



# WISCONSIN COLLABORATIVE *for* HEALTHCARE QUALITY

## 2020

### Wisconsin Health Disparities Report: Rural and Urban Populations

In collaboration with:



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**Wisconsin Partnership Program**  
UNIVERSITY OF WISCONSIN  
SCHOOL OF MEDICINE AND PUBLIC HEALTH

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The following Wisconsin Collaborative for Healthcare Quality members contributed data to this report:

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### About the Wisconsin Collaborative for Healthcare Quality

WCHQ members include 35 health systems, 325 medical clinics, and more than 150 dentists. Members represent integrated health systems, medical clinics; small, rural hospitals; health plans; and two Federally Qualified Health Centers (FQHCs), and dental practices.

WCHQ members represent more than 65 percent of Wisconsin's primary care clinicians, including physicians, advanced practice providers and physician assistants.

Many health care-related stakeholders support WCHQ, including corporate sponsors, purchasers, policy and advocacy organizations, government agencies, research institutions and foundations.



# Executive Summary

The Wisconsin Collaborative for Healthcare Quality (WCHQ) and its member organizations developed the *2020 Wisconsin Health Disparities Report: Rural and Urban Populations*, to identify where disparities in health outcomes and care exist in rural and urban areas in order to inform and accelerate programs that are working to eliminate health care disparities.

A “health care disparity” typically refers to differences between groups in health insurance coverage, access to and use of care, and quality of care. Health and health care disparities often refer to differences that are not explained by variations in health needs, patient preferences, or treatment recommendations and are closely linked with social, economic, and/or environmental disadvantage.

The *2019 Wisconsin Health Disparities Report* was the first report of its kind that identified some of the disparities that exist in health outcomes and care in Wisconsin. One of the clearest determinants of health disparities is where people live; however the results presented in the 2019 report for rural/urban residence were limited due to the use of only two categories to describe rural and urban geographies. Not all urban and rural areas are the same, and this report expands the number of groups to three rural and three urban groups. By describing and narrowly defining each group, the findings present differences in the health of Wisconsin residents by ZIP codes and more accurately reflect the health care capacity, insured rate, education, economic status, and health status of that area.

Eliminating health disparities is a task that

cannot be done by health systems alone or accomplished in silos. This report can contribute to the identification of opportunities for health systems, health departments, policymakers, nonprofits, community organizations, researchers, and employers to develop collaborative approaches within their communities to address health care disparities related to where people live to create a healthier Wisconsin for all.

WCHQ is confident that identifying and publicly reporting these differences in Wisconsin will draw attention to and promote public accountability, improvement, and action by multiple stakeholders and policymakers.

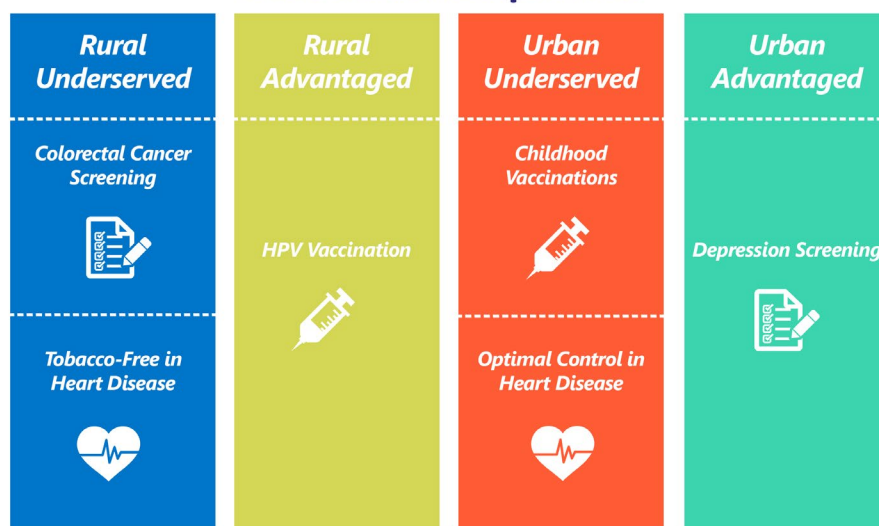
## Summary of Findings

Disparities across rural and urban ZIP codes can be attributed to a number of factors, including socioeconomic conditions, geography, health care access, utilization and cost, and the distribution of providers and health services. Using an established model, researchers at the UW-Madison distinguished the unique health-related characteristics of rural and urban ZIP codes across Wisconsin to identify important factors (e.g. health care providers, insurance status, poverty) that contribute to health. This resulted in six groups of rural and urban ZIP codes: rural underserved, rural, rural advantaged, urban underserved, urban, and urban advantaged. The characteristics of the six groups are described in the table below.

Group	Characteristics
Rural Underserved	The population living in these 95 ZIP codes have access to fewer health care providers and experiences higher rates of poverty, uninsured, and Medicaid. In addition, there is lower educational attainment and poorer health status.
Rural	The population living in these 233 ZIP codes have access to a moderate amount of health care providers and experiences moderate rates of poverty, uninsured and Medicaid. In addition, there is moderate educational attainment and moderate health status.
Rural Advantaged	The population living in these 172 ZIP codes have access to fewer health care providers, but have low rates of poverty, uninsured, and Medicaid. In addition, there are moderate rates of educational attainment and better health status.
Urban Underserved	The population living in these 23 ZIP codes have access to a moderate amount of health care providers and experiences higher rates of poverty, unemployment, uninsured, and Medicaid. In addition, there is lower educational attainment and poorer health status.
Urban	The population living in these 104 ZIP codes have access to fewer health care providers and experiences lower rates of poverty, uninsured, and Medicaid. In addition, there are moderate rates of educational attainment and moderate health status.
Urban Advantaged	The population living in these 65 ZIP codes have access to many providers and experiences lower rates of poverty, uninsured, and Medicaid. In addition, there is higher educational attainment and better health status.

Health outcome and care measures that have **substantial disparities in Wisconsin** are summarized here. *Substantial disparities* are defined as a rate that is at least 10% lower than the ZIP group with the highest rate. The rates for all ZIP groups are documented more extensively in this report, including the ZIP groups with the highest and lowest rates for each measure.

### Substantial Disparities\*



\*Substantial disparities were not found in the Rural and Urban ZIP code groups.

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# Introduction

Widespread disparities exist in health outcomes and care in Wisconsin. Although Wisconsin ranks high in overall health care quality nationally, the state performs poorly with respect to disparities and ensuring that care is provided to all people equally.<sup>1,2</sup> The *Health of Wisconsin Report Card*, published by the University of Wisconsin Population Health Institute in 2016, showed the state of Wisconsin had an overall health disparities grade of “D.”<sup>3</sup> The *2019 Wisconsin Health Disparities Report* identified substantial disparities in health outcome and care measures by race/ethnicity and payer. The report did not find substantial disparities by rural and urban residence (using the report definition of 10% or greater difference between population groups); however, these limited report findings were related to the use of only two groups to describe rural and urban geography.

This report expands on findings from the *2019 Wisconsin Health Disparities Report* and presents differences in the health of Wisconsin residents for six groups of ZIP codes that distinguish the unique health-related characteristics of rural and urban ZIP codes in Wisconsin. For this report, an in-depth exploration of rural and urban health-related characteristics was conducted to cluster ZIP codes into the six groups used in this report: rural underserved,

rural, rural advantaged, urban underserved, urban, and urban advantaged.

In the past, rural and urban definitions have been limited to broad descriptions that did not capture the difference between, for example, rural areas with few resources related to health and rural areas that are more affluent. That lack of specificity has hampered the creation or application of specific policies and programs that address a specific area of the state. This report uses a novel approach to defining rural and urban areas in Wisconsin by ZIP code.

The importance of using data to drive policy and practice is well understood by the Wisconsin Collaborative for Healthcare Quality (WCHQ). Since 2003, WCHQ has publicly reported quality information on behalf of its members that has informed and driven quality improvement across the state. Measurement has many applications in the clinic and hospital setting, but more recently it has been recognized as an essential tool for monitoring health disparities.<sup>4</sup> WCHQ and its member organizations developed the *2020 Wisconsin Health Disparities Report: Rural and Urban Populations* to identify where disparities exist in health outcomes and care in Wisconsin and to help inform and accelerate programs that are working to eliminate disparities.

Reducing health disparities is a statewide imperative. On March 19, 2019, Governor Tony Evers signed an Executive Order creating the Governor’s Health Equity Council and the first meeting of the Council was held September 30, 2020.<sup>5</sup> The goal of the Council is to develop a plan, supported by a body of research, with key benchmarks to reduce and eliminate health disparities throughout the state of Wisconsin by 2030. The plan will address health disparities in populations based on race, economic status, education level, history of incarceration and geographic location.<sup>6</sup>

## Scope

The goal of this report is to present recent Wisconsin data on disparities in health outcomes and care, comparing WCHQ performance measures among six groups of rural and urban ZIP codes categorized by health-related characteristics. This categorization represents differences in the health of Wisconsin residents using detailed groups that capture the unique health-related characteristics of rural and urban areas in Wisconsin (see: [Rural and Urban Health-Related Characteristics for Six Groups of ZIP Codes in Wisconsin](#)).

The report also includes potential barriers that may be contributing to disparities by rural and urban groups, as well as potential solutions for reducing disparities in these areas. While the potential solutions listed in this report are not exhaustive, they are intended to provide direction for stakeholders and policymakers across the state.

WCHQ is confident that by identifying and publicly reporting these differences, this report will draw attention to and promote public accountability, improvement, and action by multiple stakeholders. Information and tools to address disparities in health outcomes and care are provided in the [Resources](#) section of the report. WCHQ is incorporating disparities into all aspects of their quality improvement and measurement work to ensure health systems and medical clinics have access to the data they need to drive improvement.

## Definition of Health Disparities

A “health care disparity” typically refers to differences between groups in health insurance coverage, access to and use of care, and quality of care. Health and health care disparities often refer to differences that are not explained by variations in health needs, patient preferences, or treatment recommendations and are closely linked with social, economic, and/or

environmental disadvantage.<sup>7</sup>

For the purposes of this report, health disparities were defined as differences in health outcome and care measures adversely affecting population groups seen in primary care settings. Throughout this report, the following thresholds are used to describe the differences in rates between population groups:

- 0%-4% No difference between ZIP groups
- 5%-9% ZIP group has lower rates than the highest performing ZIP group, representing a gap or disparity
- ≥10% ZIP group has much lower rates than the highest performing ZIP group, representing a *substantial* gap or disparity

## Patient Population

WCHQ measures use a definition that limits the patient population to those individuals who are recently and regularly seen in the primary care setting by a health system. The individuals included in this report have had at least two visits in the primary care setting at a WCHQ member organization within the last two years. Individuals had at least one visit between January 1, 2018 and December 31, 2018.

## Health Disparities by Place

Disparities by rural and urban ZIP codes can be attributed to a number of factors, including: socioeconomic conditions, geography, health care access, utilization and cost, and the distribution of providers and health services.<sup>8,9</sup> Wisconsin has both rural and urban ZIP codes, with over two-thirds of the population living in urban areas.<sup>10</sup> Significant differences between rural and urban populations may be masked due to the use of broad definitions of “urban” and



“rural” settings. For example, a rural area may refer to a county with a city of 10,000 or more, or to a frontier area, which has an extremely low population density. Recognizing the distinctions between rural and urban areas will support the development of improvement strategies that are tailored to the unique needs of an area. In this report, rural and urban groups are characterized as below.

### Characterizing ZIP Codes

Using an established model, researchers at UW-Madison distinguished the unique health-related characteristics of rural and urban ZIP codes across Wisconsin to identify important factors (e.g. health care providers, insurance status, poverty) that contribute to health, resulting in six distinguished groups of rural and urban: rural underserved, rural, rural advantaged, urban underserved, urban, and urban advantaged.

For more information, see the [Detailed Methodology](#) section of the report. Rural and urban groupings for all ZIP codes in Wisconsin are available for download on HIPxChange at [www.hipxchange.org/RuralUrbanGroups](http://www.hipxchange.org/RuralUrbanGroups).

### Rural and Urban Health-Related Characteristics for Six Groups of ZIP Codes in Wisconsin

This report identifies six groups of rural and urban ZIP codes in Wisconsin that have different levels of health-related characteristics:

- rural underserved
- rural
- rural advantaged
- urban underserved
- urban
- urban advantaged

Group	Description	Example of Typical ZIP Code
<b>Rural Underserved</b>	The population living in these 95 ZIP codes has access to fewer health care providers and experiences higher rates of poverty, uninsured, and Medicaid. In addition, there is lower educational attainment and poorer health status.	<ul style="list-style-type: none"> <li>• 62 primary care providers per 100,000 (state average is 79 per 100,000)</li> <li>• Poverty rate of 16% (state average is 12%)</li> <li>• Medicaid rate of 16% (state average is 12%)</li> <li>• Uninsured rate of 15% (state average is 5.8%)</li> <li>• Percent of population with a bachelor's degree is 13% (state average is 30%)</li> <li>• 3.7 physically and mentally unhealthy days per month (state average is 3.5)</li> </ul>
<b>Rural</b>	The population living in these 233 ZIP codes has access to a moderate amount of health care providers and experiences moderate rates of poverty, uninsured and Medicaid. In addition, there are moderate rates of educational attainment and moderate health status.	<ul style="list-style-type: none"> <li>• 72 primary care providers per 100,000 (state average is 79 per 100,000)</li> <li>• Poverty rate of 11% (state average is 12%)</li> <li>• Medicaid rate of 12% (state average is 12%)</li> <li>• Uninsured rate of 6% (state average is 5.8%)</li> <li>• Percent of population with a bachelor's degree is 20% (state average is 30%)</li> <li>• 3.5 physically and mentally unhealthy days per month (state average is 3.5)</li> </ul>



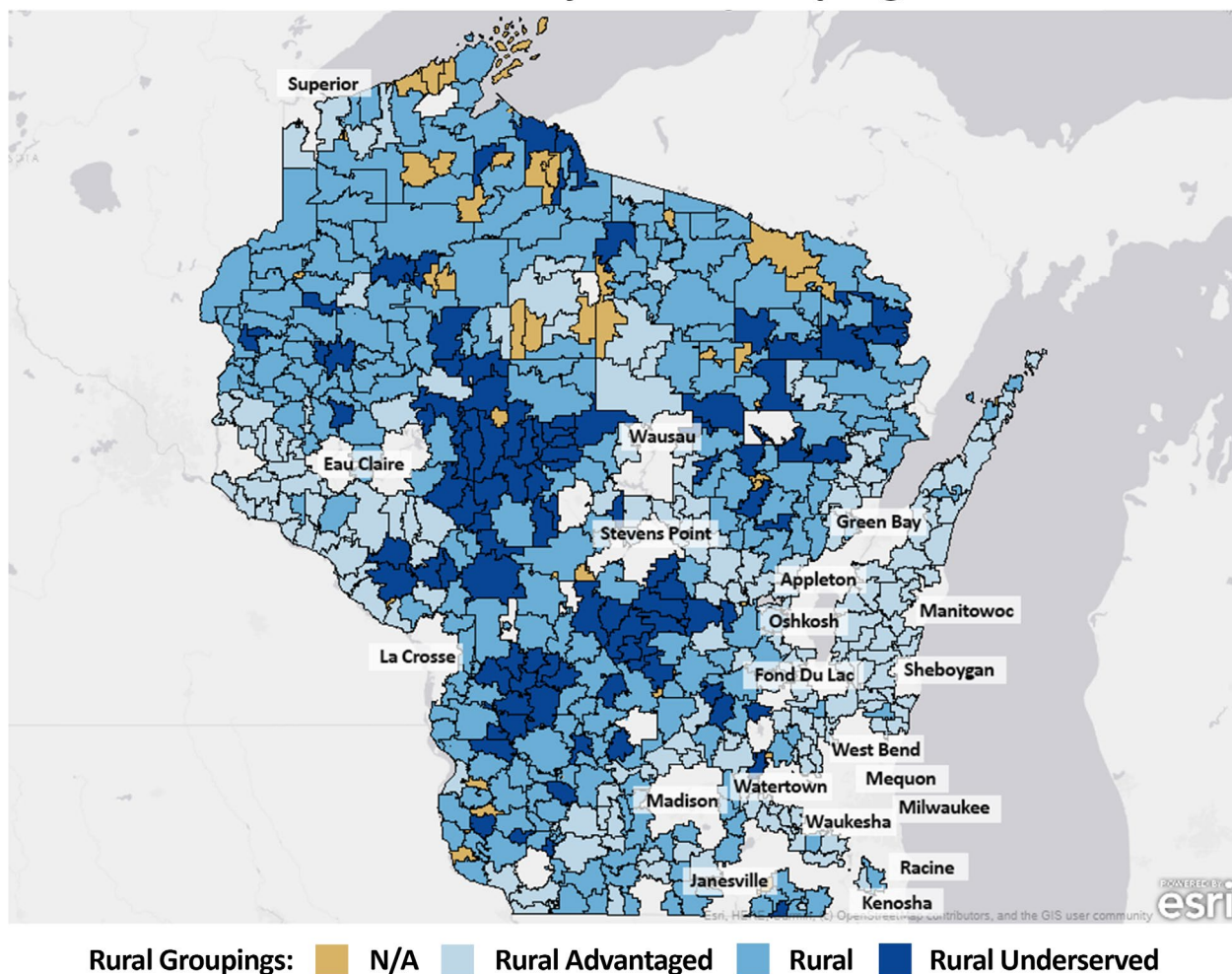
Group	Description	Example of Typical ZIP Code
<b>Rural Advantaged</b>	The population living in these 172 ZIP codes has access to fewer health care providers, but has low rates of poverty, uninsured, and Medicaid. In addition, there are moderate rates of educational attainment and better health status.	<ul style="list-style-type: none"> <li>• 55 primary care providers per 100,000 (state average is 79 per 100,000)</li> <li>• Poverty rate of 6% (state average is 12%)</li> <li>• Medicaid rate of 7% (state average is 12%)</li> <li>• Uninsured rate of 4% (state average is 5.8%)</li> <li>• Percent of population with a bachelor's degree is 23% (state average is 30%)</li> <li>• 3.3 physically and mentally unhealthy days per month (state average is 3.5)</li> </ul>
<b>Urban Underserved</b>	The population living in these 23 ZIP codes has access to a moderate amount of health care providers and experiences higher rates of poverty, unemployment, uninsured, and Medicaid. In addition, there are lower rates of educational attainment and poorer health status.	<ul style="list-style-type: none"> <li>• 70 primary care providers per 100,000 (state average is 79 per 100,000)</li> <li>• Poverty rate of 28% (state average is 12%)</li> <li>• Medicaid rate of 29% (state average is 12%)</li> <li>• Uninsured rate of 10% (state average is 5.8%)</li> <li>• Percent of population with a bachelor's degree is 19% (state average is 30%)</li> <li>• 4.0 physically and mentally unhealthy days per month (state average is 3.5)</li> </ul>
<b>Urban</b>	The population living in these 104 ZIP codes has access to fewer health care providers and experiences lower rates of poverty, uninsured, and Medicaid. In addition, there are moderate rates of educational attainment and moderate health status.	<ul style="list-style-type: none"> <li>• 62 primary care providers per 100,000 (state average is 79 per 100,000)</li> <li>• Poverty rate of 10% (state average is 12%)</li> <li>• Medicaid rate of 9% (state average is 12%)</li> <li>• Uninsured rate of 5% (state average is 5.8%)</li> <li>• Percent of population with a bachelor's degree is 30% (state average is 30%)</li> <li>• 3.5 physically and mentally unhealthy days per month (state average is 3.5)</li> </ul>
<b>Urban Advantaged</b>	The population living in these 65 ZIP codes has access to many providers and experiences lower rates of poverty, uninsured, and Medicaid. In addition, there is higher educational attainment and better health status.	<ul style="list-style-type: none"> <li>• 130 primary care providers per 100,000 (state average is 79 per 100,000)</li> <li>• Poverty rate of 9% (state average is 12%)</li> <li>• Medicaid rate of 6% (state average is 12%)</li> <li>• Uninsured rate of 3% (state average is 5.8%)</li> <li>• Percent of population with a bachelor's degree is 46% (state average is 30%)</li> <li>• 3.2 physically and mentally unhealthy days per month (state average is 3.5)</li> </ul>

## Rural Health-Related Characteristics by ZIP Code

Rural areas in Wisconsin contain about one-third of the population of the state but make up more than 96% of the land area.<sup>11</sup> The map below displays rural ZIP codes in the state according to health-related characteristics. ZIP codes labeled as “N/A” are either non-residential (e.g. only P.O. Box or commercial organization addresses) or have populations with less than 500 people.

- 95 ZIP codes categorized as Rural Underserved,
- 233 ZIP codes as Rural, and
- 172 ZIP codes as Rural Advantaged.

### ZIP Codes by Rural Groupings

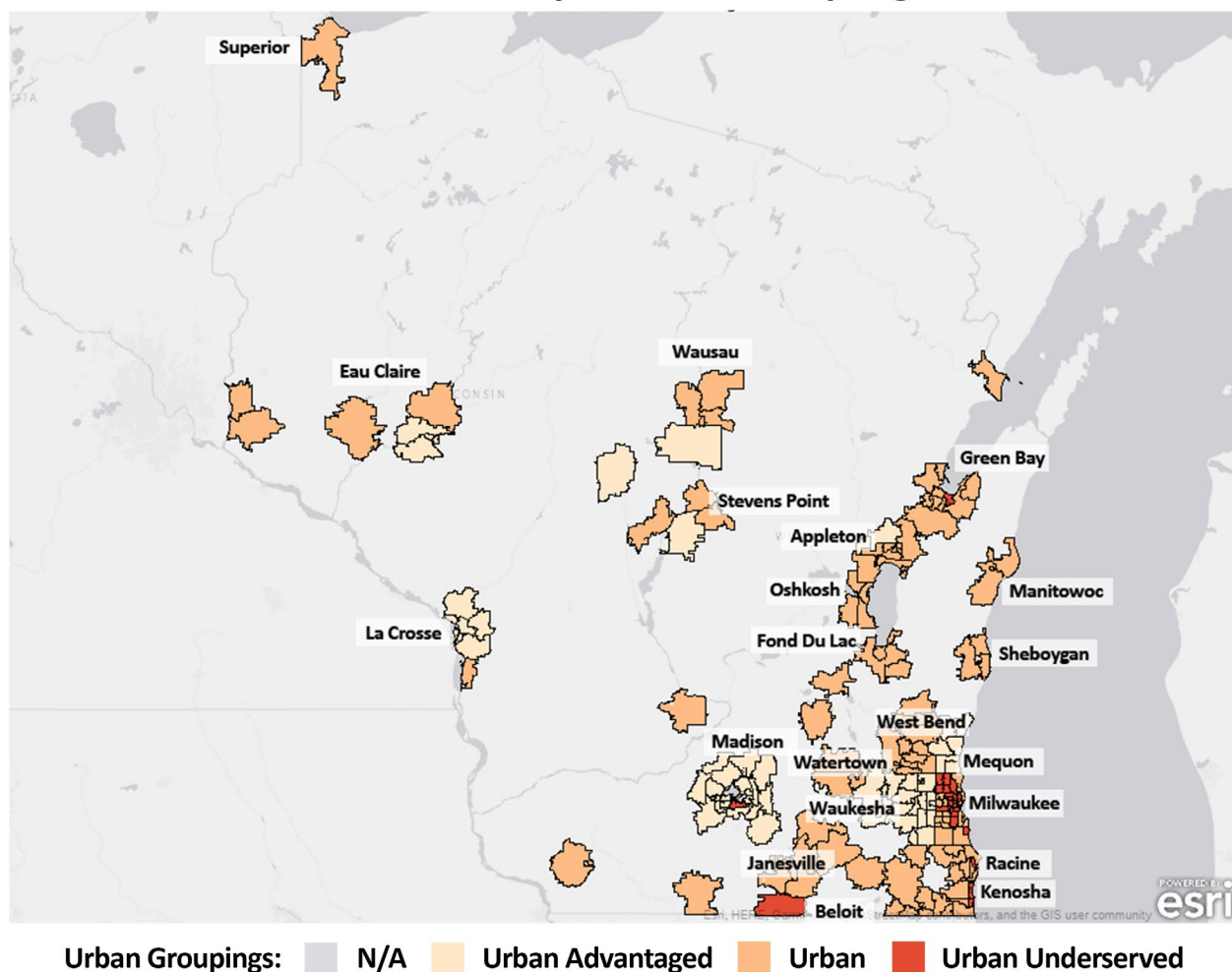


## Urban Health-Related Characteristics by ZIP Code

Urban areas in Wisconsin contain about two-thirds of the state's population, with more than one-third of the state's total population residing in Milwaukee, Dane, Waukesha, and Brown counties.<sup>10,11</sup> The map below displays urban ZIP codes in the state differentiated by health-related characteristics. ZIP codes labeled as "N/A" are either non-residential (e.g. only P.O. Box or commercial organization addresses) or have populations with less than 500 people.

- 23 ZIP codes were categorized as Urban Underserved,
- 104 ZIP codes as Urban, and,
- 65 ZIP codes as Urban Advantaged.

## ZIP Codes by Urban Groupings

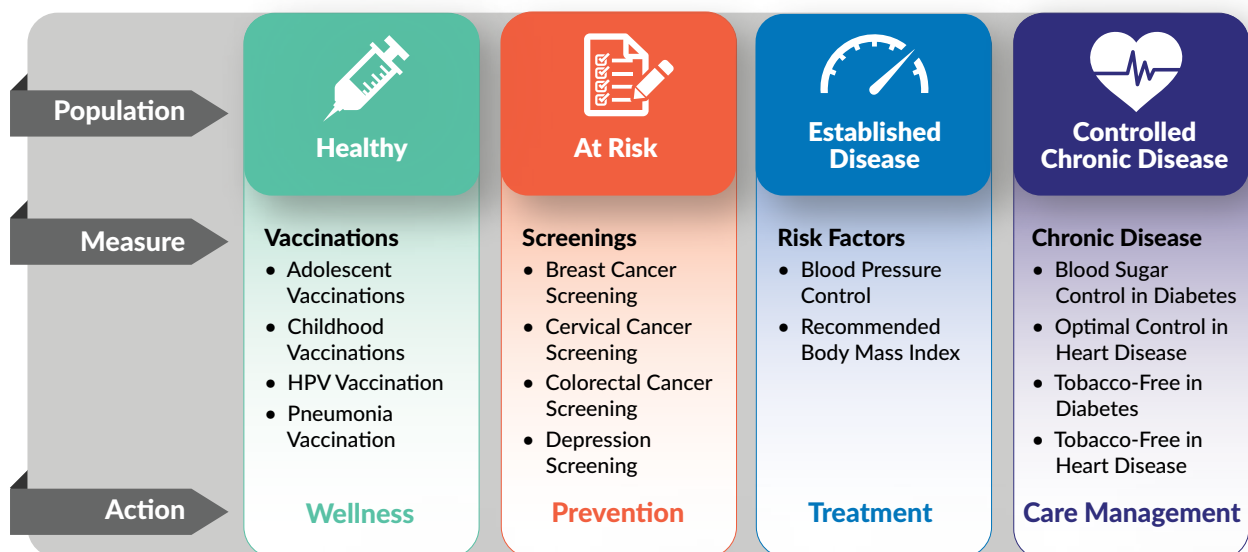


## Model

The measures selected for this report are based on an adaptation of the Chronic Disease Prevention and Management Continuum model.<sup>12</sup> The model shows population health at four stages: (1) healthy, (2) at-risk, (3) established disease, and (4) controlled chronic disease. The model orients users toward actions to prevent populations from moving or progressing from one health state to the next. WCHQ metrics included four specific types of measures (i.e. vaccinations, screenings, risk factors and chronic disease) that represented each stage of population health.

1. **Vaccinations:** These measures keep individuals well by preventing disease.
2. **Screenings:** These measures assess and reduce the risk for diseases and conditions or detect disease at an early stage when treatment is most likely to be effective.
3. **Risk Factors:** These measures monitor established conditions that are also risk factors for subsequent chronic diseases.
4. **Chronic Disease:** These measures monitor specific chronic diseases (e.g., diabetes, heart disease) to reduce complications and disability and improve health outcomes.

### Chronic Disease Prevention and Management Continuum



## Summary of Findings

### Rural and Urban Disparities

In Wisconsin, this report found that rural underserved populations had much lower rates of colorectal cancer screening and tobacco-free in heart disease. Rural advantaged populations had much lower rates of HPV vaccination.

Urban underserved populations had much lower rates of childhood vaccinations and optimal control in heart disease. Finally, urban advantaged had much lower rates of depression screening.

## Substantial Disparities in Wisconsin by Rural and Urban Groups

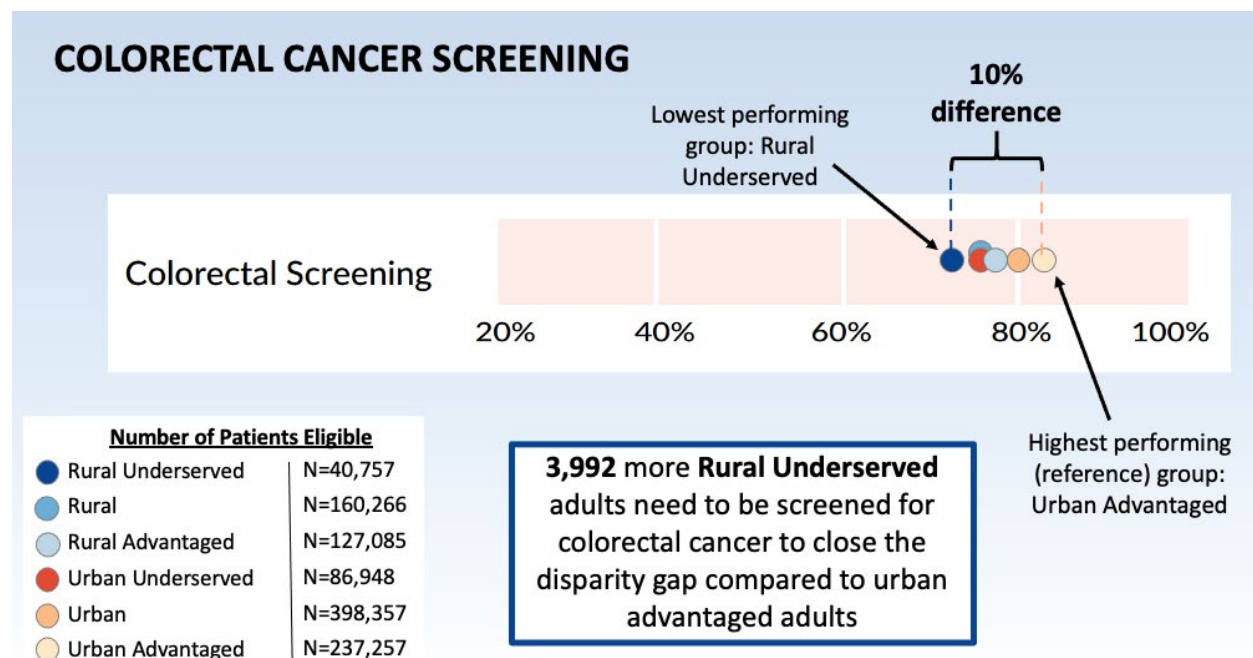
	Rural Underserved	Rural	Rural Advantaged	Urban Underserved	Urban	Urban Advantaged
Childhood Vaccinations				12% ↓		●
HPV Vaccination			10% ↓			●
Colorectal Cancer Screening	10% ↓					●
Depression Screening	●				●	12% ↓
Optimal Control in Heart Disease				11% ↓		●
Tobacco-Free in Heart Disease	10% ↓					●

● = Highest performing reference group(s) for the measure

### Number Needed to Close the Disparity Gap

The number of additional people who would need to meet the measure to close the disparity gap, using the highest performing ZIP group as a reference point, was calculated. Identifying these gaps are a starting point for understanding inequities in health care and outcomes and designing efforts to reduce these gaps across populations who receive health care regularly. For example, to close the gap in

colorectal cancer screening (see figure below) 3,992 more rural underserved adults would need to be screened to close the disparity gap compared to urban advantaged adults. The number of people who would need to meet the measure rate of the highest performing ZIP group to close the disparities gap to zero is included in the results sections of this report for every measure.





# Vaccinations

## Introduction

Many diseases that were once common and deadly can be prevented by vaccination. When individuals are not vaccinated, they are at risk of getting sick from a preventable disease and passing it on to others who may lack immunity for that disease. Many insurers cover the cost of most vaccinations. To reduce disparities, other barriers to vaccination, in addition to cost, should be addressed. This includes access to health insurance, reliable transportation and/or general awareness and education.

This section focuses on adolescent vaccinations, childhood vaccinations, HPV vaccination, and pneumonia vaccination.

**Adolescent Vaccinations:** The CDC recommends that adolescents receive vaccinations against meningitis, tetanus, diphtheria and pertussis by age 13.<sup>13</sup> Ensuring the proper vaccination of adolescents contains the transmission of infectious diseases that have become much less common in the United States.<sup>14</sup>

**Childhood Vaccinations:** In the first two years of life, the CDC recommends that children receive a series of vaccinations to protect them against infectious diseases such as polio, measles, and pertussis.<sup>15</sup> High rates of childhood vaccinations prevent the resurgence of infectious diseases, such as polio, that have been virtually eradicated in the United States.<sup>14</sup>

**Human Papillomavirus (HPV) Vaccination:** The HPV vaccine prevents cancer-causing infections and precancers. It has resulted in a significant drop in HPV infections and cervical precancers since it came into use.<sup>16</sup>

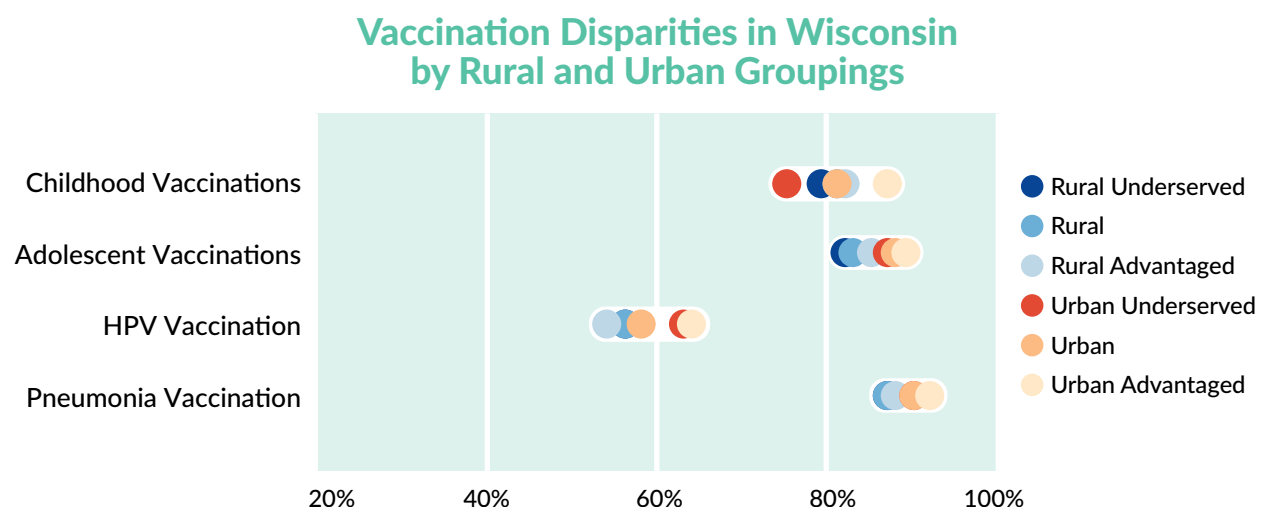
**Pneumonia Vaccination:** The CDC recommends that adults aged 65 years or older receive one dose of a pneumonia vaccination to protect against bacteria that cause pneumonia, bacteremia and meningitis.<sup>17</sup> The risks for complications, hospitalizations and death from pneumonia are higher among persons aged >65 years and the risk of getting pneumococcal disease doubles after age 60.<sup>18</sup>

## WCHQ Measure Definitions: Vaccinations

Adolescent Vaccinations	The percentage of adolescents age 13 who have had each of the following immunizations: One dose of meningococcal vaccine on or between the 11th and 13th birthdays AND One tetanus, diphtheria toxoids and acellular pertussis vaccine (Tdap) on or between the 10th and 13th birthdays.
Childhood Vaccinations	This measure calculates completion of the Primary Childhood Series for children age two who have had each of the following immunizations on or before their second birthday: Four Diphtheria Tetanus and Acellular Pertussis (DTaP), Three Polio (IPV), One Measles, Mumps and Rubella (MMR), Three H influenza Type B (HiB), Three Hepatitis B (Hep B), One Chicken Pox/Varicella (VZV), Four Pneumococcal Conjugate (PCV).
HPV Vaccination	The percentage of adolescents age 15 who have had two or three doses of the human papillomavirus (HPV) vaccine by their 15th birthday.
Pneumonia Vaccination	The percentage of adults greater than or equal to 65 years who had a Pneumococcal Vaccination.

## Results

- The *adolescent vaccination* rate was lower for rural underserved and rural populations. To close the disparity gap to zero, 73 rural underserved adolescents and 234 rural adolescents would need to be vaccinated to achieve the vaccination rate of urban advantaged adolescents.
- The *childhood vaccination* rate was much lower for urban underserved populations. The *childhood vaccination* rate was lower for rural underserved, rural, rural advantaged, and urban populations. To close the disparity gap to zero for these groups, 374 urban underserved children, 138 rural underserved children, 323 rural children, 189 rural advantaged children, and 833 urban children would need to be vaccinated to achieve the vaccination rate of urban advantaged children.
- The *HPV vaccination* rate was much lower for rural advantaged populations. The *HPV vaccination* rate was lower for rural underserved, rural, and urban populations. To close the disparity gap to zero for these groups, 283 rural advantaged adolescents, 80 rural underserved adolescents, 294 rural adolescents, and 539 urban adolescents would need to be vaccinated to achieve the vaccination rate of urban advantaged adolescents.
- The *pneumonia vaccination* rate was lower for rural underserved and rural populations. To close the disparity gap to zero for these groups, 1,439 rural underserved adults and 4,691 rural adults would need to be vaccinated to achieve the vaccination rate of urban advantaged adults.





Measure		Rural Underserved	Rural	Rural Advantaged	Urban Underserved	Urban	Urban Advantaged
Adolescent Vaccinations	Measure Performance	82%	83%	85%	87%	88%	89%
	Patients Eligible	1,020	3,858	2,841	1,576	9,873	5,952
	# to close disparity gap	73	234	104	37	64	.
Childhood Vaccinations	Measure Performance	79%	81%	82%	75%	81%	87%
	Patients Eligible	1,667	5,195	4,053	3,172	14,715	8,176
	# to close disparity gap	138	323	189	374	833	.
HPV Vaccination	Measure Performance	56%	56%	54%	63%	58%	64%
	Patients Eligible	1,006	3,733	2,856	1,630	9,714	6,081
	# to close disparity gap	80	294	283	12	539	.
Pneumonia Vaccination	Measure Performance	87%	87%	88%	90%	90%	92%
	Patients Eligible	25,520	95,239	66,690	46,167	224,868	144,566
	# to close disparity gap	1,439	4,691	2,781	1,213	4,150	.

# Screenings

## Introduction

The goal of preventive health screenings is to improve health outcomes by assessing and reducing the risk for diseases and conditions, or to detect disease at an early stage when treatment is most effective. Preventive services are often cost effective and provide better value per dollar than waiting to treat diseases.<sup>19</sup>

Nearly all people are eligible for preventive screenings,<sup>20</sup> but Americans use preventive services at about half the recommended rate.<sup>21</sup> Nationally, there are differences in who has access to and who utilizes preventive services. To reduce disparities, barriers to screenings in addition to access and utilization must be addressed. This includes access to reliable transportation and general awareness and education for both providers and patients.

This section focuses on breast cancer screening, cervical cancer screening, colorectal cancer screening, and depression screening.

**Breast Cancer Screening:** In Wisconsin, there are an average of 767 deaths from breast cancer annually.<sup>22</sup> Breast cancer screening has

been shown to reduce deaths by detecting breast cancer at an early stage when treatment is more effective.

**Cervical Cancer Screening:** In Wisconsin in 2015, 214 women were diagnosed with cervical cancer, with 51% of cancers diagnosed at an early stage.<sup>23</sup> Cervical cancer screening has been effective in reducing cervical cancer incidence and death by more than 60% since its introduction in the 1950's due to early detection.<sup>24</sup>

**Colorectal Cancer Screening:** In Wisconsin, colorectal cancer is the second leading cause of cancer-related death for males and females combined.<sup>25</sup> Colorectal cancer screening reduces mortality by both detecting the cancer early, when treatments are more effective, and by removing precancerous polyps.

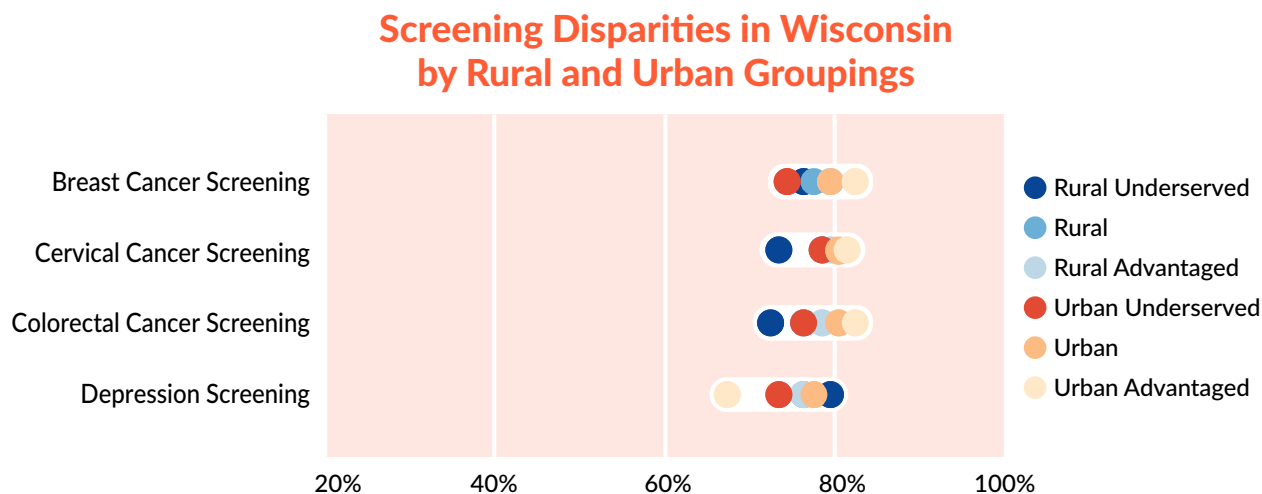
**Depression Screening:** In Wisconsin, clinical depression is a common medical illness that affects one fifth of Wisconsin residents.<sup>26</sup> Depression screening is important for detecting, diagnosing and treating depression.

## WCHQ Measure Definitions: Screenings

Breast Cancer Screening	The percentage of women age 50 through 74 who had a minimum of one breast cancer screening test during the two-year measurement period.
Cervical Cancer Screening	The percentage of women age 21 through 29 who have had a minimum of one cervical cancer screening (cytology) test performed during the three year measurement period AND the percentage of women age 30 through 64 who have had a minimum of one cervical cancer screening (cytology) test performed during the three year measurement period or one screening cytology test and a human papillomavirus (HPV) test (co-tests) or a stand-alone HPV test within the last five years (three year measurement period plus two years).
Colorectal Cancer Screening	The percentage of adults age 50 through 75 who had received a screening for colorectal cancer. This could include a colonoscopy in the past ten years, a CT colonography or flexible sigmoidoscopy in the past five years, or a stool test in the past year.
Depression Screening	The percentage of patients aged 12 years and older screened for clinical depression at any time during the measurement period using an age appropriate standardized depression screening tool.

## Results

- The *breast cancer screening* rate was lower for rural underserved, rural, and urban underserved populations. To close the disparity gap to zero for these groups, 1,171 rural underserved women, 3,354 rural women, and 4,042 urban underserved women would need to be screened to achieve the screening rate of urban advantaged women.
- The *cervical cancer screening* rate was lower for rural underserved populations. To close the disparity gap to zero for this group, 1,797 women would need to be screened to achieve the screening rate of urban advantaged women.
- The *colorectal cancer screening* rate was much lower for rural underserved
- populations. The *colorectal cancer screening* rate was lower for rural and urban underserved populations. To close the disparity gap to zero for these groups, 3,991 rural underserved adults, 9,772 rural adults, and 4,888 urban underserved adults would need to be screened to achieve the screening rate of urban advantaged adults.
- The *depression screening* rate was much lower for urban advantaged populations. The depression screening rate was lower for urban underserved populations. To close the disparity gap to zero for these groups, 33,392 urban advantaged adolescents and adults and 7,013 urban underserved adolescents and adults would need to be screened to achieve the screening rate of rural underserved adolescents and adults.



Measure		Rural Underserved	Rural	Rural Advantaged	Urban Underserved	Urban	Urban Advantaged
Breast Cancer Screening	Measure Performance	76%	77%	79%	74%	79%	82%
	Patients Eligible	19,957	79,091	61,007	51,084	203,940	118,278
	# to close disparity gap	1,171	3,354	1,764	4,042	4,845	.
Cervical Cancer Screening	Measure Performance	73%	78%	79%	78%	80%	81%
	Patients Eligible	23,159	93,530	74,363	77,520	290,488	172,267
	# to close disparity gap	1,797	3,358	1,433	2,316	2,283	.
Colorectal Cancer Screening	Measure Performance	72%	76%	78%	76%	80%	82%
	Patients Eligible	40,757	160,266	127,085	86,948	398,357	237,257
	# to close disparity gap	3,991	9,772	5,085	4,888	10,356	.
Depression Screening	Measure Performance	79%	76%	76%	73%	77%	67%
	Patients Eligible	44,208	167,595	125,736	105,381	442,629	277,279
	# to close disparity gap	.	5,902	4,157	7,013	9,122	33,392

# Risk Factors for Chronic Disease

## Introduction

Obesity and high blood pressure are common risk factors for other chronic diseases such as diabetes, stroke, cancer and heart disease. Measuring and monitoring weight and blood pressure are important strategies for improving long-term health outcomes.

This section focuses on recommended body mass index and blood pressure control.

**Recommended Body Mass Index:** Obesity has reached epidemic levels in Wisconsin, with nearly half of Wisconsin residents meeting

the definition of obesity.<sup>27</sup> Body mass index (BMI) is an important screening tool for weight categories that are associated with other health problems. If an adult has a BMI within the normal parameters, they are considered to have recommended BMI.

**Blood Pressure Control:** In 2017, heart disease was the leading cause of death in Wisconsin. Hypertension (high blood pressure) is a precursor to heart disease that impacts approximately 1.3 million adults statewide.<sup>28</sup>

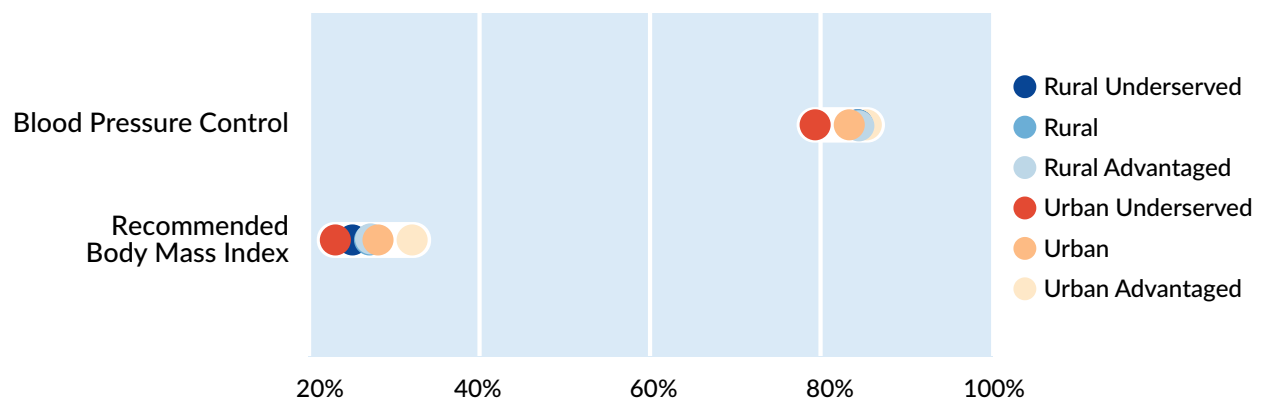
### WCHQ Measure Definitions: Risk Factors for Chronic Disease

Blood Pressure Control	The percentage of essential hypertension patients 18 through 85 years of age who had the following during the 12-month measurement period: A Representative Blood Pressure (BP) in control during the 12-month measurement period. Adequate Control is defined as follows: Less than 140/90 for patients less than 60 years of age or patients of any age with a diagnosis of diabetes and/or chronic kidney disease OR less than 150/90 for patients 60 years of age and older without diabetes or chronic kidney disease.
Recommended Body Mass Index	The percentage of patients aged 18 years through 85 years of age who had the following during the 12-month measurement period: At least one Body Mass Index (BMI) test annually. Most recent BMI measurement based on the following Normal Parameters: 18-64 years BMI $\geq 18.5$ and $< 25$ ; 65 years and older BMI $\geq 23$ and $< 30$ .

## Results

- The *blood pressure control* rate was lower for urban underserved populations. To close the disparity gap to zero for this group, 3,289 urban underserved adults would need to have blood pressure control to achieve the control rate of urban advantaged adults.
- The attainment of *recommended body mass index* was lower for rural underserved, rural, rural advantaged, and urban underserved populations. To close the disparity gap to zero for these groups, 4,511 rural underserved adults, 12,986 rural adults, 10,098 rural advantaged adults, and 13,455 urban underserved adults would need to have recommended body mass index to achieve the rate of urban advantaged adults.

### Risk Factor Disparities in Wisconsin by Rural and Urban Groupings



Measure		Rural Underserved	Rural	Rural Advantaged	Urban Underserved	Urban	Urban Advantaged
Blood Pressure Control	Measure Performance	84%	84%	84%	79%	83%	85%
	Patients Eligible	22,904	84,633	66,236	60,137	227,696	113,462
	# to close disparity gap	179	644	631	3,289	3,630	.
Recommended Body Mass Index	Measure Performance	25%	27%	27%	23%	28%	32%
	Patients Eligible	62,830	244,876	184,926	151,805	646,388	392,990
	# to close disparity gap	4,511	12,986	10,098	13,455	25,354	.

# Chronic Disease Management



## Introduction

Sixty percent of Americans live with at least one chronic disease, such as diabetes, heart disease or cancer. Over 90 percent of the nation's \$3 trillion in annual health care expenditures are attributed to people with chronic health conditions.<sup>29</sup> Therefore, caring for these high-need, high-cost individuals is an urgent priority.

Managing populations with chronic conditions can reduce complications and disability and improve health outcomes. Nationally, there are differences in which populations are more likely to live with a chronic condition and in how these chronic conditions are managed. To reduce disparities, other barriers to chronic disease management must be addressed. This includes access to health insurance and lower cost health care, reliable transportation, community-based self-management programs, and general awareness and education.

This section focuses on the following measures: blood sugar control in diabetes, optimal control in heart disease, tobacco-free in diabetes, and tobacco-free in heart disease.

**Blood Sugar Control in Diabetes:** In Wisconsin, approximately 356,000 adults have been diagnosed with diabetes.<sup>30</sup> The blood sugar control measure provides information on a patient's average level of blood sugar over the past three months to monitor diabetes and see if they are meeting treatment goals.<sup>31</sup>

Frequently monitoring a patient's blood sugar correlates with decreased incidence of diabetic complications.

**Optimal Control in Heart Disease:** Heart disease is the leading cause of death among men and women of all racial and ethnic groups in Wisconsin, resulting in over 11,000 deaths per year. Heart disease can be controlled through management of blood pressure, weight, cholesterol and tobacco use and by increasing physical activity and a nutritious diet. Cardiovascular disease is the most expensive chronic disease in Wisconsin, with an estimated \$7.9 billion in costs in 2017.<sup>32</sup>

**Tobacco-Free in Diabetes:** People with diabetes who smoke are more likely than non-smokers to have trouble with controlling their disease and are more likely to have serious health problems from diabetes.<sup>33</sup> Advising individuals to not smoke or use tobacco products and to encourage smoking cessation counseling is an important component of diabetes care.

**Tobacco-Free in Heart Disease:** Nationally, smoking causes one out of every three deaths from cardiovascular disease.<sup>34</sup> Similar to diabetes, advising individuals to not smoke or use tobacco products and to encourage smoking cessation counseling is an important component of heart disease care.



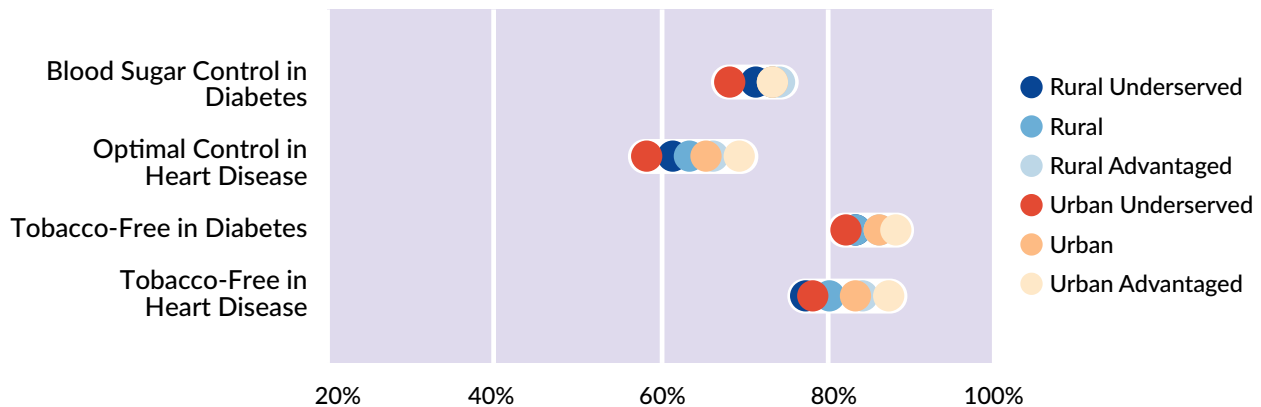
## WCHQ Measure Definitions: Chronic Disease Management

Blood Sugar Control in Diabetes	The percentage of patients with diabetes 18 through 75 years of age who had the following during the 12-month measurement period: Most recent A1c blood sugar level controlled to less than 8.0%.
Optimal Control in Heart Disease	The percentage of patients with IVD who meet all of the following conditions: most recent blood pressure measurement is less than 140/90 mmHg AND most recent tobacco status is Tobacco Free AND daily aspirin or other antiplatelet AND statin use.
Tobacco-Free in Diabetes	The percentage of patients with diabetes 18 through 75 years of age who had the following during the 12-month measurement period: Most recent Tobacco Status is Tobacco-Free.
Tobacco-Free in Heart Disease	The percentage of patients age 18 through 75 with one of the following conditions: 1) Two diagnoses related visits with Coronary Artery Disease (CAD) or a CAD risk-equivalent condition, or 2) Acute Coronary Event consisting of an acute myocardial infarction (AMI), coronary artery bypass graft (CABG), or percutaneous coronary intervention (PCI) from a hospital visit, who had each of the following during the one year measurement year: Most recent Tobacco Status is Tobacco-Free.

## Results

- The *blood sugar control in diabetes* rate was lower for urban underserved populations. To close the disparity gap to zero for this group, 1,398 urban underserved adults with diabetes would need to have blood sugar control to achieve the control rate of rural advantaged adults.
- The *optimal control in heart disease* rate was much lower for urban underserved populations. The *optimal control in heart disease* rate was lower for rural underserved and rural populations. To close the disparity gap to zero for these groups, 927 urban underserved adults, 286 rural underserved adults, and 782 rural adults with heart disease would need optimal control to achieve the control rate of urban advantaged adults.
- The *tobacco-free in diabetes* rate was lower for rural underserved, rural, and urban underserved populations. To close the disparity gap to zero for these groups, 411 rural underserved adults, 1,292 rural adults, and 1,356 urban underserved adults with diabetes would need to be tobacco-free to achieve the tobacco-free rate of urban advantaged adults.
- The *tobacco-free in heart disease* rate was much lower for rural underserved populations. The *tobacco-free in heart disease* rate was lower for rural populations. To close the disparity gap to zero, 332 rural underserved adults and 821 rural adults with heart disease would need to be tobacco-free to achieve the tobacco-free rate of urban advantaged adults.

## Chronic Disease Disparities in Wisconsin by Rural and Urban Groupings



Measure		Rural Underserved	Rural	Rural Advantaged	Urban Underserved	Urban	Urban Advantaged
Blood Sugar Control in Diabetes	Measure Performance	71%	73%	74%	68%	73%	73%
	Patients Eligible	8,825	30,814	22,744	22,870	74,318	37,368
	# to close disparity gap	302	433	.	1,398	612	390
Optimal Control in Heart Disease	Measure Performance	61%	63%	66%	58%	65%	69%
	Patients Eligible	3,546	12,557	8,953	8,108	31,517	16,111
	# to close disparity gap	286	782	305	927	1,429	.
Tobacco-Free in Diabetes	Measure Performance	83%	83%	86%	82%	86%	88%
	Patients Eligible	7,702	26,430	19,012	22,853	65,030	36,780
	# to close disparity gap	411	1,292	436	1,356	1,394	.
Tobacco-Free in Heart Disease	Measure Performance	77%	80%	84%	78%	83%	87%
	Patients Eligible	3,546	12,557	8,953	8,108	31,517	16,111
	# to close disparity gap	332	821	233	752	1,098	.

# Challenges and Opportunities

The goal of the 2020 *Wisconsin Health Disparities Report: Rural and Urban Populations* is to provide baseline information on disparities in health outcomes and care within Wisconsin to better understand the relationship between place of residence and health. This report can contribute to the identification of opportunities for health systems, health departments, policymakers, non-profits, researchers, and employers to develop collaborative approaches within their communities to create a healthier Wisconsin for all.

Those in *rural underserved areas* experienced substantial disparities in colorectal cancer screening and tobacco-free in heart disease. Those in *urban underserved areas* experienced substantial disparities in childhood vaccinations and optimal control in heart disease. *Rural advantaged areas* experienced substantial disparities in HPV vaccination. *Urban advantaged areas* experienced substantial disparities in depression screening.

In the spirit of beginning to identify strategies to redress these disparities, we conclude the report by highlighting some barriers that may be contributing to the current state, as well as potential solutions for reducing the disparities gaps in these areas.

## Colorectal Cancer Screening

Barriers that may exist for colorectal cancer screening in rural underserved populations include limited availability of providers, fewer provider recommendations to obtain screening, lack of insurance coverage and cost, long distances and limited transportation to health care facilities, as well as a lack of prevention

attitudes toward cancer.<sup>35, 36, 37,38</sup> Focused efforts to increase colorectal cancer screening in patients who live in rural underserved areas may include supporting screening recommendations and improving patient access to screenings.

## Tobacco-Free Status

Barriers that may exist for tobacco-free status in heart disease in rural underserved populations include limited access to tobacco cessation services (e.g. medication), services not customized to rural settings, and lack of infrastructure (e.g. limited availability of population health interventions).<sup>39,40,41</sup> Focused efforts to increase tobacco-free status in heart disease in patients living in rural underserved areas may include promotion and delivery of cessation services in health care and community settings, promoting and expanding quitlines, implementation of telephone and web-based programs, as well as developing and adapting existing tobacco-cessation services to rural settings.<sup>41</sup>

## Childhood Vaccinations

Barriers that may exist for childhood vaccinations in urban underserved populations include limited knowledge and/or perception of the benefits of vaccination, limited availability or high cost of transportation to a clinic, and scheduling challenges.<sup>42,43</sup> Focused efforts to increase childhood vaccinations in patients who live in urban underserved areas may include implementing strategies to communicate more effectively with parents, modifying clinic hours, and supporting the incorporation of vaccination

programs into non-traditional spaces, such as schools.<sup>44</sup>

## Heart Disease

Barriers that may exist for optimal control in heart disease in urban underserved populations include low socioeconomic status, missed opportunities in the community to aggressively target traditional cardiovascular risk factors (e.g. obesity, diabetes, smoking, hypertension), the absence of patient engagement in their cardiovascular health, and limited information about available programs to manage cardiovascular health.<sup>45, 46, 47</sup> Focused efforts to increase optimal control of heart disease in patients who live in urban underserved areas should target multilevel behavioral interventions at the individual and community level that incorporate the social determinants of health and engage the community.<sup>48</sup> This may include behavioral counseling to reduce cardiovascular disease risk factors. In addition, integrating community health workers (CHWs) into the health care team can support risk factor improvement in areas with limited resources and providers, facilitate communication between patients and providers to increase patient engagement, and increase access by connecting patients to health care services and self-management programs.<sup>48,49,50</sup>

## HPV Vaccination

Barriers that may exist for HPV vaccination in rural advantaged populations are lack of parental knowledge about the benefits of vaccinations, missed opportunities to vaccinate, and parental hesitancy to vaccinate

against a sexually transmitted infection.<sup>51</sup> Focused efforts to increase HPV vaccination in patients who live in rural advantaged areas may include implementing multi-component clinic-based interventions including decision support alerts for providers, parent reminders, provider recommendation of HPV vaccination, and addressing parental concerns about and misinformation around the vaccine.<sup>52,53</sup>

## Depression Screening

Barriers that may exist for depression screening in urban advantaged populations may include a need to increase the use of screening tools, telehealth, and patients' concerns about stigma surrounding mental health issues.<sup>54</sup> Focused efforts to increase depression screening for patients who live in urban advantaged areas may include integrating behavioral health into primary care to improve mental health screening and treatment, which also may reduce stigma.<sup>55,56</sup>

## Conclusion

Health disparities cannot be eliminated by health systems working alone or be accomplished in silos. For good health to be accessible across all populations, relationships and trust must be built among multiple entities including health systems, policymakers, state and local public health departments, community organizations, higher education, and Wisconsin residents. Together, these entities must commit to a shared vision with defined roles and responsibilities and co-develop strategies to reduce disparities in health outcomes and care for all populations.

# Organizations

## Wisconsin Collaborative for Healthcare Quality

The Wisconsin Collaborative for Healthcare Quality (WCHQ) publicly reports and brings meaning to performance measurement information that improves the quality and affordability of health care in Wisconsin, in turn improving the health of individuals and communities. WCHQ is the primary author of the *2020 Wisconsin Health Disparities Report: Rural and Urban Populations*.

## University of Wisconsin Health Innovation Program

The University of Wisconsin Health Innovation Program (HIP) is a research program based within the University of Wisconsin (UW) School of Medicine and Public Health. HIP's mission is to transform health care delivery and population health across the state and nation through health systems research that partners UW faculty with health care and community organizations. HIP staff collaborated with WCHQ on development of the *2020 Wisconsin Health Disparities Report: Rural and Urban Populations*.

## Wisconsin Partnership Program

The Wisconsin Partnership Program (WPP) was established at the School of Medicine and Public Health in 2004 through a generous and visionary endowment gift from Blue Cross and Blue Shield United of Wisconsin's conversion to a stock insurance corporation. Its mission is to

improve the public health needs of Wisconsin and reduce health disparities through initiatives in research, education and community partnerships. The *2020 Wisconsin Health Disparities Report: Rural and Urban Populations* was funded by WPP through a grant to HIP and WCHQ.

## Data

WCHQ members submitted standardized clinical data (2018), which was aggregated to provide a statewide snapshot that identified disparities across health outcome and care measures. Differences in statewide performance are presented separately for populations defined by differences in rural and urban health-related characteristics. For all WCHQ measures, higher performance is considered better. Additional information can be found in the [Detailed Methodology](#) section of this report.

## Appendix

Stratified results for all WCHQ measures are available in a separate appendix document. The appendix contains detailed methodology, measure definitions for all WCHQ measures, and tables including performance and denominator data for all measures stratified by the six rural and urban groups. The appendix is available as a separate Excel file for download from HIPxChange at [www.hipxchange.org/WCHQDisparities](http://www.hipxchange.org/WCHQDisparities).

# Resources

- Agency for Healthcare Research and Quality – Resources for Addressing Disparities and Improving Quality  
<https://nhqrnet.ahrq.gov/inhqrdr/resources/info>
- American Hospital Association – Equity of Care Tools  
<http://www.equityofcare.org>
- Centers for Disease Control and Prevention – Health Equity Tools  
<https://www.cdc.gov/chronicdisease/healthequity/index.htm>
- Community Preventive Services Task Force – The Guide to Community Preventive Services  
<https://www.thecommunityguide.org/>
- County Health Rankings & Roadmaps – What Works for Health  
<http://www.countyhealthrankings.org/take-action-to-improve-health/what-works-for-health>
- HIPxChange from the Health Innovation Program  
<https://www.hipxchange.org>
- University of Wisconsin Population Health Institute – Assessing and Improving Community Health in Wisconsin  
<http://www.improvingwihealth.org/>
- University of Wisconsin Population Health Institute – What Works for Health: Policies and Programs to Improve Wisconsin’s Health  
<http://whatworksforhealth.wisc.edu/index.php>
- Wisconsin Collaborative for Healthcare Quality – Public Reporting Website  
<https://reports.wchq.org/>
- Healthy People 2020 Tools and Resources  
<https://www.healthypeople.gov/2020/tools-resources>
- Wisconsin Hospital Association – Community Benefit Reports  
<https://www.wha.org/DataandPublications/WHAreports>
- Wisconsin Partnership Program  
<https://www.med.wisc.edu/wisconsin-partnership-program/>

# Detailed Methodology

This report expands on findings from the *2019 Wisconsin Health Disparities Report* and presents more nuanced categories to distinguish the unique health-related characteristics of rural and urban areas in Wisconsin.

## Data

WCHQ member organizations submit data to WCHQ from their electronic health records (EHRs) in one of two ways. Most members submit data directly to WCHQ's data repository. A smaller subset of members calculate measure results in their own reporting systems.

## Data Quality and Validation

Data from WCHQ member organizations underwent a rigorous validation process. This consisted of a series of quality checks, including comparing denominators and performance rates with their publicly reported WCHQ measure results and ensuring that all data mappings were complete. Some member-level data was excluded from analysis due to missing data (e.g. patient ZIP code).

## Data Completeness

WCHQ analyzed the completeness and quality of address data currently submitted to the WCHQ data repository and reporting system and worked directly with members to complete data mapping and submission for ZIP code. We selected a subset of measures on which to focus and include all publicly reported measures currently in use on the WCHQ website within a separate Appendix on HIPxChange (<https://www.hipxchange.org/WCHQDisparities>).

## Defining Rural/Urban Groups using ZIP Codes

We used the Wisconsin Urban-Rural Classification System (WURCS) – ZCTA Version (see table below for codes and description),<sup>57</sup> developed by Wisconsin Area Health Education Center to define rural and urban areas. We re-categorized R3 as urban because ZIP codes labeled R3 had 10,000-49,999 people. We classified the codes in the table below as rural if: R1, R2/R1, and R2; and as urban if: R3, Urban, Metro W-O-W, and Metro Milwaukee County. Rural and urban groupings for all ZIP codes in Wisconsin are available within a separate [Appendix](#).



ZCTA-based WI urban-rural code	Description
R1	A ZCTA that includes only communities of 2500 or less, outside urban areas ( $\leq 5\%$ of the population in UAs).
R2/R1	A ZCTA that includes both R1 and R2 communities (counted as R2)
R2	A ZCTA that includes a community of 2,500-9,999 outside urban areas ( $\leq 5\%$ of the population in UAs).
R3	A ZCTA that includes all or part of a community of 10,000-49,999 outside urban areas ( $\leq 5\%$ of the population in UAs).
Urban	A ZCTA for an urbanized area with population nucleus of 50,000 up to 1 million ( $\leq 5\%$ of the population in UAs).
Metro W-O-W	A ZCTA for communities in Waukesha, Ozaukee, and Washington Counties that are part of the greater Milwaukee Metropolitan Area
Metro Milwaukee County	A ZCTA for communities in Milwaukee County. All are part of the greater Milwaukee Metropolitan Area.

## ZIP Code Exclusions

We excluded ZIP codes that are non-residential (e.g. only P.O. Box, or commercial organization addresses), and ZIP codes with populations less than 500.

## Measuring Health-Related Characteristics

We clustered rural and urban ZIP codes into six groups using 11 measures representing health care capacity, economic status, and health status.

### Health Care Capacity

Shortages of primary care physicians and mental health providers limit people's ability

to seek essential preventive services and necessary treatments. Wisconsin counties, both rural and urban, are designated as Health Professional Shortage Areas (HPSAs), which affects access to health care. Using data on HPSAs,<sup>58</sup> the researchers measured health care capacity using the number of primary care providers and the number of mental health providers per 100,000 population for each county in Wisconsin.

### Economic Status

Socioeconomic factors are strongly linked to health care access and health outcomes. For example, income impacts one's ability to access health-promoting goods and services (e.g., nutritious food, medications,

and medical care).<sup>59</sup> Using data from the American Community Survey,<sup>60</sup> researchers measured economic status using rates of poverty, unemployment, uninsured, Medicaid enrollment, and educational attainment for each ZIP code in Wisconsin.

## Health Status

Physical and mental health are key determinants of health care need and use of health care services. Health varies by place (where an individual lives) and is influenced by the conditions of the environment (e.g., grocery stores, parks, crime). Using data from the Behavioral Risk Factor Surveillance System, physical and mental health status was measured using the average number of unhealthy days reported in the past 30 days for each county in Wisconsin.<sup>61</sup>

## Limitations of the Report

There are several limitations to the findings in this report. Some of the population sizes are small. This means that small fluctuations in health outcomes or care could have an inflated impact on the measure results. Second, this report only includes data from patients that are regularly seen by health care organizations that are members of WCHQ. Therefore, a subset of individuals throughout the state who are treated in other health systems or who have not recently visited a health system are not included. This particularly impacts patient population groups who receive care through Federally Qualified Health Centers (FQHCs), Indian Health Service clinics, and clinics in northwestern Wisconsin. Lastly, due to the large sample sizes, statistical significance testing was not performed on the data in this report.

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