

# An initial attempt at ranking population health outcomes and determinants

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## Introduction

Just as some people are healthy and others are not, the “health” of communities also varies. The Wisconsin Public Health and Health Policy Institute recently released its first annual Wisconsin County Health Rankings (2003 edition, available at [www.pophealth.wisc.edu/wphi/](http://www.pophealth.wisc.edu/wphi/)) which describes, using publicly available data, some of the variation in several measures of population health. This brief report introduces the County Health Rankings and presents a subset of the rankings pertaining to summary measures of population health “outcomes” and “determinants.” The focus of this issue of the *Wisconsin Medical Journal*—medical care quality improvement—serves as an impetus for one example of health determinants that we also include here: ac-

cess to health care—a fundamental component of health care quality.

The conceptual framework underpinning the rankings is based on a model of population health improvement that has health outcomes and their distribution in the population produced by a set of health determinants, which in turn are influenced by policies and interventions that enhance or limit the determinants.<sup>1</sup> The empirical framework of the County Health Rankings was built upon the model of United Health Foundation’s annual State Health Rankings,<sup>2</sup> which ranks US states from “healthiest” to “least healthy.” It is our hope that our efforts to summarize and communicate such information about Wisconsin communities to broad audiences will add value to Wisconsin public health and health policy discussions.

## Methods

In creating the Wisconsin County Health Rankings, we chose to 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. Two broad components were used to represent health outcomes: death and health status while alive. Death and health status are each assessed with a sin-

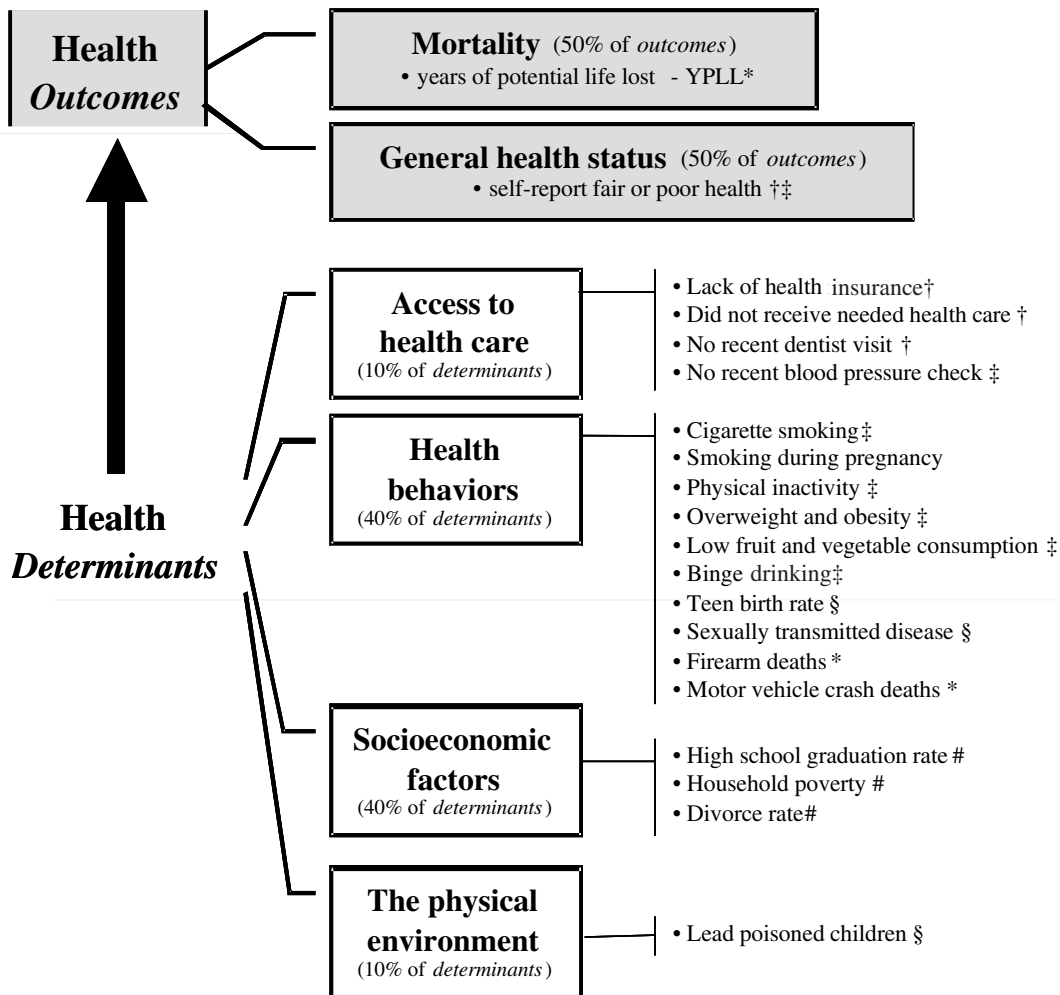
gle measure—years of potential life lost and self-reported health status, respectively. The selection of health determinant measures was largely guided by the Wisconsin State Health Priorities.<sup>3</sup> We divided 18 health determinant measures into four major components: access to health care, health behaviors, socioeconomic factors related to health, and the physical environment. Each of these four components is comprised of one or more underlying health measures.

The 20 specific measures of health outcomes and determinants were selected by the authors using the following criteria: 1) the measure is a direct or proxy measure of an important aspect of population health; 2) the measure fit our conceptual model of population health determinants or outcomes; 3) the data are reasonably valid; 4) the data are publicly available; 5) the data are available at the county level; and 6) the data are current and updated periodically. Figure 1 depicts our population health determinants-outcomes model, the health outcome and determinant components, and their associated health measures and corresponding data sources.

For health measures where there were few data (i.e., health behavior and access to health care measures) for low-population counties, counties were grouped according to the Wisconsin

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This report and the Wisconsin County Health Rankings were supported by funding from the University of Wisconsin Medical School. Dr Peppard is a senior epidemiologist for the Wisconsin Public Health and Health Policy Institute; Doctor Kindig is an emeritus professor in the Department of Population Health Sciences and co-director of the Wisconsin Public Health and Health Policy Institute; Ms Jovaag and Ms Dranger are graduate students in the University of Wisconsin Medical School’s Department of Population Health Sciences; and Doctor Remington is a professor in the Department of Population Health Sciences and Director of the Wisconsin Public Health and Health Policy Institute.



**Key for Data Sources**

- \* US Centers for Disease Control and Prevention (CDC) WONDER mortality database, years 1997-1999
- † Wisconsin Department of Health and Family Services Family Health Survey, years 1997-2001
- ‡ CDC Behavioral Risk Factor Surveillance System, years 1997-2001
- § Wisconsin Department of Health and Family Services, years 1997-2002, depending on measure
- # US 2000 Census

**Figure 1.** The structure of the Wisconsin County Health Rankings. Rankings are given for a summary of health outcomes and health determinants as well as components of outcomes and determinants. Counties receive a ranking for each population health component shown in a box (not all rankings are detailed in this report). Overall summary health outcomes rankings are based on weighted scores of two components: mortality and general health status. Health determinants are based on weighted scores of four major components: access to health care, health behaviors, socioeconomic factors and the physical environment.

Department of Health and Family Services' groupings for their publication summarizing county-level health behavior data.<sup>4</sup> Then, county-specific estimates were calculated using a weighted average of county-level data and county-group-level data. This ap-

proach was unnecessary for many of the counties since larger-population counties had sufficient data available to independently estimate their health measures.

Each of the health outcomes and determinants measures was estimated for the counties (averaging

over years and sometimes over county groups as discussed above) for the time periods listed in Figure 1. The means and standard deviations of the health measures were calculated across the 72 counties. Counties were then given a score for each health measure (a Z-

score—the number of standard deviation units that the county was from the counties’ mean). Weighted averages of the 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 Figure 1. The weights were determined by a combination of literature review and expert opinion. A major source of data used to assign weights for health determinants was the work of Ezzati and colleagues reporting on the efforts of the World Health Organization to attribute contributions of selected health determinants to global and regional burdens of disease and mortality.<sup>5</sup> A more detailed description of our methods, including data sources, county-level health measure estimation, and weighting and scoring approaches can be found on-line at the Wisconsin Public Health and Health Policy Institute Web site.<sup>6,7</sup>

## Results

Table 1 ranks Wisconsin counties according to population health outcomes (a combination of mortality and general health status) and health determinants (a combination of access to health care, health behaviors, socioeconomic factors, and physical environment). The shadings in the maps in Figure 2 depict the quartiles of the rankings for health outcomes, determinants, and for one of the determinant’s components—access to health care. The counties in the top (healthiest) 25% of the rankings are unshaded and the counties in the lowest 25% are the most shaded. Rankings for the individual health measures and other determinant components are not reported here, but are available at the Wisconsin Public Health and

**Table 1.** County Health Rankings for Summary Health Determinants and Outcomes\*

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

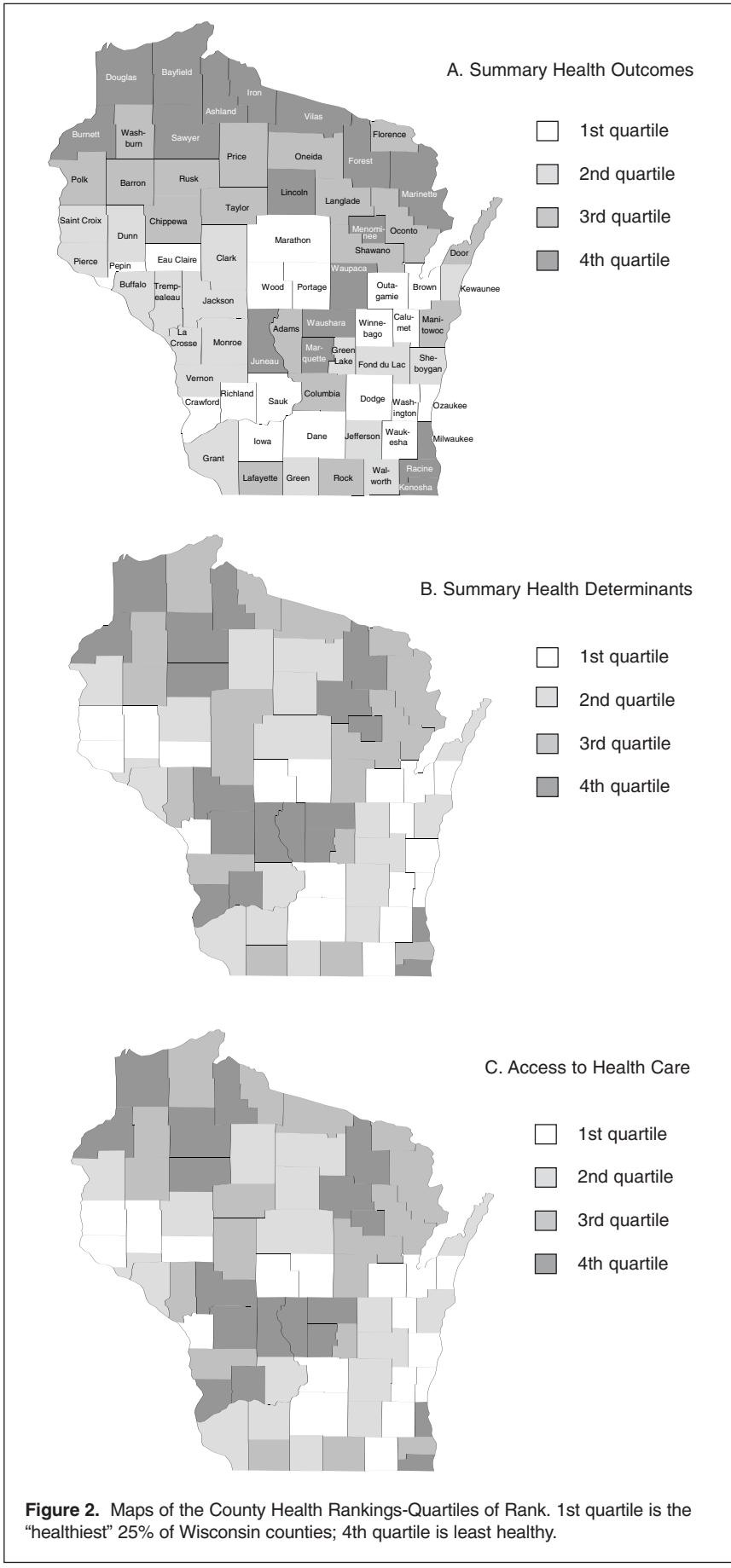
\* Higher ranks (e.g., 1,2,3) are “Healthier.”

Health Policy Institute Web site—[www.pophealth.wisc.edu/wphi/](http://www.pophealth.wisc.edu/wphi/).

Generally—but with an important exception—it can be seen that the higher population-density counties also tend to be “healthier” counties. For example, seven of the 10 most densely populated counties—Brown, Dane, Outagamie, Ozaukee, Washington, Waukesha, and Winnebago counties—are in the top half of both summary health determinants and outcomes rankings. Conversely, nine out of 10 of the least densely populated counties—Ashland, Bayfield, Burnett,

Florence, Forest, Iron, Menominee, Rusk, and Sawyer counties—are in the lower half of both health determinants and outcomes. The major exception to this pattern is the urban counties of southeast Wisconsin. Three of the four most dense counties—Kenosha, Milwaukee, and Racine—had lower health rankings.

The variation in the health measures underlying the health rankings is not small. For example, in Wisconsin, the average years of potential life lost prior to age 85 (the mortality component of “health



**Figure 2.** Maps of the County Health Rankings-Quartiles of Rank. 1st quartile is the “healthiest” 25% of Wisconsin counties; 4th quartile is least healthy.

outcomes”) was 10,683 per 100,000 population per year for the 1997-1999 time period (the most currently available data at the time the rankings were calculated). However, counties ranged from a low of 8132 years (Waukesha County) to a high of 23,500 years (Menominee County) of potential life lost. Large variation was also seen in lack of health insurance (1 of 4 measures combined into the “access to health care” component of health determinants): the Wisconsin average was 6.5%, but varied from a low of approximately 3% (Sheboygan County—i.e., 97% of adult were covered by some form of health insurance) to a high of 11% (Iron County).

**Discussion**

Built upon the concept of United Health Foundation’s State Health Rankings,<sup>2</sup> the Wisconsin Public Health and Health Policy Institute’s County Health Rankings demonstrate variation among Wisconsin’s counties in population health and its determinants. We hope that the County Health Rankings are effective in calling attention to and encouraging discussion about the variation in population health among Wisconsin communities. Perhaps, by doing so, this effort may provide an impetus to improve the basic socioeconomic and environmental factors that influence health behaviors and access to medical care, the quality of that medical care, and the ultimate production of desirable health outcomes—increased longevity and quality of life.

None of the health determinants used in the rankings are direct measures of the quality of medical care—the focus of this issue of the *Journal*. This is because no measures of medical care quality exist at the county level that might be used for valid comparisons among

Wisconsin counties. Access to medical care is a broad component of medical care quality, but even the measures of access (and most of the health determinant measures) used for the rankings have substantial limitations.

Several specific limitations will be addressed in the near-future editions of the rankings. First, the rankings are limited in geographic scope to counties—while this geopolitical level of reporting may be useful for observing large-scale patterns, it obscures important variations in population health for which county borders are irrelevant. Some counties, such as Milwaukee, have highly heterogeneous populations with regard to health and many other factors. We hope to examine sub-county population health data in the more populous Wisconsin counties in future reports. Second, one important aspect of population health that is not addressed in the current rankings is socioeconomic and racial-ethnic disparities in health. While it is unlikely that sufficient data will soon be available to examine health disparities in all health measures, we will attempt to incorporate a measure of racial disparities in mortality in future reports. Third, we will attempt to include more and better health measures in future reports. Fourth, we will work to improve the statistical methods used to estimate county-level health data—currently there are very few data available to estimate health determinants measures for many of the smaller-population counties. Fifth, we will refine the conceptual health determinants-outcomes model on which the rankings are based and improve the methods by which the variety of health measures used for the rankings are combined, summarized and ranked. Finally, we will work to improve our “population

health communication” strategies so that future rankings are optimally interpretable and useful. As we improve our rankings methods, we urge the public and private health sectors in Wisconsin to work together to develop better measures of health outcomes and determinants—including measures of health care access and quality—so that we can incorporate those improvements into future health ranking efforts.

We acknowledge that the ranking of counties can be controversial. We present these rankings in the spirit of encouraging improvement and discussion, not judgment. Every community has strengths and weaknesses; we hope that the higher ranked counties provide insights for improvement and that the lower ones might draw additional resources for improvement.

We welcome feedback regarding how we might improve this effort so that it is truly useful in helping make Wisconsin communities as healthy as they can be.

#### Acknowledgments

We acknowledge the Bureau of Health Information, Division of Health Care Financing, Wisconsin Department of Health and Family Services, which provided the Behavioral Risk Factor Survey, Family Health Survey, and other data used for this report and for the Wisconsin County Health Rankings—2003 Edition. We acknowledge Robert Stone-Newsom, Jane McElroy, Irene Golembiewski and Judy Knutson for providing support in the development and production of this report and the rankings. We acknowledge the management and staff of the Bureau of Health Information and members of the Wisconsin Public Health and Health Policy Institute Advisory Board for comments and suggestions.

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# Wisconsin Medical Journal

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