their associated health measures. The data used for this report came from a variety of sources:

- **Complete population** (non-sample), annually available data: these data include vital statistics (mortality/YPLL, teen births, and smoking during pregnancy) obtained from the Bureau of Health Information and Policy, Division of Public Health, Wisconsin Department of Health and Family Services, and the U.S. Centers for Disease Control and Prevention (CDC) WONDER database.
- **Census data:** based on nearly complete population or large-sample decennial data (education level, income, divorce rate, and year housing structure built). These were obtained online from the U.S. Census Bureau.
- **Sample survey data:** based on moderate-sized annual samples primarily from the U.S. Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System (cigarette smoking, physical inactivity, overweight and obesity, low fruit and vegetable consumption, and binge drinking) or the Wisconsin Department of Health and Family Service's Family Health Survey (no health insurance, did not receive needed health care, and no recent dentist visit). These data are often quite sparse for some counties and were obtained from the Bureau of Health Information and Policy. Multiple years of data were combined to provide more robust sample sizes.
- **Other data** were obtained from the Wisconsin Department of Health and Family Services, Wisconsin Department of Natural Resources, Wisconsin Department of Public Instruction, Wisconsin Office of Justice Assistance, the U.S. Environmental Protection Agency, and Metastar, Inc.

The specific time periods and sources corresponding to each health measure are further detailed on the University of Wisconsin Population Health Institute's website: http://www.pophealth.wisc.edu/uwphi/

Overview of Methods continued

III. Rankings

Each of the 2 health outcomes measures and 27 health determinants measures were estimated for each county. The mean and standard deviation of each of the health measures were calculated across the 72 counties. Counties were then given a Z-score for each measure. This score was the number of standard deviation units that the county was from the mean of all the counties. To avoid a county's rank being strongly influenced by one extreme component score, we truncated the score at (-3.0) or (3.0) if the actual score fell outside of this range. Weighted averages of the truncated scores were used to calculate the overall summary outcomes and determinants rankings and the rankings for the four major categories of determinants. The weights used for the components to calculate summary outcome and determinant rankings are given in the figure on page 3.

IV. Special Feature Methodology

Examining trends in county mortality: Age-adjusted mortality data were collected for 1994-2003 using the Bureau of Health Information and Policy, Division of Public Health, Wisconsin Department of Health and Family Services' WISH database. Mortality data were analyzed using a statistical package to fit a linear regression for each county. Year 2000 and 2010 estimates were obtained by solving the equation of the line for these years. Counties were ranked by the estimated percent change in age-adjusted mortality (per 100,000 persons) from 2000-2010. The 2004 edition contained an analysis of change in health outcomes focusing on YPLL. This change ranking is more sensitive to annual variation in mortality and infant and child mortality than the method used in this edition, especially for smaller counties.

Survey research and reliable rates: For a detailed list of methods, please see the source paper.

Schumann CL, Remington PL. Using local data to monitor obesity rates in Wisconsin counties. *Wisconsin Medical Journal* 2005; 104(5): 20-25.

Available on the web:
http://www.wisconsinmedicalsociety.org/uploads/wmj/Schumann.pdf

V. Changes from the *Wisconsin County Health Rankings—2004*

The annual production of the *Wisconsin County Health Rankings* provides us with the opportunity to incorporate improvements from the previous year's document. Based on feedback received through survey of the recipients of the 2004 edition, discussion and advice from groups in many fields, and continued investigation into available data sources, a number of health measures were added to the 2005 edition.

Metastar, Inc. provided county rates of Medicare patients receiving recommended care. The recommended services include pneumococcal vaccinations, influenza vaccinations, biennial diabetic retinal eye exams, biennial lipid profile testing for diabetics, annual diabetic hemoglobin A1c testing, and biennial mammography for women 50-67 years of age. These measures were added to the health care component of the health determinants ranking.

Please see *Why did my county's rank change?* at http://www.pophealth.wisc.edu/uwphi/ for an analysis of changes in county rank due to sampling variance, changes in methods, and real changes.

As the *Wisconsin County Health Rankings* continues to evolve, we invite the readers and users of this publication to advise us on points of potential improvement. Feedback from users of this material is invaluable as we tailor the *Wisconsin County Health Rankings* to the needs of county officials and organizations.

POPULATION HEALTH SCIENCES
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UNIVERSITY OF WISCONSIN
Population Health Institute
Translating Research into Policy and Practice

Mission

To translate public health and health policy research into practice.

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