North Central Wisconsin
Pandemic Assessment and Future Response

Health Pandemic Assessment and Future Response Committee

Kristen Anchor, Former Northern Area Administrator, Wisconsin Department of Health Services
Ron Barger, Director, Langlade County Health Department
Linda Conlon, Director, Oneida County Health Department
Elena Cox, Previous Public Health Officer, Forest County Potawatomi Health Department
Michaela Daubon, Supervisor Community Health, Lac du Flambeau
Amanda Dederich, Health Officer, Juneau County Health Department
Robbie Deede, Coordinator, North Central Wisconsin Healthcare Emergency Readiness Coalition
Holli Denton, Director, Forest County Health Department
Laurel Dreger, Director, Vilas County Health Department
Leah Eckstein, Health Officer, Adams County Health Department
Gary Garske, Health Officer, Portage County Health Department
Joel Gottsacker, Director, Oneida County Aging and Disability Resource Center
Shelley Hersil, Director, Lincoln County Health Department
Sue Kunferman, Director, Wood County Health Department
Rebecca Luebke, Northern Area Administrator, Wisconsin Department of Health Services
Tammy Queen, Director, Forest County Office on Aging
Jacee Shepard, Director, Forest County Potawatomi Health Department
Tina Sullivan, Public Health Supervisor/Interim Health Officer, Juneau County Health Department
Joan Theurer, Health Officer, Marathon County Health Department

Peer Review

Captain Mark Neuman, Corrections Captain, Oneida County Sheriff's Office

Photo sources: Wood County Health Department
Oneida County Health Department

This plan was prepared by the North Central Wisconsin Regional Planning Commission (NCWRPC) under the advisement of the Committee.

For more information contact:

North Central Wisconsin Regional Planning Commission (NCWRPC)
210 McClellan St., Suite 210
Wausau, WI 54403
715-849-5510
www.ncwrpc.org

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INTRODUCTION

BACKGROUND

The North Central Wisconsin Regional Planning Commission (NCWRPC) provides assistance throughout a ten-county region in the areas of economic development, geographic information systems (GIS), intergovernmental cooperation, land use, and transportation. The region consists of a ten-county area stretching one hundred and eighty-five miles in a north-south direction, extending from Forest and Vilas Counties in the north to Adams and Juneau Counties in the south. The region roughly follows the upper Wisconsin River Valley and covers 9,328 square miles, or about 17 percent of the state's total land mass. The ten counties are: Adams, Juneau, Forest, Langlade, Lincoln, Marathon, Oneida, Portage, Wood, and Vilas. The region includes 268 units of local government: 198 towns, 39 villages, 21 cities, and ten counties and four tribal regions. NCWRPC staff regularly provides professional planning to communities, for projects of both local and regional significance.

In the summer of 2020, the NCWRPC sought funding and was awarded a Coronavirus Aid, Relief, and Economic Security (CARES) Act grant from the Economic Development Administration (EDA) to assist with the economic recovery of the region as a result of the COVID-19 global pandemic. The scope of work supports activities to prevent, prepare for, and to respond to the COVID-19 pandemic, and associated economic injury. A part of this response effort included the preparation of this Regional Health Pandemic Assessment and Future Response document.

> The purpose of this plan is to analyze various county and tribal response efforts related to the COVID-19 pandemic and to identify approaches to better address future pandemics. The overarching goal is to better prepare the region for future public health related disruptions.

COMMITTEE

The Regional Health Pandemic Assessment and Future Response Committee included a group of experts representing every county throughout the region. The committee included those directing county health departments and tribal health departments. In addition, coordinators from various agencies including those dealing with healthcare emergency readiness, seniors, persons with disabilities, and other specialty populations served on the committee. This group responded to a questionnaire and met virtually throughout the 2021 calendar year.

During these meetings, the committee was able to analyze the response to the COVID-19 global pandemic and identify strengths and weaknesses.   Through this process, recommendations were created to better respond to pandemics and similar health related disruptions in the future.

COVID-19 PANDEMIC

In early 2020, after a December 2019 outbreak in China, the World Health Organization identified SARS-CoV-2 as a new type of coronavirus. The outbreak quickly began to spread around the world. COVID-19 is a disease caused by SARS-CoV-2 and cause a respiratory tract infection. It spreads through person-to-person contact and infections range from mild to deadly. On March 11, 2020, the World Health Organization declared the novel coronavirus (COVID-19) a global pandemic.
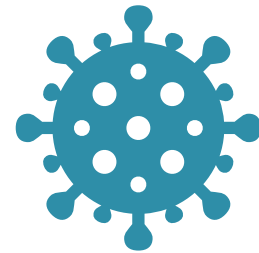
All viruses including SARS-CoV-2 change over time. Most changes have little to no impact on the virus's properties. However, some changes impact things such as how easily a virus spreads, the associated disease severity or the performance of vaccines or therapeutic medicines. Throughout the pandemic, the World Health Organization has monitored SARS-CoV-2 variants. The have implemented a system of naming Variants of Interest (VOI) and Variants of Concern (VOC) by using letters of the Greek Alphabet. This allows a system that is both easy to pronounce and is not stigmatizing.

Variants of Interest (VOI) includes mutations known to cause community transmission, in multiple countries, or identified by the WHO working group. Variants of Concern (VOC) include those that cause an increase in transmissibility or detrimental change in epidemiology, increase in virulence or disease presentation, or more resistant to treatment measures. As of May 31, 2021, WHO identified four VOC's:

- Alpha (B.1.1.7) – first documented in the United Kingdom in September of 2020
- Beta (B.1.351) – first documented in South Africa in May of 2020
- Gamma (P.1) – first documented in Brazil in November of 2020
- Delta (B.1.617.2) – first documented in India in October 2020

Variants of High Consequence (VOHC) is a third category that include variants where there is clear evidence that prevention measures or medical countermeasures have significantly reduced effectiveness relative to previously circulating variants. There are no variants as of July 1, 2021, assigned to this category.

Figure 1: Wisconsin Coronavirus Timeline
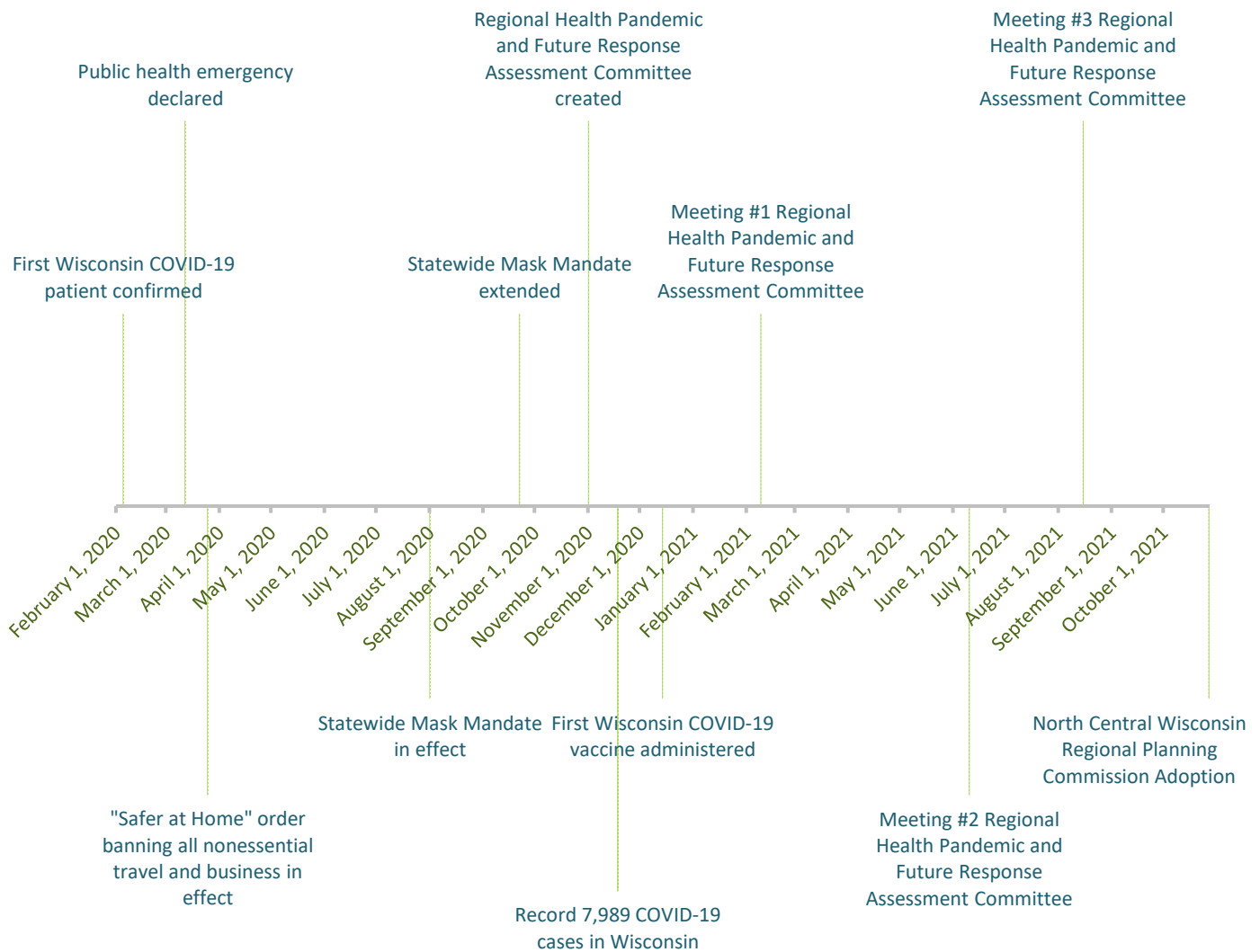
On March 12, 2020, Governor Tony Evers declared a public health emergency in Wisconsin. In March, he issued a "Safer at Home" order banning all nonessential travel and business. The Wisconsin State Supreme Court overturned that order in May of 2020. A statewide mask mandate became effective in August of 2020. The state began to experience a dramatic uptick in the number of COVID-19 cases in the fall of 2020, with a single day high number of 7,989 COVID-19 positive cases on November 18, 2020, according to the Wisconsin Department of Health Services. The first COVID-19 vaccine in Wisconsin was administered on December 14, 2020, to a UW Health employee.

PROJECT GOALS

Counties and tribes within our region, the State of Wisconsin and the nation are on the front lines of the coronavirus pandemic. During this unprecedented public health emergency and the aftermath of the economic crisis, counties and tribes are working with other governmental agencies and health entities to mitigate the far-reaching impacts of COVID-19. The various departments within counties and tribes including community health, human services, county management, justice and public safety, and transportation have all been impacted as a result of the pandemic.

This document seeks to analyze county and tribal public health responses to coronavirus within the region and to create recommendations that would assist counties and tribal entities to better manage health related disruptions in the future. The goals of this assessment include:

Analyzing county and tribal response to the COVID-19 pandemic including:

1. Identifying key priority areas
2. Analyzing what did and did not work well and where additional support was needed to maintain best practices
3. Creating recommendations to better deal with future pandemic and health related disruptions

DEMOGRAPHICS

GENERAL DEMOGRAPHICS

The North Central Wisconsin Regional Planning Commission's region includes ten counties and four tribal entities. The region is known for an abundance of outdoor amenities, an affordable cost of living and a high quality of life. In addition, it has a diverse array of resources, partners and assets that support the regional economy. However, the region also faces a variety of complex issues including uneven population and housing growth, an increase in population age, lack of broadband, and a constantly changing economic landscape often resulting in lower employment and lower incomes. COVID-19 has caused additional disruption regionally and worldwide, resulting in the largest global recession since the Great Depression.

An analysis of the demographic landscape helps to better understand how COVID-19 infection has impacted individuals and groups throughout the region.
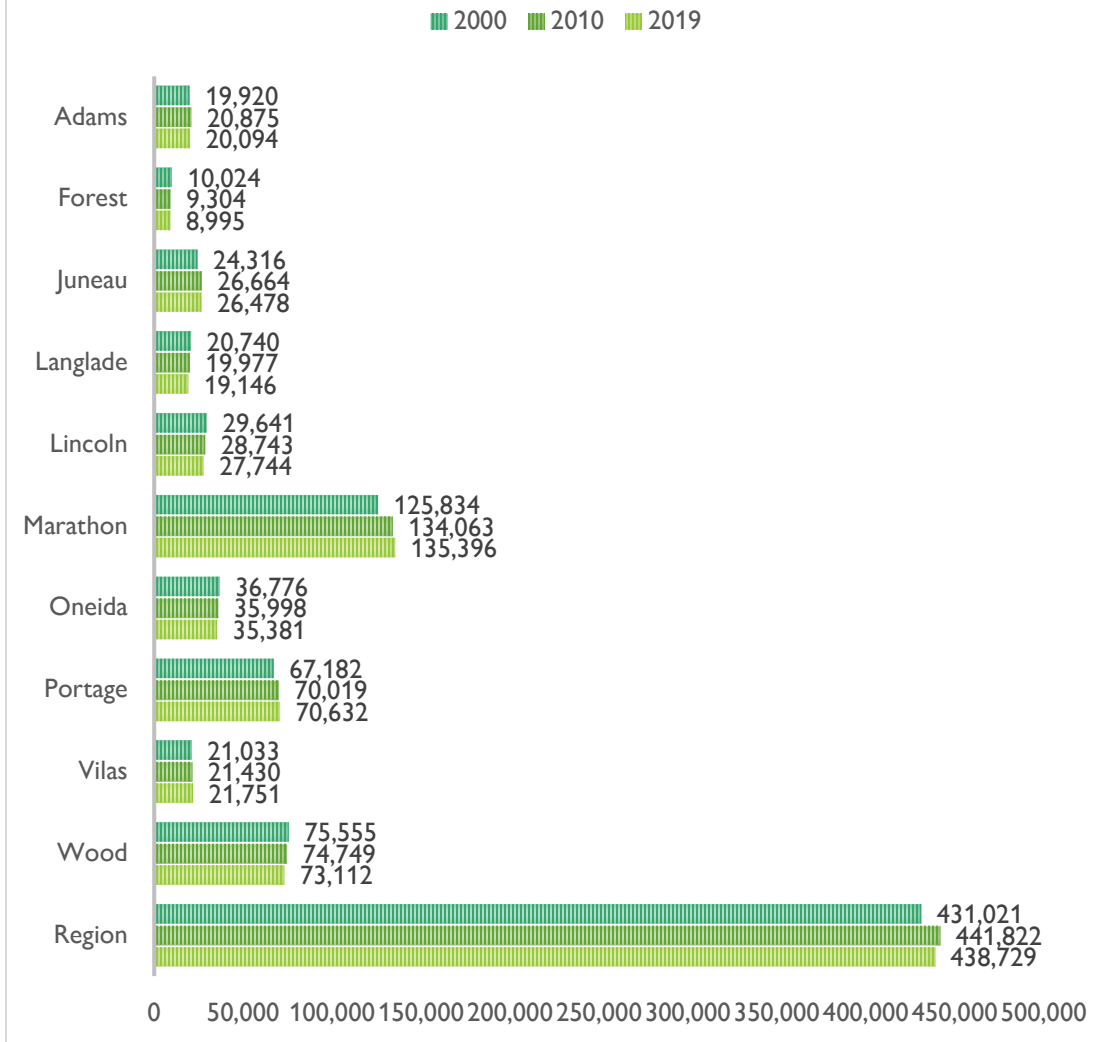
Population and Households

Figure 2 compares population information by county from 2000, 2010 and 2019. In 2019, the total regional population of 438,729 was down slightly from the 2010 population of 441,822, but up from 431,021 in 2010. The population in 2019 in each of the ten counties varied greatly with a total of 8,995 residents in Forest County to 135,396 in Marathon County. Most counties lost population from 2010 to 2019, with the exceptions of Marathon, Portage and Vilas Counties.

Figure 3 provides population for the four tribal areas located within the region. In 2019, the tribal area with the greatest resident population is Lac du Flambeau, with a population of 3,413. The Ho-Chunk Nation followed, with 1,621 residents. The Forest County Potawatomi Community had a population of 655 and the Sokaogon Chippewa Community had the fewest residents at 513.
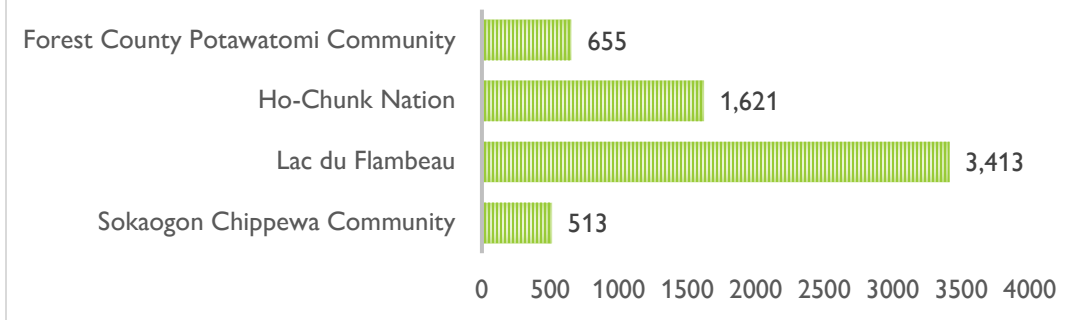
Figure 4 details the number of households by county. In 2019, there were 187,874 total households in the region. Numbers ranged from 4,008 households in Forest County to 55,466 in Marathon County.
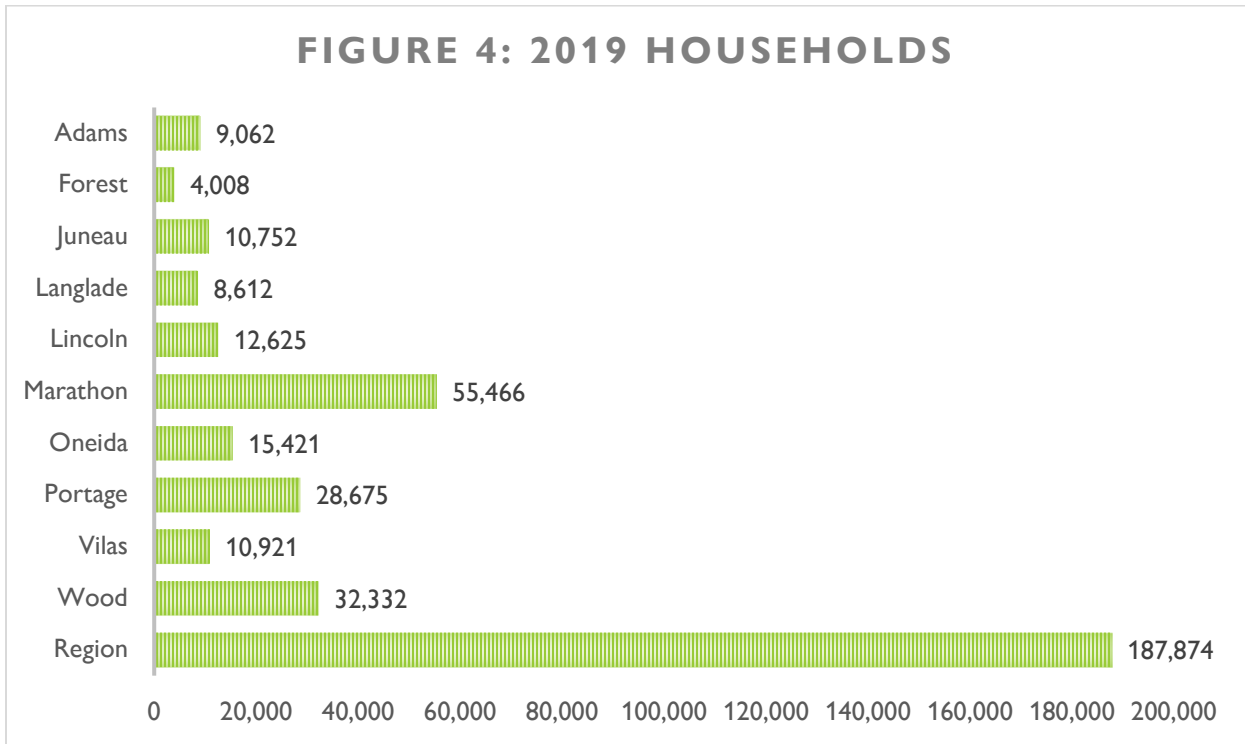
FIGURE 2: POPULATION

Legend: 2000 2010 2019

County	2000	2010	2019
Adams	19,920	20,875	20,094
Forest	10,024	9,304	8,995
Juneau	24,316	26,664	26,478
Langlade	20,740	19,977	19,146
Lincoln	29,641	28,743	27,744
Marathon	125,834	134,063	135,396
Oneida	36,776	35,998	35,381
Portage	67,182	70,019	70,632
Vilas	21,033	21,430	21,751
Wood	75,555	74,749	73,112
Region	431,021	441,822	438,729

X-axis: 0 50,000 100,000 150,000 200,000 250,000 300,000 350,000 400,000 450,000 500,000

Source: U.S. Census, American Community Survey 5-Year Estimates

FIGURE 3: 2019 POPULATION (TRIBAL AREAS)

Tribal Area	2019
Forest County Potawatomi Community	655
Ho-Chunk Nation	1,621
Lac du Flambeau	3,413
Sokaogon Chippewa Community	513

X-axis: 0 500 1000 1500 2000 2500 3000 3500 4000

Source: American Community Survey 5-Year Estimates (My Tribal Area)

FIGURE 4: 2019 HOUSEHOLDS

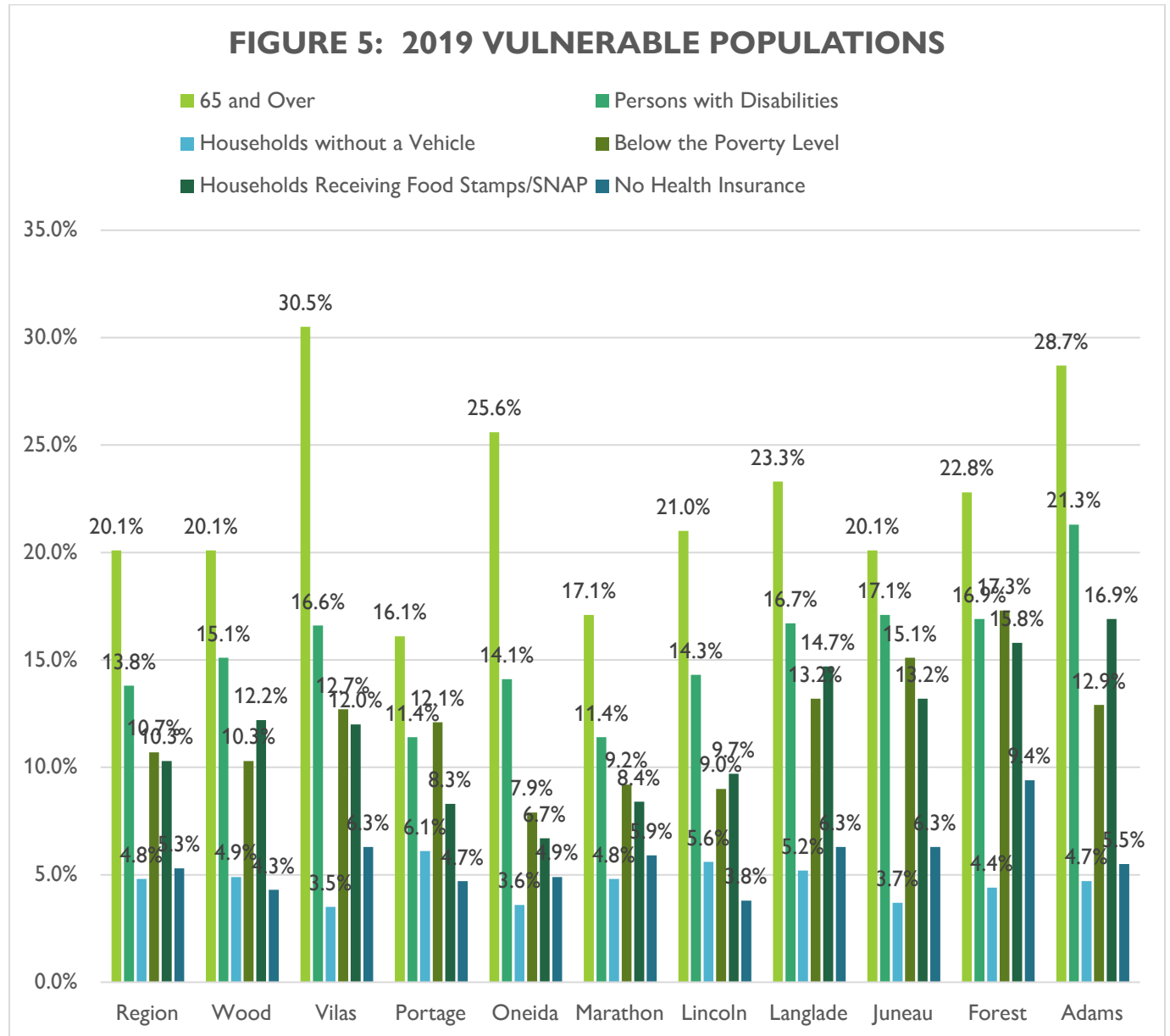| County	Households
Adams	9,062
Forest	4,008
Juneau	10,752
Langlade	8,612
Lincoln	12,625
Marathon	55,466
Oneida	15,421
Portage	28,675
Vilas	10,921
Wood	32,332
Region	187,874

Source: American Community Survey 5-Year Estimates

Figure 5 displays vulnerable populations by county. It is important to consider vulnerable populations to properly understand how COVID-19 has impacted the greater population and region as a whole. The CDC has stated that although the specific age threshold has been removed, COVID-19 risk increases steadily as you age. Age is an independent risk factor for severe illness from COVID-19, but risk in older adults is also related to the increased likelihood that older adults will also have underlying medical conditions. Figure 5 details the percentage of adults 65 and older in each county throughout the region. The counties with the most individuals 65 and older include Vilas County (30.5%), Adams County (28.7%) and Oneida County (25.6%), based on 2019 data.

The CDC states that most people with disabilities are not at higher risk for becoming infected or having severe illness from COVID-19. However, some people with disabilties might be at higher risk of severe illness from COVID-19 because of their underlying medical conditions. Figure 4 shows that regionally, 13.8 percent of the population are persons with disabilties. The number of persons within disabilties is highest in Adams County (21.3%) and lowest in Marathon and Portage Counties (11.4%).

Households without a vehicle and receiving Food Stamps or Supplemental Nutrition Assistance Program (SNAP) benefits are households that may be at a greater risk of health inequity. This

is true with a variety of health outcomes, coronavirus being no exception. Persons below the poverty level and persons who lack health insurance coverage are also at risk for great health inequity.

FIGURE 5: 2019 VULNERABLE POPULATIONS

Legend:
- 65 and Over
- Persons with Disabilities
- Households without a Vehicle
- Below the Poverty Level
- Households Receiving Food Stamps/SNAP
- No Health Insurance

Source: American Community Survey 5-Year Estimates

The 2020 United Way ALICE in Wisconsin: A Financial Hardship Study is a report that provides detailed information to foster a better understanding of who is struggling in our communities. ALICE is an acronym for Asset Limited, Income Constrained, Employed – households with income above the Federal Poverty level but below the basic cost of living. A household consists of all people who occupy a housing unit. The Household Survival Budget estimates the actual bare-minimum cost of basic necessities (housing, child-care, food

transportation, health care, and a basic smartphone plan) in Wisconsin, adjusted for different counties and household types. Table 1 details this budget threshold for 2018 for single adult, single senior and four-person (two adults, one infant and one preschooler) households.

Table 1: Household Survival Budget, Wisconsin, Average, 2018

	Single Adult	Senior (1 Adult)	2 Adults, 1 Infant, 1 Preschooler
MONTHLY COSTS			
HOUSING	$526	$526	$767
CHILD CARE	$-	$-	$1,297
FOOD	$264	$224	$798
TRANSPORTATION	$326	$280	$795
HEALTH CARE	$214	$468	$699
TECHNOLOGY	$55	$55	$75
MISCELLANEOUS	$164	$182	$519
TAXES	$253	$265	$756
MONTHLY TOTAL	$1,802	$2,000	$5,706
ANNUAL TOTAL	$21,624	$24,000	$68,472
HOURLY WAGE*	$10.81	$12.00	$34.24

*Full-time wage required to support this budget   Source: ALICE Report, 2020

Table 2 details the percentage of households by county that are below a basic survival threshold (ALICE Threshold) for 2018. Counties throughout the region ranges from 29 percent of households below the ALICE Threshold in Marathon County to 44 percent below in Vilas County.

Table 2: Regional Counties, 2018

County	Total Households	% ALICE & Poverty
ADAMS	8,619	43%
FOREST	4,029	40%
JUNEAU	10,640	37%
LINCOLN	12,547	33%
LANGLADE	8,594	36%
MARATHON	56,245	29%
ONEIDA	15,403	33%
PORTAGE	29,193	32%
VILAS	10,914	44%
WOOD	32,274	32%

Source: ALICE Report, 2020

Figure 6 includes population estimates and projections taken from the Wisconsin DOA Demographic Services Center in 2013. The population projections begin for year 2015, but in many communities across North Central Wisconsin, the DOA population projections have been lower than expected. Regionally, the population is expected to grow from 2010 through 2030, but is then expected to decrease somewhat through 2040.

FIGURE 6: POPULATION PROJECTIONS
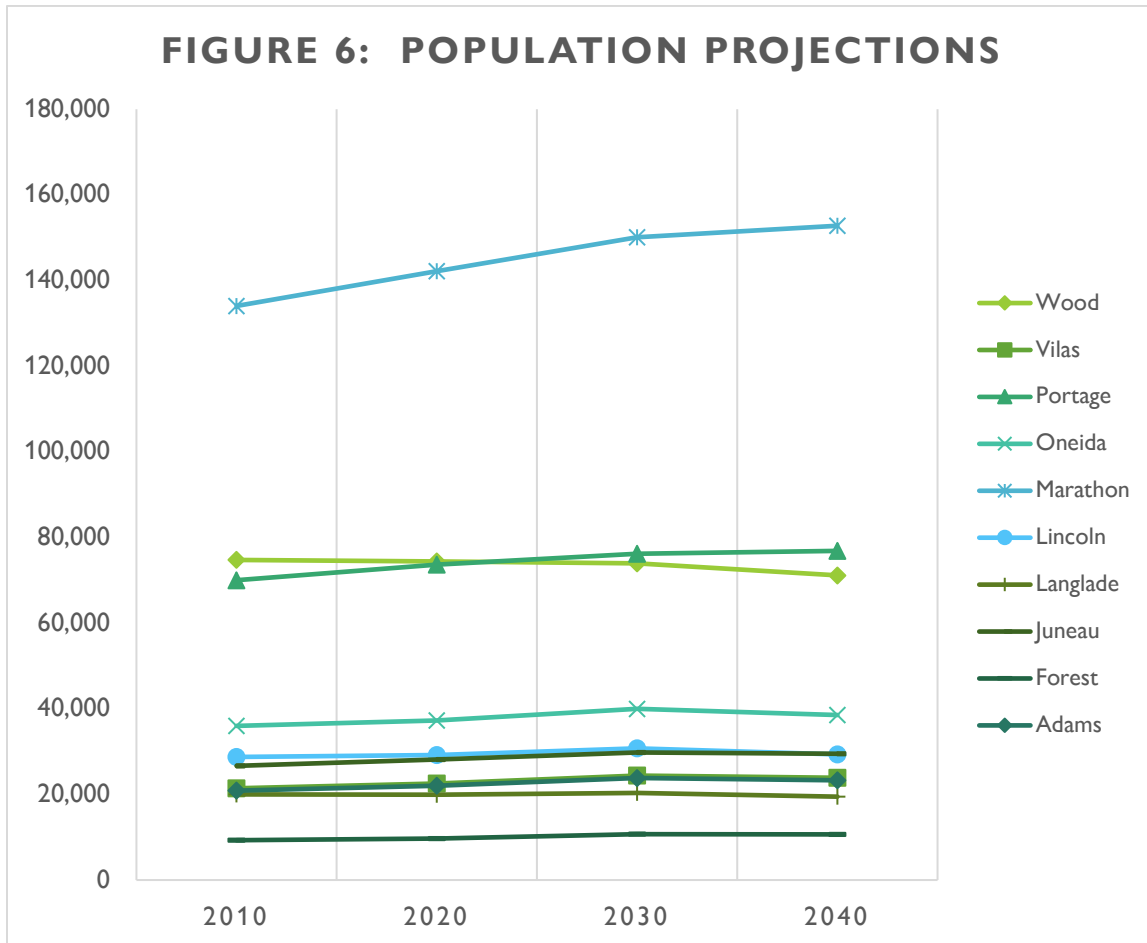
Source: U.S. Census, Wisconsin Department of Administration

Education and Income

Figure 7 outlines educational attainment in 2019 by county. Educational attainment varied greatly throughout the region, with 87.5 percent of Forest County residents obtaining a high school diploma or higher and 93.9 percent of Portage County residents obtaining a high school diploma or higher. There is also great variation in the percentage of bachelor's degree recipients. The greatest percentage of residents have bachelor's degrees in Portage County (32.9%), Vilas County (29.1%) and Oneida County (27.2%). The smallest percentage of the population hold bachelor's degrees in Juneau County (13.7%) and Adams County (13.9%).

FIGURE 7: 2019 EDUCATIONAL ATTAINMENT
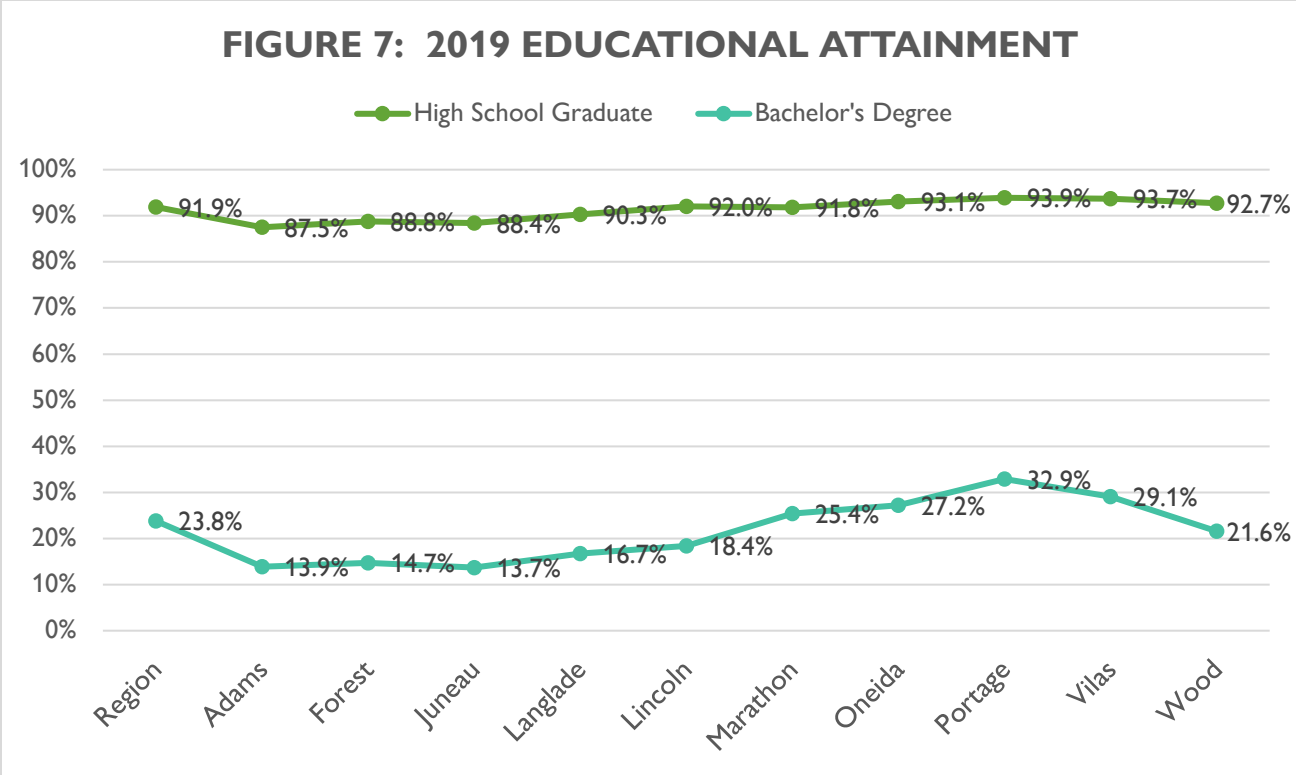
Source: American Community Survey 5-Year Estimates

Figure 8 uses two measures of income, per capita income and median household income. Per capita income is calculated by taking the total aggregate income for an area and dividing by the population. Median household income divides the income distribution into two equal groups, half having incomes above the median and half below. In 2019, the average per capita income in the region was $31,614 and the median household income was $56,799. Most counties fell below the regional per capita income, with only Marathon, Oneida and Vilas Counties falling above. In 2019 median household income ranged from $45,536 in Forest County to $62,633 in Marathon County. The regional median household income was $56,799.

Coronavirus and the associated business and workplace closures have had a significant impact on the region in terms of jobs and the economy. Unemployment rates surged from April through the summer of 2020. They have dropped significantly, but as shown in Figure 9, in many areas throughout the region have still not returned to pre-pandemic levels. The highest unemployment levels are in Forest and Adams Counties and remain higher than the unemployment level in the State of Wisconsin.

FIGURE 8: 2019 INCOME

■ Per Capita   ■ Median Household

County	Per Capita	Median Household
Region	$31,614	$55,091
Adams	$27,241	$46,369
Forest	$25,700	$45,536
Juneau	$27,889	$53,490
Langlade	$27,618	$49,491
Lincoln	$30,972	$58,541
Marathon	$33,189	$62,633
Oneida	$34,910	$56,852
Portage	$31,453	$58,853
Vilas	$33,316	$47,072
Wood	$31,425	$54,913
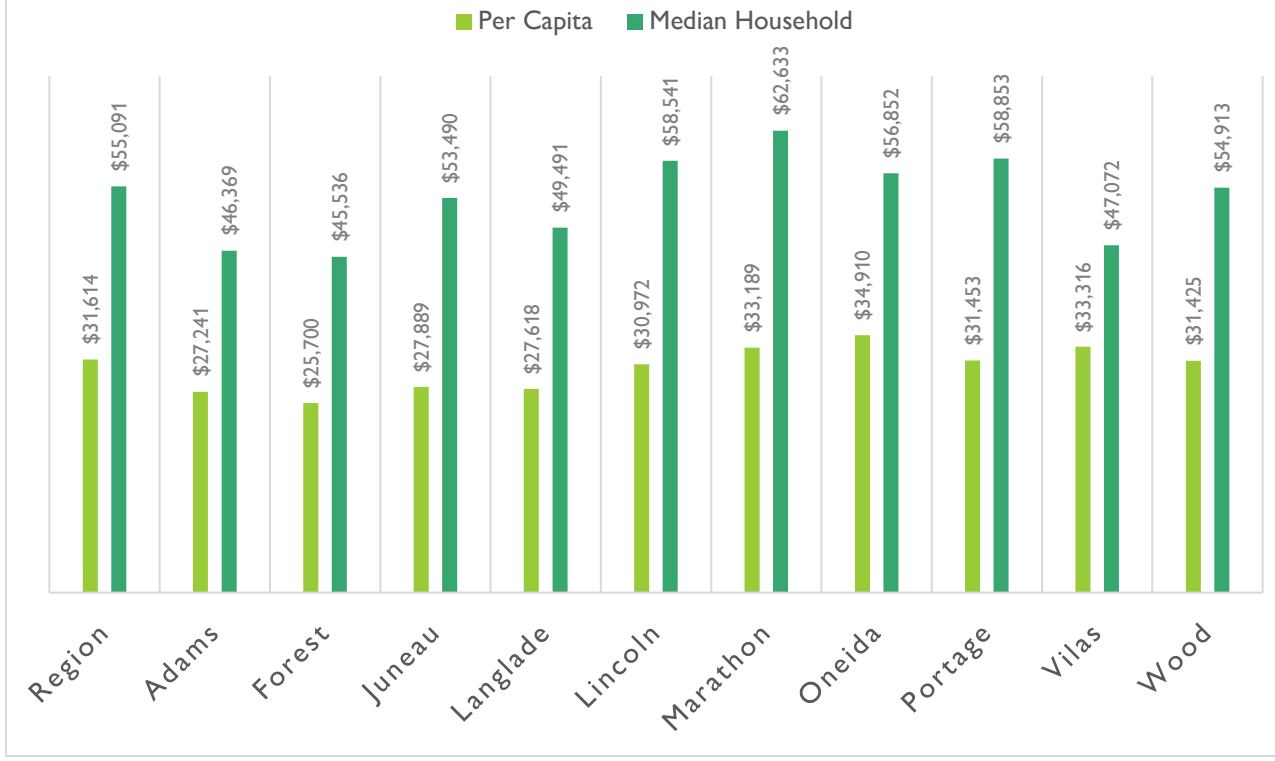
Source: American Community Survey 5-Year Estimates

FIGURE 9: 2020 UNEMPLOYMENT RATES

Legend: State, Region, Adams, Forest, Juneau, Langlade, Lincoln, Marathon, Oneida, Portage, Vilas
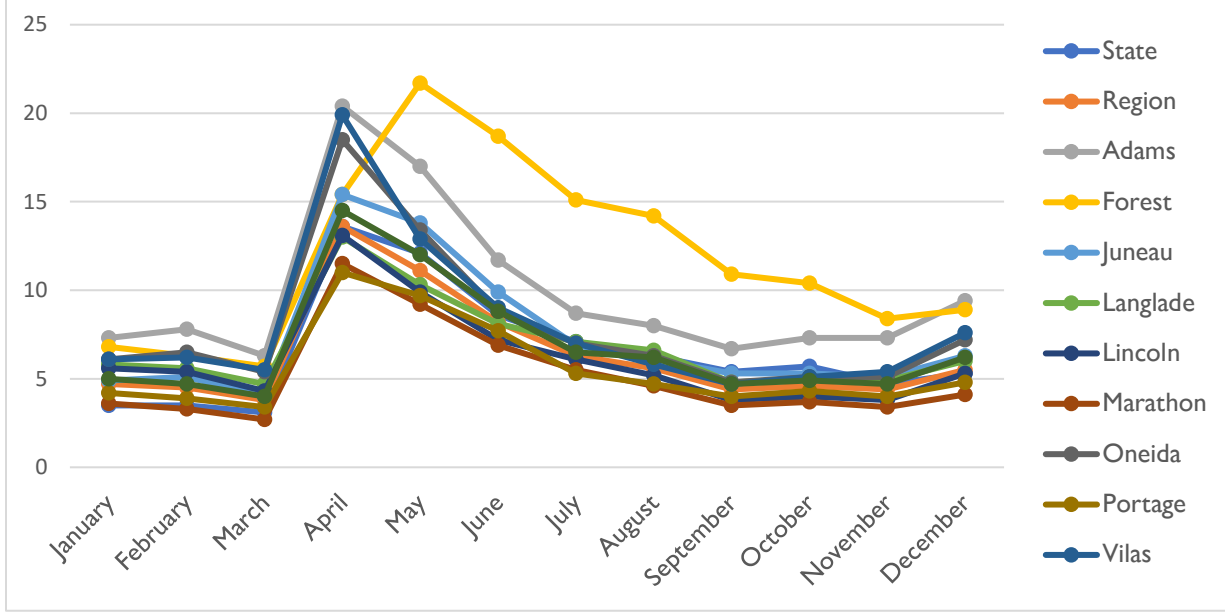
Source: Bureau of Labor Statistics

HEALTH DEMOGRAPHICS

Demographics specific to health and health outcomes help us to better understand the impact of coronavirus within our geographic region. Individual factors related to health such as age, gender and genetics have been widely recognized as contributing to health outcomes. In addition, individual behaviors including exercise, diet, stress management, cigarette smoking, and the like are widely known as being connected to health outcomes. Of late, there has been increased attention devoted to social determinants of health and how they impact health outcomes.

The Centers for Disease Control and Prevention (CDC) defines social determinants of health (SDOH) as conditions in the places where people live, learn, work, and play that affect a wide range of health risks and outcomes.

A publication by the U.S. Department of Health and Human Services known as Healthy People 2030, uses a place-based framework that outlines five key areas of SDOH:

- Healthcare access and quality
- Education access and quality
- Social and community context
- Economic stability
- Neighborhood and built environment

Regional demographics including individual factors, behavioral factors and SDOH are all significant when analyzing the impact of COVID-19.

County Health Statistics

The Department of Health Services publish Public Health Profiles annually for Wisconsin counties. The Public Health Profiles provide concise health and demographic information about each county. Table 3 details birth outcomes, preventable hospitalizations, and life expectancy for each county in the region. In 2017, within the ten-county region the percentage of normal weight birth outcomes ranged from 90.6 percent of births in Juneau County to 95.2 percent of births in Lincoln County. Access to high quality health services is measured by preventable hospitalizations for conditions where timely and effective ambulatory care can reduce the likelihood of hospitalization. Preventable hospitalizations were better than the state average of 13.2 per 1,000 in Oneida and Portage Counties. All other counties fared worse than

the state average ranging from 13.3 per 1,000 in Marathon County to 20.1 per 1,000 in Vilas County.

Table 3: 2017 Wisconsin County Public Health Profile Data

County	Normal Weight Birth Outcomes	Preventable Hospitalizations (per 1,000 population)	Life Expectancy*
ADAMS	94.5%	13.7	78.0
FOREST	93.4%	15.2	77.6
JUNEAU	90.6%	19.9	78.1
LANGLADE	92.3%	14.9	78.8
LINCOLN	95.2%	16.9	78.7
MARATHON	92.9%	13.3	80.5
ONEIDA	93.8%	11.2	79.1
PORTAGE	92.3%	11.6	81.0
VILAS	91.3%	20.1	78.4
WOOD	93.2%	17.8	80.3
WISCONSIN	92.6%	13.2	79.5

*2014 data (most recent)
2017 Department of Health Services Wisconsin Public Health Profiles

The most current life expectancy data from the Department of Health Services is from 2014. The life expectancy of a population describes how long the members of that population are predicted to live, given a particular set of conditions. Differences in life expectancy may be the result of a number of factors, but most directly they are associated with differing infant mortality and crude mortality rates. Hence, life expectancy can be seen as a valuable summary indicator of population health. The average life expectancy in Wisconsin is 79.5 years, Portage, Marathon, and Wood Counties are slightly higher than the state average. All other counties are lower than the state average ranging from 77.6 years in Forest County to 79.1 in Oneida County.

The CDC defines health disparities as preventable differences in the burden of disease, injury, violence, or opportunities to achieve optimal health that are experienced by socially disadvantaged populations. For example, some groups are affected by prediabetes and diabetes more than other groups. Differences in health status or access to health care among racial, ethnic, geographic, and socioeconomic groups are some of the health disparities that can impact diseases such as diabetes. Figure 10 depicts the incidence of some common health disparities across the region.

FIGURE 10: HEALTH DISPARITIES

Legend: ■ Diagnosed Diabetes Prevalence ■ Leisure Time Physical Inactivity ■ Obesity Prevalence

County	Diagnosed Diabetes Prevalence	Leisure Time Physical Inactivity	Obesity Prevalence
Adams	18.2%	22.3%	31.90%
Forest	11.1%	22.0%	30.80%
Juneau	9.0%	22.1%	35.60%
Lincoln	8.7%	19.0%	41.30%
Langlade	12.7%	21.2%	31.10%
Marathon	9.2%	21.4%	33.50%
Oneida	9.4%	19.8%	34.90%
Portage	7.7%	18.0%	28.50%
Vilas	11.6%	19.7%	29.30%
Wood	8.3%	18.3%	26.80%
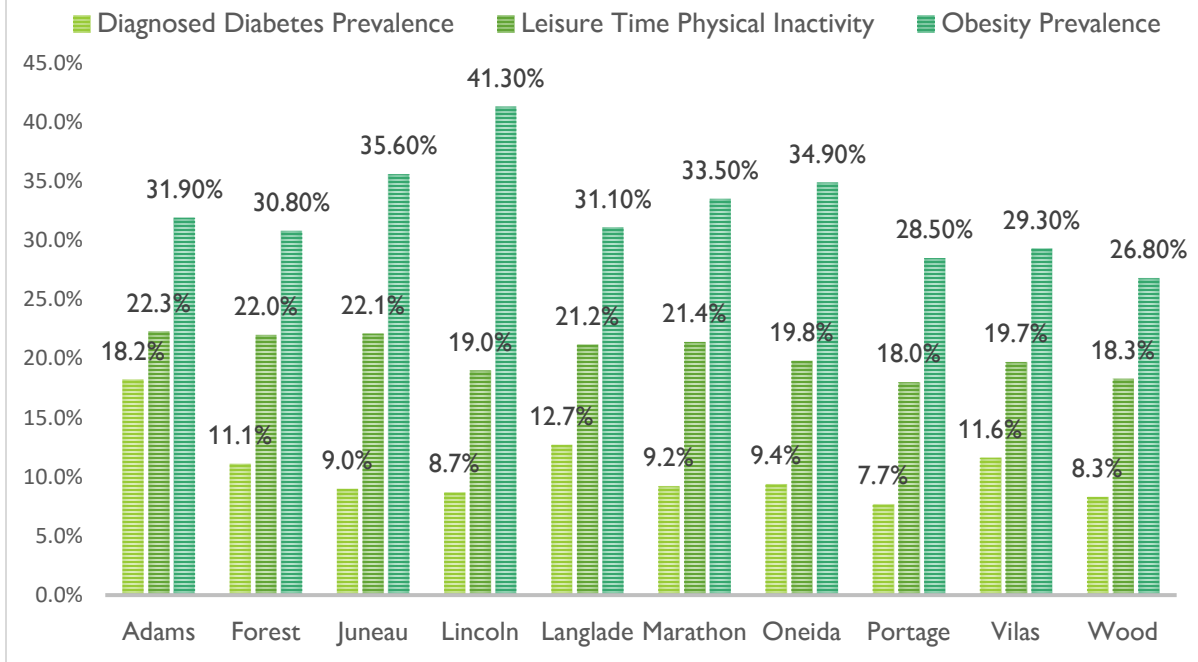
Source: Rural Health Information HUB, 2017

The Rural Health Information HUB reports all counties in the region are fully or partially in health professional shortage areas in 2020, and this information is shown in Figure 11. All of Adams and Wood Counties are in primary care shortage areas, and all other counties have at least portions of the counties that are short on primary care providers. All counties within the region are short on mental health care providers. All of Vilas, Oneida, Wood, and Adams Counties are short on dental health providers, and all other remaining counties have portions of the counties that lack dental health professionals.

FIGURE 11: PROVIDER SHORTAGE AREAS

Primary Care Shortage Areas

Mental Health Shortage Areas

Dental Health Shortage Areas

None of county is shortage area   Part of county is shortage area   Whole county is shortage area
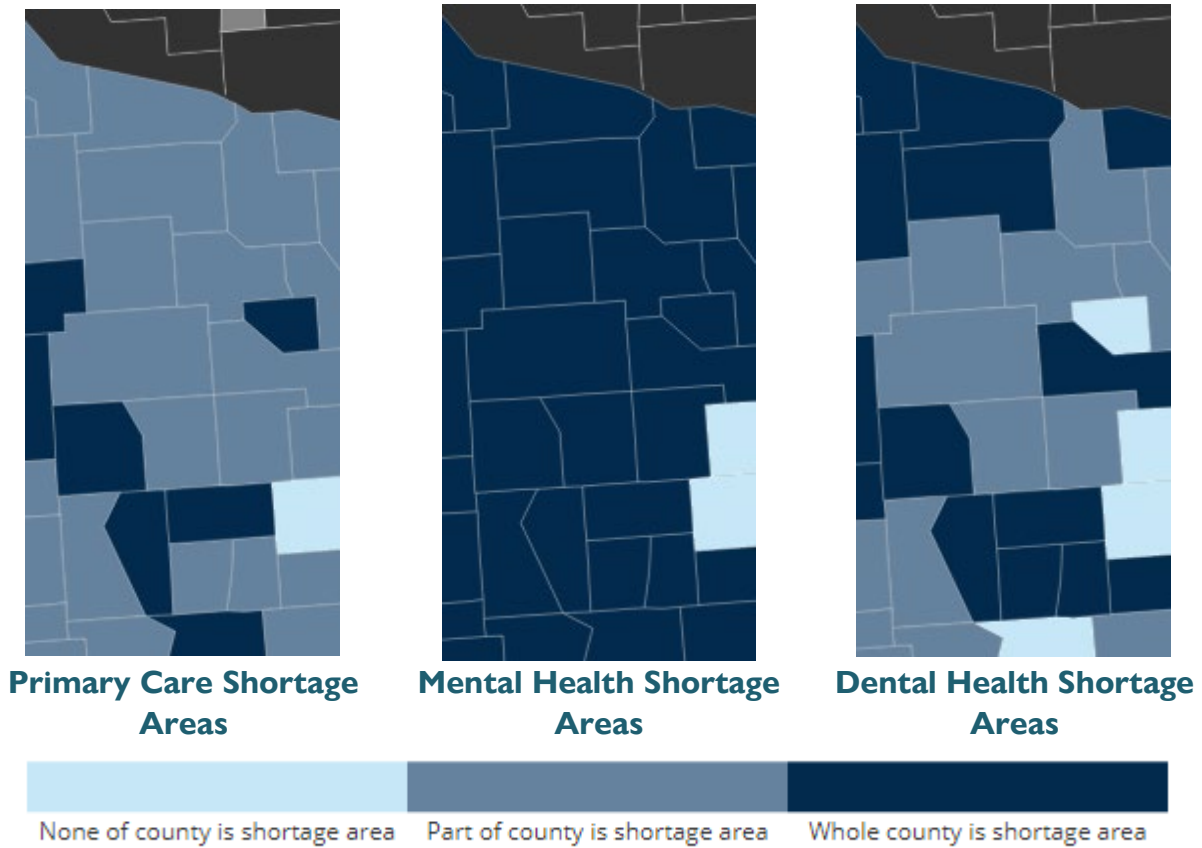
Source: Rural Health Information HUB, 2020

County Health Rankings

Each year a County Health Rankings Report is prepared through a collaboration between the Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute. The rankings help us to better understand what influences our health and how long and well we will live. The rankings provide an indication of overall health in each county and look at a variety of measures that affect future health including high school graduation rates, access to healthy foods, rates of smoking, children in poverty, and teen births.

County health rankings for the ten-county region are detailed in Table 4. There are 72 total ranked counties. Health outcome rankings are obtained from measuring both length and quality of life, a lower ranking indicating a better length and quality of life. Health factor rankings assess the factors that shape how well and long we live, including health behaviors, access and quality of healthcare, social and economic factors, and the physical environment. Lower health factor rankings indicate a better mix of health factors.

Table 4: 2020 County Health Rankings in Wisconsin

County	Health Outcomes	Health Factors
ADAMS	68	69
FOREST	70	70
JUNEAU	59	59
LINCOLN	34	28
LANGLADE	44	53
MARATHON	14	11
ONEIDA	38	22
PORTAGE	8	15
VILAS	67	47
WOOD	53	18

Source: countyhealthrankings.org

The North Sub-Region (Forest, Langlade, Lincoln, Oneida, and Vilas) contains an array of outdoor amenities, natural resources and contains many desirable tourist and retirement destinations. Therefore, in many portions of this region, there is also a disproportionate number of older adult community members. These residents have greater needs for access to healthcare and a variety of healthcare specialists. However, according to the Rural Health Information (RHI) Hub in 2020, portions of every county in the North Sub-Region are in primary care health professional shortage areas. In addition, in 2017 leisure time physical inactivity ranged between 19.0 percent in Lincoln County to 22.0 percent in Forest County. The prevalence of obesity ranged between 29.3 percent in Vilas County to 41.3 percent in Lincoln County.

The Central Sub-Region (Marathon, Portage and Wood) generally contain more urbanized areas and therefore better access to health systems and health care providers. These factors are likely at play with better generalized rankings. However, the RHI Hub still indicates that in 2020 portions of Marathon and Wood Counties are still in primary care health professional shortage areas, with all of Wood County being in a shortage area. In 2017, leisure time physical inactivity ranged between 18.0 percent in Portage County to 21.4 percent in Marathon County. The prevalence of obesity ranged between 26.8 percent in Wood County to 33.5 percent in Marathon County.

The South Sub-Region (Adams and Juneau) also contain an array of outdoor amenities and are largely rural. The median age is substantially higher in these counties than the state average. In 2020, all of Adams County and portions of Juneau County were in primary care health professional shortage areas according to the RHI Hub. In 2017, leisure time physical inactivity was reported by 22.1 percent of those in Juneau County and 22.3 percent of those in Adams

County. The prevalence of obesity was 31.9 percent in Adams County and 35.6 percent in Juneau County.

In 2017, the RHI HUB reports that diagnosed diabetes prevalence ranged from 7.7 percent in Portage County to 18.2 percent in Adams County. In addition, the median age through much of the region is above average, which places people at greater risk for heart conditions, cancer, and other serious illness. The Centers for Disease Control and Prevention (CDC) reports that adults at any age are at an increased risk of severe illness from the virus that causes COVID-19 if they have any of the following conditions:

- Chronic kidney disease
- Chronic obstructive pulmonary disease (COPD)
- Heart disease
- Diagnosed diabetes
- Obesity (BMI >= 30)

Health factors and outcomes are significant in their own right. However, as health factors, health behaviors, access and quality of healthcare, social and economic factors, and the physical environment become more unpredictable, COVID-19 has more opportunity to thrive.

Social Vulnerability Index

The CDC has developed a Social Vulnerability Index (SVI), which uses U.S. Census data to determine the social vulnerability of every census tract. Social vulnerability refers to the resilience of communities (the ability to survive and thrive) when confronted by external stresses on human health, stresses such a natural or human caused disasters, or disease outbreaks. Social vulnerability includes factors such as poverty, lack of access to transportation and crowded housing. A vulnerability in these areas may weaken a community's ability to respond in the case of natural disaster, disease outbreak, or other hazardous event and thereby prevent human suffering and financial loss. Social vulnerability is grouped into four related themes:

- Socioeconomic status
- Household composition and disability
- Minority Status and language
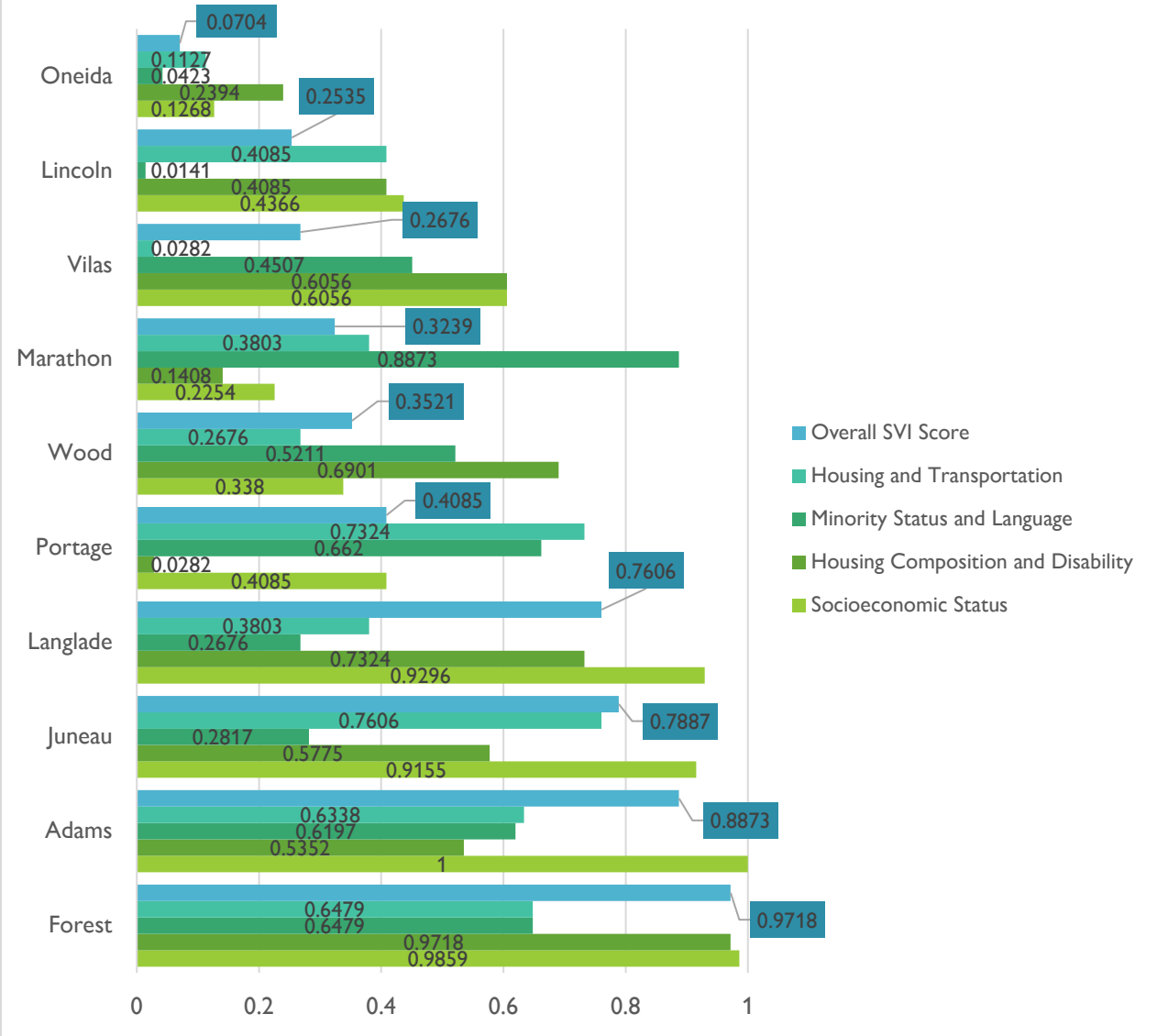- Housing and Transportation

CDC SVI databases and maps can be used to estimate needed supplies, adequately staff emergency personnel, place emergency shelters as needed, plan evacuations, and identify communities that need ongoing monitoring. During the COVID-19 pandemic, SVI ranking information can help to identify areas that may need additional supports to remain resilient. To

assist with planning, the CDC assigns an overall SVI score for each county, possible scores range from 0 (lowest vulnerability) to 1 (highest vulnerability). Figure 12 depicts overall SVI scores and SVI scores in each of the four related themes for each county.

Overall SVI scores range from 0.0704 in Oneida County to 0.9718 in Forest County. Each county varies greatly in terms of social vulnerability. "Socioeconomic Status" (including those below poverty, unemployed, income, and low educational attainment) is a significant factor in Forest, Adams, Juneau, and Langlade Counties. Forest, Langlade and Wood Counties are more vulnerable in the "Household Composition and Disability" category (aged 65 or older, age 17 or younger, older than 5 with a disability, single-parent households). "Minority Status and Language" (minority, speak English "less than well") is a significant factor in Marathon, Forest, Adams, and Portage Counties. Juneau, Portage, Forest, and Adams Counties all have vulnerability in the area of "Housing Type and Transportation" (multi-unit structures, mobile homes, crowding, no vehicle, group quarters).

FIGURE 12: 2018 CDC SOCIAL VULNERABILITY RANKING BY COUNTY

Legend:
- Overall SVI Score
- Housing and Transportation
- Minority Status and Language
- Housing Composition and Disability
- Socioeconomic Status

Oneida:
- 0.0704
- 0.1127
- 0.0423
- 0.2394
- 0.1268

Lincoln:
- 0.2535
- 0.4085
- 0.0141
- 0.4085
- 0.4366

Vilas:
- 0.2676
- 0.0282
- 0.4507
- 0.6056
- 0.6056

Marathon:
- 0.3239
- 0.3803
- 0.8873
- 0.1408
- 0.2254

Wood:
- 0.3521
- 0.2676
- 0.5211
- 0.6901
- 0.338

Portage:
- 0.4085
- 0.7324
- 0.662
- 0.0282
- 0.4085

Langlade:
- 0.7606
- 0.3803
- 0.2676
- 0.7324
- 0.9296

Juneau:
- 0.7887
- 0.7606
- 0.2817
- 0.5775
- 0.9155

Adams:
- 0.8873
- 0.6338
- 0.6197
- 0.5352
- 1

Forest:
- 0.9718
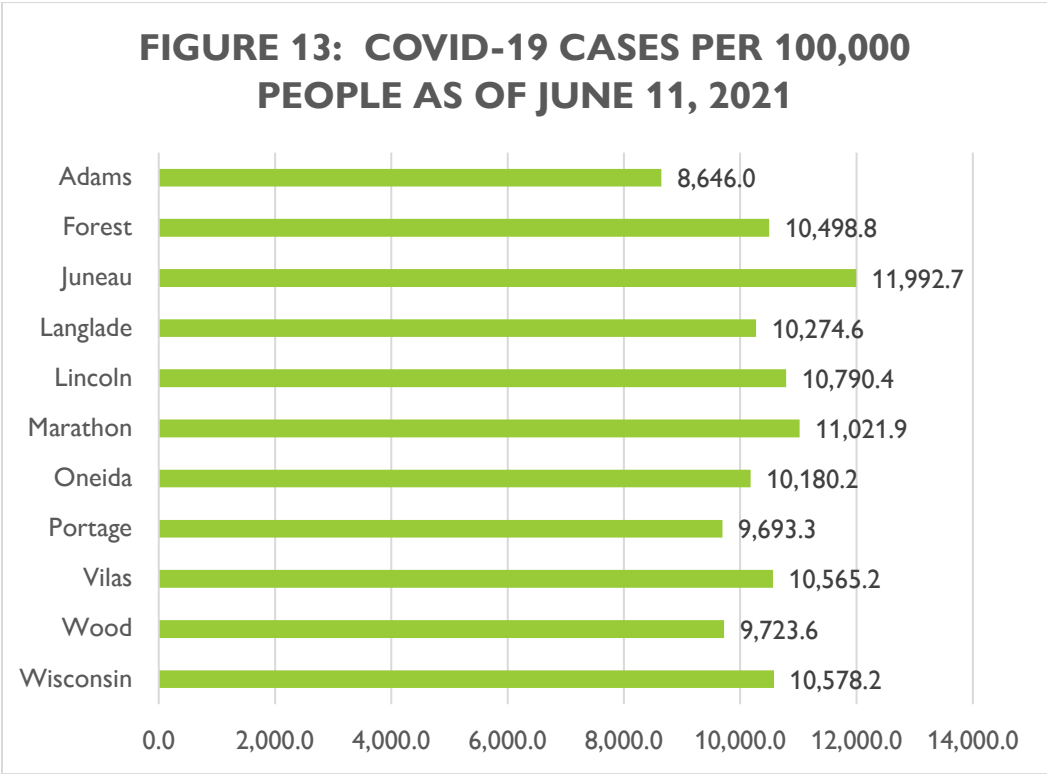- 0.6479
- 0.6479
- 0.9718
- 0.9859

Source: Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry/Geospatial Research, Analysis and Services Program

COVID-19 Regionally

The Wisconsin Department of Health Services has been collecting and reporting a myriad of COVID-19 data at the census tract, county, and state level. The data ranges from 7-day percent positives to cases and deaths by gender, race and ethnicity. They also report data on labs and testing, hospitals, and wastewater monitoring.
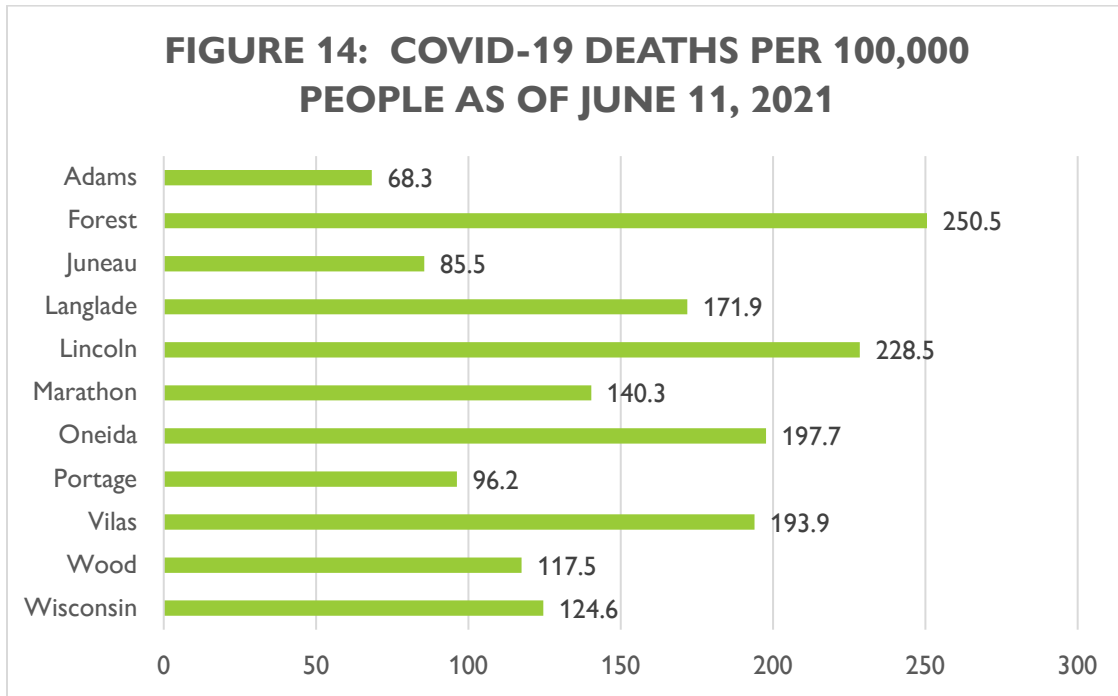
Figure 13 details number of confirmed positive COVID-19 cases and deaths per 100,000 by county and state, as of June 11, 2021. It is important to note that the rate of COVID-19 cases or deaths per 100,000 people are not age adjusted. This is significant as those counties with a higher proportion of those in the older age categories are more likely to experience a greater severity in both case burden and deaths as a result of COVID-19.

In the State of Wisconsin there were 10,578.2 confirmed positive COVID-19 cases per 100,000 people as of June 11. Juneau, Marathon and Lincoln Counties all had more cases than the state average. All other regional counties had fewer cases than the state average.

FIGURE 13: COVID-19 CASES PER 100,000 PEOPLE AS OF JUNE 11, 2021

County	Cases per 100,000
Adams	8,646.0
Forest	10,498.8
Juneau	11,992.7
Langlade	10,274.6
Lincoln	10,790.4
Marathon	11,021.9
Oneida	10,180.2
Portage	9,693.3
Vilas	10,565.2
Wood	9,723.6
Wisconsin	10,578.2

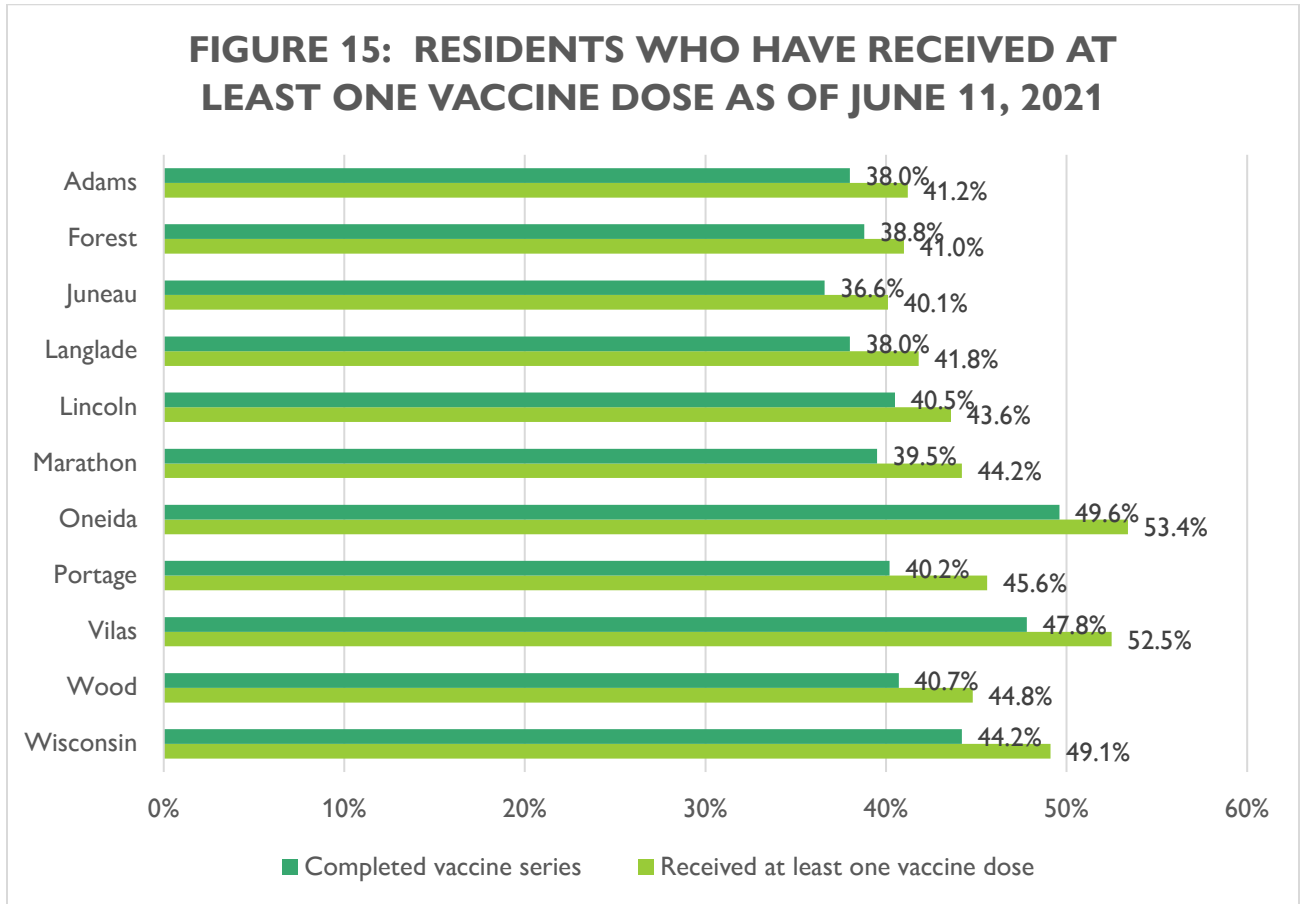Source: Wisconsin Department of Health Services

Figure 14 details confirmed COVID-19 deaths per 100,000 people as of June 11. The state average was 124.6 as of June 11. Forest, Lincoln, Oneida, Vilas, Langlade, and Marathon Counties were all higher than the state average. Adams, Juneau, Portage, and Wood Counties were lower than the state average. In all counties that are higher than the state average, the median age is substantially higher than the state average. This is likely a significant contributing factor.

FIGURE 14: COVID-19 DEATHS PER 100,000 PEOPLE AS OF JUNE 11, 2021

County	Deaths per 100,000
Adams	68.3
Forest	250.5
Juneau	85.5
Langlade	171.9
Lincoln	228.5
Marathon	140.3
Oneida	197.7
Portage	96.2
Vilas	193.9
Wood	117.5
Wisconsin	124.6

Source: Wisconsin Department of Health Services

On December 11, 2020 the U.S. Food and Drug Administration issued the first emergency use authorization (EUA) for a vaccine for the prevention of COVID-19 caused by SARS-CoV-2 in individuals 16 and over. In April of 2020 there was subsequent authorization for the use of vaccines for those 12-15 years of age. Figure 15 illustrates the percentage of those who had received at least one dose of the vaccination as of June 11, 2021.
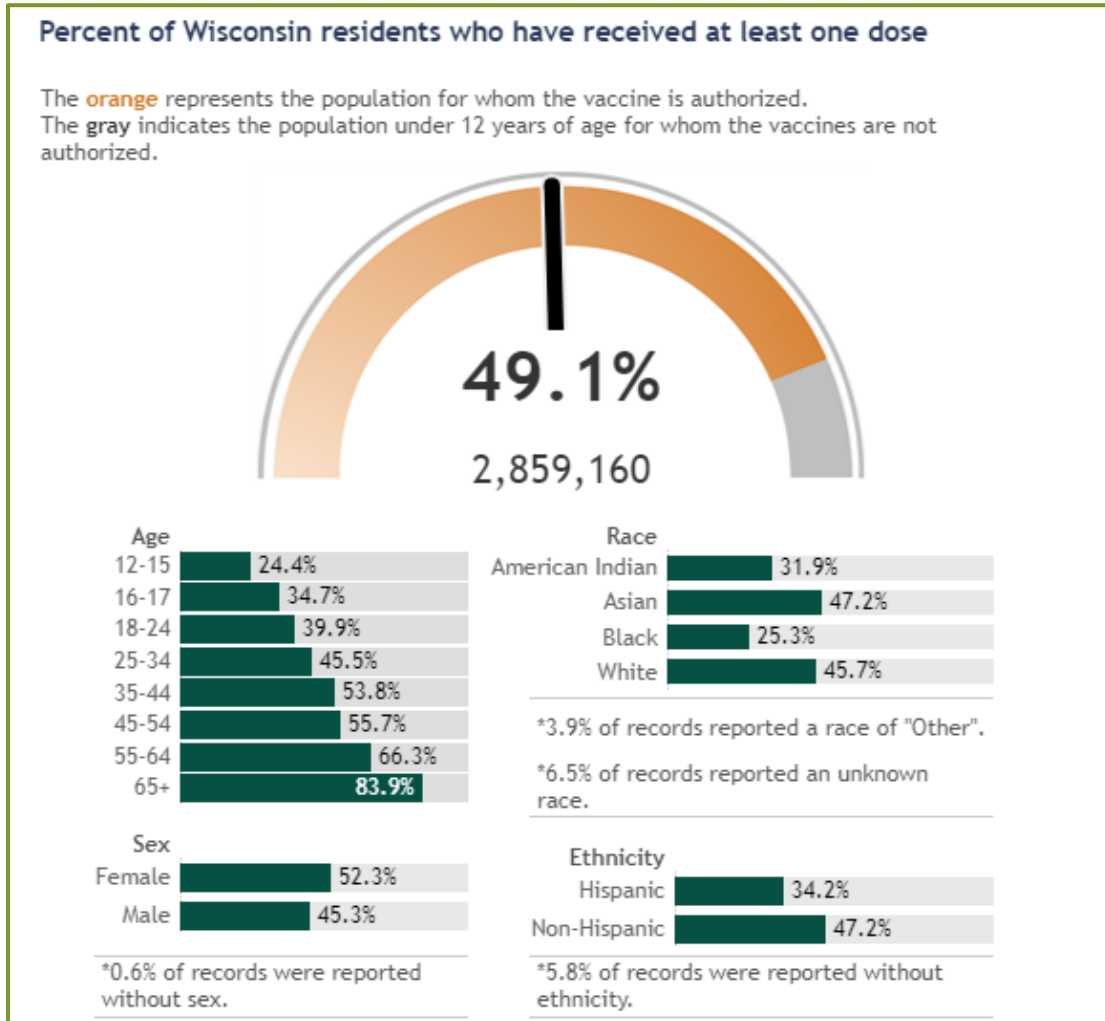
The percent of those who had completed the vaccine series ranged from 36.6 percent in Juneau County to 49.6 percent in Oneida County. The percent of those that had received one vaccine ranged from 40.1 percent in Juneau County to 53.4 percent in Oneida County. This compares to 44.2 percent of Wisconsin residents that had completed the vaccine series and 49.1 percent of Wisconsin residents that had received one dose.

FIGURE 15: RESIDENTS WHO HAVE RECEIVED AT LEAST ONE VACCINE DOSE AS OF JUNE 11, 2021

County	Completed vaccine series	Received at least one vaccine dose
Adams	38.0%	41.2%
Forest	38.8%	41.0%
Juneau	36.6%	40.1%
Langlade	38.0%	41.8%
Lincoln	40.5%	43.6%
Marathon	39.5%	44.2%
Oneida	49.6%	53.4%
Portage	40.2%	45.6%
Vilas	47.8%	52.5%
Wood	40.7%	44.8%
Wisconsin	44.2%	49.1%

Source: Wisconsin Department of Health Services

Figure 16 details more detailed vaccination data at the state level as of June 11, 2021. Most Wisconsin residents (83.9%) that have received their vaccination are 65 and over. More females (52%) versus males (45.3%) have been vaccinated. Asians have the highest vaccination rate of all racial groups at a rate of 47.2 percent.

FIGURE 16: STATE OF WISCONSIN VACCINATION DATA BY AGE, GENDER, AND RACE/ETHNICITY AS OF 6/11/21

Percent of Wisconsin residents who have received at least one dose

The **orange** represents the population for whom the vaccine is authorized.
The **gray** indicates the population under 12 years of age for whom the vaccines are not authorized.

49.1%
2,859,160

Age
12-15	24.4%
16-17	34.7%
18-24	39.9%
25-34	45.5%
35-44	53.8%
45-54	55.7%
55-64	66.3%
65+	83.9%

Race
American Indian	31.9%
Asian	47.2%
Black	25.3%
White	45.7%

*3.9% of records reported a race of "Other".

*6.5% of records reported an unknown race.

Sex
Female	52.3%
Male	45.3%

*0.6% of records were reported without sex.

Ethnicity
Hispanic	34.2%
Non-Hispanic	47.2%

*5.8% of records were reported without ethnicity.

Source: Wisconsin Department of Health Services

ANALYSIS

PRIORITY AREAS

The Regional Health Pandemic Assessment and Future Response Committee had the opportunity to discuss many key issues in their meetings throughout 2021. The COVID-19 global pandemic created new issues and exposed areas that were already vulnerable pre-pandemic. There were several re-emerging themes and areas that were identified as being significant. Four priority areas were identified by the Committee:

1. Meeting public health mission objectives during the COVID-19 pandemic
2. Building on intergovernmental and interagency collaboration
3. Advancing health equity
4. Investing in public health in the state and thereby the region

Meeting Public Health Mission Objectives

County and tribal health departments throughout the State of Wisconsin carry out a wide range of critical service objectives. These services include measures that prevent disease outbreaks, promote healthy practices, and protect community health and economic vitality. Due to the COVID-19 outbreak, local public health agencies throughout the region were tasked with response services in addition to critical mission services being carried out.

Preventing Outbreaks and Disease

All county and tribal health departments throughout the ten-county region implement a wide-range of programs and measures to prevent and control the spread of outbreaks and disease. They do this in a variety of ways. Local health departments provide immunizations to prevent disease transmission. They also provide disease surveillance, investigate disease outbreaks, and implement best practices to better detect, stop, and prevent, disease outbreaks. Health departments are tasked with keeping food and the physical environment safe. This can include well testing, radon testing, and information about lead poisoning.

Promoting Healthy Practices

County and tribal health departments throughout the ten-county region work to promote healthy practices in a multitude of ways. Most commonly this is done through informing the public on healthy practices. Local health departments promote health behaviors through changes in policies and practices at an organizational and systems level. This is done on range of topics including infectious disease, environmental safety, and accident and injury prevention. All local health departments throughout the ten-county region administer the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). This program provides federal grants to states for supplemental foods, health care referrals, and nutrition education for low-income women and children up to age five.

Protecting Community Health and Economic Vitality

Finally, county and tribal health departments are tasked with protecting community health and economic vitality. All regional health agencies prepare the public for public health emergencies and other disasters. This may include ensuring the safety of outdoor recreational activities by monitoring the presence of E. coli bacteria throughout the swimming season. It may include assisting residents with prescription costs, disease prevention and management, or immunizations.

COVID-19 Related Public Health Services

The COVID-19 outbreak created a myriad of response activities that included:

- Keeping the public, businesses, organizations, and schools informed on what actions they could take to be safe
- Ensuring access to COVID-19 testing by working in partnership with health care, EMS, Emergency Management, and other community organizations
- Conducting disease investigation, contact tracing, and monitoring; ensuring residents had a safe place to quarantine/isolate
- Coordinating COVID-19 vaccination efforts in their community, standing up vaccine clinics to compliment and address access gaps
- Collecting and reviewing data to inform the community how quickly the virus is spreading, the severity of the virus, and the percentage of individuals vaccinated.
- Prioritizing and integrating health equity into all response activities
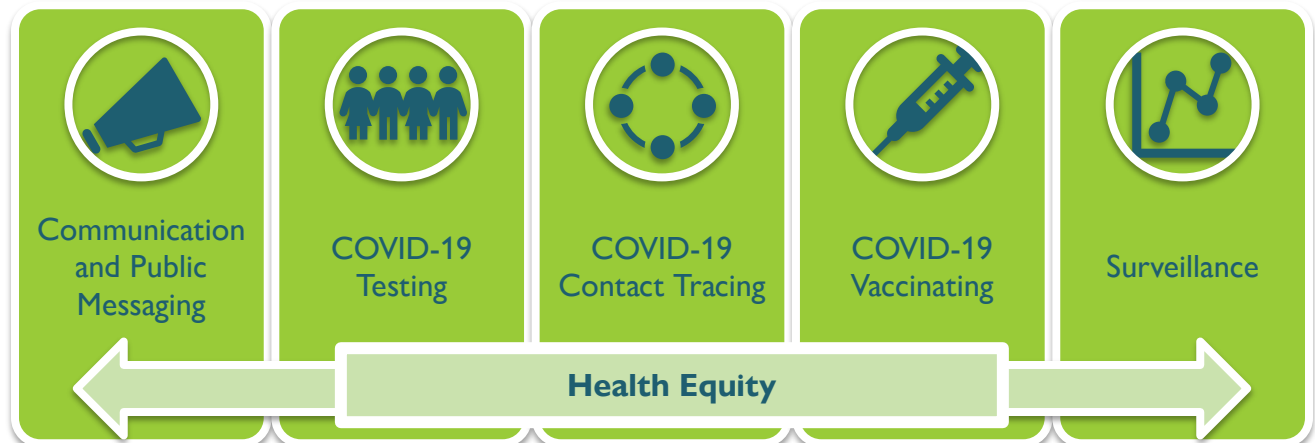
Local and tribal health department needed to stand-up COVID-19 response services while continuing to carry-out critical mission services that needed to continue uninterrupted. This resulted in the need for additional staff hours and personnel either through hiring, contracting and/or utilization of volunteers.

Communication/Public Messaging

During the COVID-19 pandemic, local public health departments were tasked with being the primary source of public messaging. They provided timely, consistent, and clear messaging to the public during times when there were inconsistent messages at the federal and state level. To further complicate the situation, new information about COVID-19 was being gathered at an extremely fast pace and having best practices continued to shift on a daily and weekly basis.

State, local, and tribal health departments advised the public to stay home, practice social distancing, wear a mask, and eventually to get a vaccine. The adoption of new health behaviors is challenging, even for individuals who are motivated to make the change. This was a difficult objective throughout the nation and our region. One reason being that COVID-19 became an increasingly politicized issue from March 2020 and beyond. A fairly sizable group still believes that COVID-19 does not exist or is a hoax. An additional barrier for tribal entities is a lack of trust of tribal members due to past instances when Native Americans did not consent to medical testing or were not fully informed about procedures. Lastly, there was an economic impact in terms of lost wages associated with being quarantined or isolated.

Marathon County Health Department Facebook Page

This communication and public messaging also included guidance to educational institutions, workplaces, and municipalities. Local health departments were asked to guide policy on everything from school district protocol to pool openings. They were asked to provide recommendations and guidance in a rapidly changing and dynamic environment. Some local health authorities noted that it would have been helpful to have more uniform guidance at the state level to advise local entities such as school districts.

COVID-19 Testing. Disease Investigation and Contact Tracing. Vaccination

County and tribal health departments are charged with the assurance role of assuring access to COVID-19 testing, carrying out disease investigation and contact tracing, and assuring access to vaccinations. Because of the rapidly changing landscape associated with the global pandemic, they were required do this within a very dynamic environment. All local health departments within the ten-county region provided information about where and how to get tested for COVID-19. In most cases they also provided this testing, sometimes through governmental partnership. For example, many local health departments partnered with the Army National Guard. Guidance from local health departments included information about symptoms, when to get tested and where to go. They also provided information about how test results would be shared.
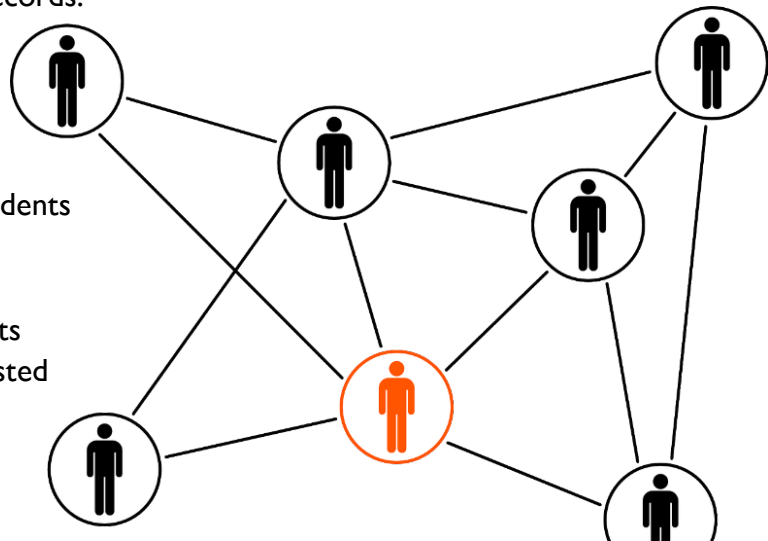
Disease investigation and contact tracing has been a key component in reducing the spread of COVID-19. Local health department staff identified contacts of an individual with COVID-19,

notifying them of their exposure and need to quarantine. They also helped to ensure the safe, sustainable, and effective quarantine of contacts to prevent additional transmission. They used technology to maintain up-to-date records.

During the significant surge in cases, local health departments relied on schools, businesses, and organizations to identify and notify contacts for their employees and students to ensure timely notification.

County and tribal health departments throughout the region have also assisted with informing the public about the vaccine phases and general vaccine information. Health departments in their assurance role stood up vaccination clinics for vulnerable populations and access gaps. As

Source: Image by OpenClipart-Vectors from Pixabay

part of the WI Departments of Health Services overall vaccination strategy, Marathon County was selected to be one of five regional vaccination sites. The site staffed by AMI Expeditionary Healthcare is capable of administering 1,000 COVID-19 vaccines per day.

Surveillance

During the COVID-19 pandemic local health departments throughout the ten-county region were responsible for reporting and monitoring COVID-19 cases. Data collected from disease investigation and contact tracing was reported into the Wisconsin Electronic Disease Surveillance System (WEDSS). This data is used to track the impact of the disease and inform the public health response. Local health departments throughout the region noted that WEDSS was cumbersome, having data fields for entering information and reporting features built in real-time.

The monitoring of COVID-19 to look at the spread and impact of the disease is done through the review of data looking at case totals, hospitalization rates, mortality, and vaccination percentages, through the lens of age, race/ethnicity, and census tract.

One challenge related to disease surveillance is that much of the region is largely rural, having smaller numbers to report.   Many local health departments do not have an epidemiologist on staff, relying on state data experts and resources.

Staffing

County and tribal health department staff throughout the ten-county region have reported working longer hours including nights and weekends to keep up with demand resulting from the COVID-19 pandemic. They have reported dealing with issues such as low staff morale, staff burnout and fatigue. In fact, staff related issues appeared most commonly across all categories when Committee members were asked about goals, challenges and accomplishments. Mental health became significant area of concern during the pandemic for the general population. However, this was true to a very large extent for those working in the area of public health.

Health departments devised ways to address the need to substantially increase staff capacity by reprioritizing critical mission services, reassigning staff duties, hiring limited term employees, and/or contracting with staffing agencies. In almost all cases, staff reorganization was required to maintain critical mission services while carrying out COVID-19 response functions. Even prior to the COVID-19 pandemic, local health departments have been understaffed. The Trust for America's Health reports that the most recent Public Health Workforce Interest and Needs Survey found that the governmental public health workforce faces major challenges in turnover and attrition, putting the public's health at risk. Furthermore, reductions in federal and state public health budgets have impacted efforts to hire, train and retain a strong public health workforce. The pandemic has demonstrated the need for a strong public health system at the local level and Wisconsin ranks 47th in the nation in per capita public health spending.

Juneau County Health Department Facebook Page

In moving forward, local and tribal health departments will need to continue to explore staffing models that can expand staffing resources to response to communicable disease threats. In a 2019 article by Deloitte.Insights "The Future of Work in Government", the authors look at the future of work in government in terms of work, the workforce, and the workplace. They note that in the future government will have more options in terms of how work is performed, who performs the work and where it is completed. They identify ways to increase our use of technology, simplify job descriptions and create more flexible work systems. There may be

opportunities in these areas within the local public health realm. In addition, looking at ways to further share services across jurisdictions has merit, as shared service models have demonstrated added value for local and tribal health departments in carrying out program services.

Over Half of the Public Health Workforce Experienced Mental Health Challenges During the Pandemic

A recent (June 25, 2021) Monthly Morbidity and Mortality Weekly Report from the Centers for Disease Control and Prevention revealed that, among the 26,174 public health workers who responded to a survey, 53% reported having symptoms of at least one mental health condition in the preceding two-week period (survey conducted March 29-April 16, 2021). Of particular concern, Post Traumatic Stress Disorder (PTSD) was found to be 10-20% higher among public health workers than previously reported rates for healthcare workers, frontline personnel, and the general public. Respondents indicated that contributors to PTSD symptoms included feeling overwhelmed by their workload and feeling bullied, threatened, or harassed because of their work. The survey also assessed symptoms of depression, anxiety, and suicidal ideation.

On an equally concerning note, the survey also revealed that, even where available, Employee Assistance Programs (EAP) were not commonly used and many public health workers were not aware if they had access to EAP. This study highlights the importance of quickly ramping up staffing to assure reasonable work schedules and opportunities for breaks and time off. However, with this damage already done, the question at hand is how can we support our public health workforce in their own recovery while they continue to work tirelessly to support the recovery of the communities they serve? If left to their own accord, far too many public health workers will continue to focus on others, while leaving their own mental health needs unmet.

Susan Kunferman, RN, MSN, CPM, Wood County Director/Health Officer

Health Equity
From the outset, health equity has been a critical component of the work of local public health departments. Health equity is defined by the U.S. Department of Health and Human Services as "the attainment of the highest level of health for all people". This weaves into every service objective carried out by local public health. Local health departments are considering healthcare disparities when carrying out of range of services including violence prevention, ending the HIV epidemic and reducing the burden of largely preventable chronic diseases.

The COVID-19 pandemic was no exception. The pandemic highlighted the need to continue to ensure that health equity was continually prioritized in all objectives ranging from public messaging to contact tracing to vaccination. For example, in contact tracing and quarantining, local health departments were instrumental in ensuring safe isolation and quarantine in contact tracing. Safe isolation and quarantine presented particular challenges for those within disadvantaged populations. Counties evaluated the need to put into place alternative housing

so that people could safely isolate or quarantine and many counties within the region did so. This process varied from county to county. In certain instances, additional measures were put into place for the homeless population, who oftentimes faced even greater challenges.

Throughout the pandemic, health equity was continually considered and there were multiple layers that shifted somewhat over time. Initially, the needs of an especially vulnerable elderly population were identified. This group was at greater risk for getting severe illness and was also at a high risk for social isolation and loneliness due to social distancing practices. In addition, those that were economically disadvantaged were quickly identified as needing special consideration due to such factors as more people in the home, less ability to work remotely and the need for continued public transportation services. Within this region, the health equity lens must also include the rural population. This group faces such barriers as nonexistent or insufficient broadband and lack of proximity to services including healthcare. This group is also at increased risk for isolation.

Planning Guidance

In terms of planning guidance, local public health entities relied mainly on national and state guidance as it was released. This was mainly in the form of documents released by the CDC and Wisconsin Department of Health Services (DHS). The guidance was most beneficial when released in a clear and timely manner with continued updates as we learned more about the virus. It was noted that it would have been helpful to have had clear metrics for specific instances (i.e. statewide guidance for school metrics).

Building on Intergovernmental and Interagency Collaboration

The COVID-19 global pandemic has demonstrated a unique opportunity for coordination and collaboration between governmental agencies. This can be done either vertically (between federal and local or state and local governments) or horizontally (between various local entities).

One example of vertical collaboration within the region, local public health partnering with the Wisconsin National Guard (WING) for COVID-19 testing. The testing was free to residents and was available at specified locations such as churches and Aging and Disability Resource Centers (ADRC's). In the case of Portage County, Portage County Public Health and Emergency Medical Services collected half of the samples and the National Guard collected the other half. Individuals received results through email.

Regional collaboration proved to be essential during the COVID-19 pandemic. The North Central Wisconsin Healthcare Readiness Coalition (NCW HERC) increases collaboration readiness across the healthcare sector, public and private, to prevent, respond to, and recover from emergent, catastrophic events. NCW HERC provided much needed resources and information throughout the COVID-19 pandemic. Throughout the response, NCW HERC focused on assisting members and partners in information sharing and situational awareness on three efforts: medical surge, testing, and vaccination. They focused extensively on regional medical coordination to increase information sharing and situational awareness across healthcare and emergency responders across the NCW HERC region.

Source: Oneida County Health Department Facebook Page

Through these efforts, several best practices have been identified, including enhancing engagement between acute and post-acute care, home health and hospice capabilities, and home monitoring. Additionally, NCW HERC tracked strengths and opportunities to outline a comprehensive After-Action Report. From collaborative efforts, metrics and measurements of success were able to be defined and monitored. Shifts in the healthcare climate were able to be identified as well. Regional awareness was seen as invaluable, related to creating a platform for up down

dissemination and aggregating concerns and best practices from the local level, leveraged by responders throughout.

Another opportunity in horizontal collaboration that deserves further exploration is in larger local health departments partnering with smaller local health departments to share services. By providing some public health services on a more regional scale it may be possible to eliminate duplication of services and offer additional services to those in more rural areas.

DHS/WING Collaboration on COVID-19 Testing

Collaboration between DHS and the WING on COVID-19 testing began in early to mid-April. At that time, Wisconsin began to see outbreaks in long term care facilities and businesses which required short-notice testing for staff and residents. When these outbreaks occurred, DHS and WING held a coordination call with the affected location, their local public health, and emergency management partners through the Specimen Collection Action Team. If the testing was for an outbreak in a long-term care facility, business, or other similar location, the location requesting the testing was responsible for securing the space for testing. For community testing open to the public, local public health and/or emergency management secured the space for the testing. Parameters for each site, such as where the testing would occur, limitations or expectations, proper lighting, restrooms, and break areas, were discussed and agreed upon during the coordination call with the Specimen Collection Action Team. WING specimen collection teams moved across the entire state to support all testing requests. State level collaboration was very advantageous, giving us the ability to communicate effectively with local partners, provide a joint voice in said communications, and have the bandwidth and resources to work through any areas of concern in the process. This collaboration also set us up well for the rollout of vaccination support, and further collaboration between WING and DHS in the vaccination arena. Considerations for future efforts include encouraging public health partners to explore and maximize private sector resources as well as increase planning for interpretation needs that may be present in each community.

Becky Luebke, CSW Human Service Area Coordinator – Northern Region Wisconsin Department of Health Services

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Advancing Health Equity

The CDC defines health equity as when "all people have the opportunity to attain their full health potential and no one is disadvantaged from achieving this potential because of their social position or other socially determined circumstance". One major category that influences health equity is social determinants of health. This category includes social and economic conditions that influence the health of people and communities. The COVID-19 pandemic has created new challenges for those with social and economic barriers and highlighted health inequities across the nation and throughout our region. The Committee has identified factors impacting health equity that are most critical to those within the region.

Rural Populations

Much of the ten-county region is rural, and those within these rural areas have barriers that were highlighted as a result of the COVID-19 pandemic. Many rural areas still lack adequate broadband service. During the pandemic most business, education and health shifted to a work/learn/shop from home environment. This was especially true when Governor Evers issued the "Safer at Home Order" and much of it continued even after the order was lifted. A great deal of healthcare shifted to telehealth visits during this time. Those without broadband did not have the option of utilizing telehealth appointments, virtual learning or accessing online social services.

Another concern within the region is provider shortages. All counties in the ten-county region are either all or partially in primary care, mental health, and dental provider shortage areas. Therefore, those is rural areas are often already commuting long distances to their appointments. In addition, some have transportation barriers. Medical office closures made it even more difficult for those in rural areas to obtain healthcare. Additionally, many nonessential appointments were cancelled which added another level of complication.

Interestingly, many with second homes throughout these rural areas temporarily or permanently located to them during the pandemic. This placed additional strain on medical and healthcare facilities. This impacted not only healthcare services, but all public services in these areas.

Vulnerable Populations

Vulnerable populations including those in institutions, with disabilities/special needs and those that lack resources, had unique barriers during the pandemic. The Committee believed that challenges that this group faced were not always addressed adequately during the pandemic. Those in congregate settings such as homeless shelters, group homes and detention centers

were at increased risk for getting and spreading the virus due to the fact that COVID-19 is spread largely through person-to-person contact. It was and continues to be extremely difficult for those living within these settings to follow proper quarantine procedure when recommended. In addition, mask compliance can be difficult for adults and children with special needs.

Those in nursing homes and long-term care facilities received special guidance from the CDC including unique considerations for infection control and vaccination. COVID-19 causes outbreaks in nursing homes and residents are at higher risk of becoming sick or seriously ill due to their age and medical conditions. Guidance involved limiting guests and visitors and monitoring of those caring for residents. Although these steps were necessary for patient safety, the heightened isolation created other difficulties for residents. Wisconsin Department of Health Services lists the following county owned nursing homes within the ten-county region:

Regional Government Owned Licensed Nursing Home Facilities

Lincoln County
- Pine Crest Nursing Home, Merrill

Marathon County
- North Central Health Care, Wausau

Portage County
- Portage County Health Care Center, Stevens Point

Wood County
- Norwood Health Center-Central, Marshfield
- Edgewater Haven Nursing Home, Port Edwards

Additionally, all counties in the ten-county region administer county jails. Staff and inmates in county jails were at increased risk of COVID-19 infection due to living in close proximity. Some Wisconsin sheriffs' offices introduced temporary measures to reduce jail populations. Some of these actions state-wide included allowed those working in the community under Huber Law return home after shifts instead of returning to jail. In some cases, additional restrictions were added to these work release programs such as breathalyzer tests in jail lobbies. Daily bonds were also significantly reduced.

For example, in Oneida County a screening process and restricted block was used for new inmates. Inmates in this area were confined to individual cells. They also installed UV lighting into the air handlers and specialized air filters. Inmates were kept informed on a regular basis what COVID safety measures were being undertaken. Inmates assisted voluntarily with additional cleaning tasks. Vaccines have also been made available to inmates and as of June 30, 2021, 100 inmates have received a vaccine. Implementation of these measures has resulted in

very successful outcomes. Although measures such as these made a significant impact within the region, the overall risk to the inmate population on a national level remained high. The American Medical Association reported in July of 2020 that incarcerated people were infected with COVID-19 at a rate more than five times higher than the national rate.

Another area of concern is those populations with specialized needs. Local Aging and Disability Resource Centers (ADRC) provided critical services during the pandemic. These centers provide information and services about all aspects of life related to aging or living with a disability. The ADRC provides programs and services including in-home personal care and nursing, housekeeping, home modifications, adaptive equipment, transportation, and home-delivered meal programs. Many of these programs and services became especially critical for populations disproportionately impacted by COVID-19.

Providing transportation services has always been challenging in rural areas. People tend to not like to use routed bus services due to not wanting to spend the whole day away from home or it is too difficult for them physically. When COVID started in March 2020, Forest County scaled back their bus services to only in county routed services. At first, we were only transporting one person at a time to complete their shopping or other errands in Crandon. Our usership decreased sufficiently as many individuals were not comfortable using public transportation. The individuals who we were transporting had no other means of transportation including family members. We required them to wear a mask and seating was six feet apart from the bus driver.

As COVID-19 infections decreased and vaccinations efforts increased, we have expanded our services outside of the county. The main reason we changed our service area outside of the county was for people to obtain more affordable food options. Our county has one grocery store that is located in Crandon, which is our county seat. For many, traveling to Crandon is at least a 15 to 40 minute drive depending on where they live. Seniors who were using our transportation services expressed concerns that they needed more affordable food options. We expanded our transportation service area outside of Forest County in March 2021. Individuals who use our transportation services are still required to wear a mask when they are on the bus and we continue to limit our capacity to half of the vehicle's capacity to allow for room for social distancing. Our Medical Escort Program, which is contracted through New Freedom Transportation did not change during the pandemic, we saw an increase in individuals using this service.

Tammy Queen, Director, Forest County Office on Aging

Social Determinants of Health

As stated earlier, social determinants of health (SDOH) are the conditions in the places people live, learn, work, and play that affect a wide range of health risks and outcomes. In a study by Sharma, et. al. in Preventing Chronic Disease Public Health Research, Practice, and Policy, in research titled Social Determinants of Health – Related Needs During COVID-19 Among Low-Income Households with Children, the authors looked at SDOH needs during the pandemic. They found that most respondents reported concerns about financial stability (76.3%), employment (42.5%), food availability (69.4%), food affordability (49.5%), housing stability (31.0%), and access to a clinic or physician (35.9%). A small portion were concerned about transportation (6.4%) and childcare (8.2%).

This is very consistent with the Committee's synopsis. They noted that high unemployment, food access and broadband access were areas of concern during the pandemic. Income and education continue to be barriers to upward mobility. They noted that affordable and reliable broadband, consistent government messaging, and financial resources for food and other needs would be enhancements that would have the most impact on health equity. Other areas of focus included instilling the importance of quarantining and providing support to quarantine. Community healthcare that connects to people where they are and increased funding for public health to build community awareness and engagement were also identified as factors that would have an impact in this area.

Investing in Public Health

As the COVID-19 pandemic has unfolded, the country has experienced stay-at-home and safer-at home orders, mandated businesses closures (including restaurants, health clubs and indoor shopping areas), school closures, and public facility closures as governors take steps to protect public health. Governor Evers declared a Safer-at-Home Order in March and associated business, school, and public facility closures followed.

The degree to which state and federal powers have been tested through this pandemic is unprecedented. Under the U.S. Constitution's 10th Amendment and U.S. Supreme Court decisions over the past 200 years, state governments have the power to prevent the spread of contagious disease. The 10th Amendment also allows states to take public health emergency actions such as setting quarantine and business restrictions.

The central dilemma in public health is balancing the rights of the individual against those of society. The police power is the right of the state to take enforcement action against individuals for the benefit of society. Historically and to present day, public health is granted the ability to do this. However, this concept has become increasing controversial. No matter where the balance falls at any given point in the individual rights versus society continuum, local public health is not equipped from a monetary or infrastructural standpoint for enforcement to maintain the chosen ideal. As it stands, once guidelines are established for individuals, businesses and schools, local public health must establish whether or not cases are epidemiologically linked and then carry-out enforcement measures. It is important to ensure that the required funding and infrastructure are in place to match this expectation.

Public health funding has been and continues to be a critical issue on a federal, state, and local level. There is evidence that health outcomes are improved, and total health care spending is reduced when we invest in public health. A robust public health system is vital to maintain the regions health and vitality. The Trust for America's Health (TFAH) has identified five core capabilities of a robust public health system:

- **Threats assessment and monitoring:** the ability to track the health of a community via data and laboratory testing.
- **All-hazards preparedness:** the capacity to respond to emergencies of all kinds, from natural disasters to infectious disease outbreaks to bioterrorism.
- **Public communication and education:** the ability to effectively communicate to diverse public audiences with timely, science-based information.
- **Community partnership development:** the ability to harness, work with, and lead community stakeholders and to create multisector collaborations to address public health and health equity issues.
- **Program management and leadership:** applying the best business and data informed practices to the public health enterprise.

Federal Funding Sources

The United States has a stratified public health funding system and funding largely flows one way. Public health funds typically flow from the federal government to the state government to local government. Federal government funds are the main source of public health funds and when these funds are cut the impact is felt at all government levels.

To ensure that these core capabilities are maintained requires public health funding. The federal government invests in public health through a variety of agencies and programs. The Center for Disease Control and Prevention (CDC) receives federal dollars to improve public health. In addition to its own agency objectives, the CDC supports states, municipalities, tribes, and other entities. On average in fiscal year 2019, states received $23.53 per person in CDC grants, ranging from $69.25 in Alaska to $18.44 in New Jersey. As shown in Table 5, Wisconsin fell on the far low end of this spectrum at $19.32, ranking 47 out of 50.

Table 5: 2020 CDC Program Funding Transfers to States, FY 2019

	Total State Funding	Total State Funding Per Capita	Total State Funding Per Capita Ranking
WISCONSIN	**$112,496,274**	**$19.32**	**47**
MINNESOTA	$126,543,035	$22.44	34
IOWA	$78,769,080	$24.97	22
ILLINOIS	$255,414,547	$20.16	42
MICHIGAN	$199,429,813	$19.97	44

Source: TFAH 2020 The Impact of Chronic Underfunding on America's Public Health System

Because local governments are reliant on federal funding streams, the National Association of County & City Health Officials (NACCHO) is supporting the 22 x 22 coalition request urging Congress to increase CDC funding 22 percent by 2022 (FY22). The basis for the proposed

increase is that more local health department efforts are needed to prevent diseases that have contributed to a decrease in life expectancy. Federal investment in public health has not kept pace with inflation, nor the considerable challenges associated with infectious disease outbreaks (including COVID-19), extreme weather events and other emergencies. Reductions in the public health workforce have strained the ability of public health departments to protect and promote public health. Creating additional strain for State of Wisconsin and our region, is that Wisconsin is on the far low end of this CDC funding.

Source: NACCHO

State Funding Sources

Total state expenditures of federal funds for public health went from $16 billion in FY 2016 to $13 billion in FY 2017 to $12.8 billion in FY 2018. In addition, in FY 2018, 55 percent of states' public health expenditures came from federal funding sources, up from 48 percent in FY 2015. The other two sizeable sources of state public health revenue were taxes and service charges. Figure 14 displays year over year state public health funding from FY 2018 to FY 2019. From FY 2018 to 2019, Wisconsin increased only slightly at 0.3 percent. Minnesota, Illinois, and Michigan increased substantially, ranging from 6.9 percent to 17.2 percent, and Iowa fell slightly. Wisconsin is far below all neighboring states in the total amount of state funding beyond federal funding. Clearly Wisconsin is not keeping pace at the federal or state level when it comes to public funding.

FIGURE 14: FY 2019 STATE FUNDING FOR PUBLIC HEALTH BEYOND FEDERAL FUNDING
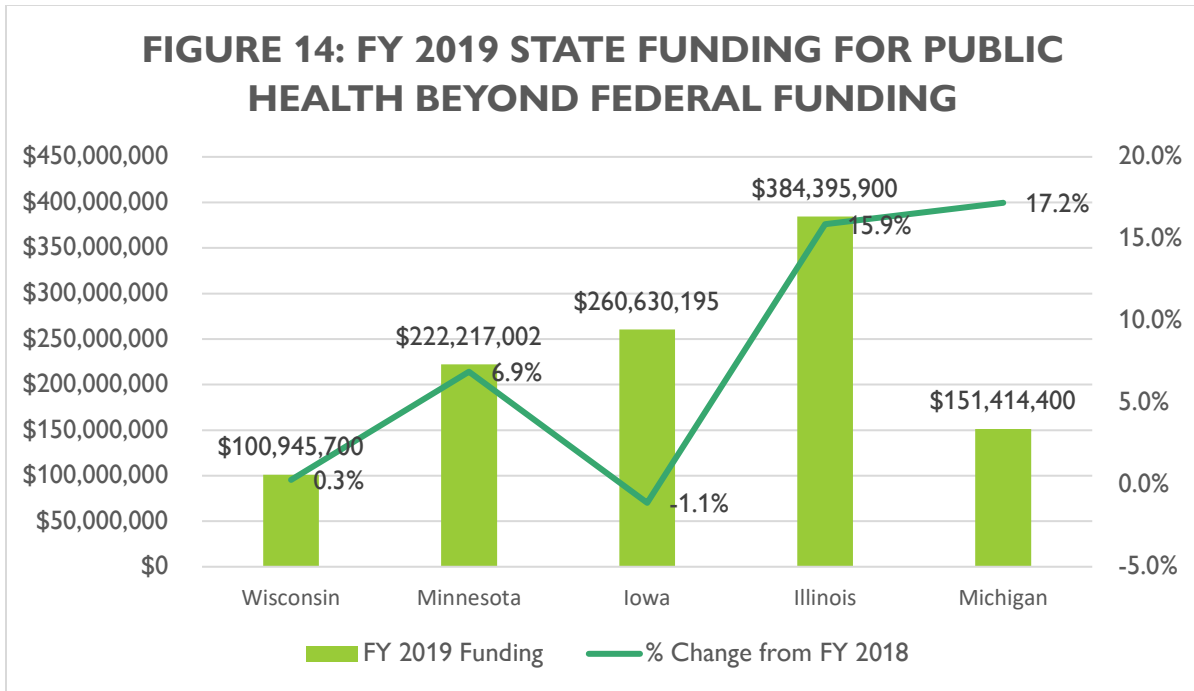
Source: TFAH 2020 The Impact of Chronic Underfunding on America's Public Health System

Adequate public health funding is required to provide services including:

- Threats assessment and monitoring
- All-hazards preparedness
- Public communication and education
- Community partnership development
- Program management and leadership

The COVID-19 global pandemic required a dramatic uptick in public health services in addition to the critical service level that is already provided. The Trust for America's Health reports that the public health system has been chronically underfunded for decades. This is at least in part because the emphasis in the United States is to treat people after they get sick rather than preventing disease before it occurs. Investing in disease prevention helps to reduce preventable illness, reduce healthcare costs, and improve the productivity of the American workforce.

The Kaiser Health Network states that in an April 2020 interview, Dr. Robert Redfield, the director of the CDC said that his "biggest regret" was "that our nation failed over decades to effectively invest in public health". As a result, when the COVID-19 outbreak began, state and local health departments were ill equipped to respond. In summary, the most logical starting point in assessing the COVID-19 pandemic and creating recommendations for future response, is first advocating for an increase in public health funding.

We need a modern and well-funded public health system at all levels to keep our residents protected from all communicable diseases, and to be prepared to address diseases that have been with us for generations, like illness from food, insects, and sexually transmitted diseases, and well as those that arise once a century like COVID. Our current public health system and funding are not enough, our current fight against COVID is not sustainable, and our response to other current and future communicable diseases are not possible without investments and increased flexibility. https://www.dhs.wisconsin.gov/budget/public-health.htm

Joan M. Theurer, R.N., MSN Marathon County Health Officer

SUMMARY & RECOMMENDATIONS

IN SUMMARY

Throughout 2021, the Regional Health Pandemic Assessment and Future Response Committee conducted analysis of the local public health response to the COVID-19 pandemic. This is the largest sustained public health response in history. Local public health response was done with limited resources and placed an intense strain on critical level services. At present, local public health is not structured in such a way to respond to significant events of varying intensity. In addition, it is difficult to calculate a return on investment when an agency's primary objective is prevention.

The global COVID-19 pandemic will likely not have a discernable end date. More likely, the virus will circulate at a lesser degree as local public health continues to conduct testing, contact tracing and vaccination. At this juncture, it is imperative to carefully look at how we invest in public health, and how we staff and provide infrastructure throughout 2022 and beyond. We need to look critically what it is we want local public health to do. If that includes preventing outbreaks and disease (including those of a significant scale and nature such as COVID-19), promoting healthy practices and protecting community health and economic vitality, then we must ensure that this can be done at various levels of crisis.

Local public health, not unlike other areas of government, faces the challenge of determining public value by weighing individual freedoms and the public good. When the desired measure is determined we need infrastructure in place to support public health in meeting the desired objectives. In this way, we are not just reacting to the COVID-19 pandemic, but building a public health system that is sustainable and resilient and can respond effectively to similar events in the future.

Recommendation 1:
Meet Public Health Mission Objectives

1. Modernize and streamline data management and surveillance technology. Local public health relied on the state through the Wisconsin Electronic Disease Surveillance System (WEDSS). Managing this system was staff intensive. Infrastructural improvements are needed.

2. Continue to explore ways to improve metrics within rural communities.

3. Encourage specific state-level guidance related to recommendations for business, educational and municipal facilities best practices in real time during communicable disease threats.

4. Strengthen the department's collection and dissemination of information that connects determinants of health with health outcomes.

Recommendation 2:
Build on Intergovernmental and Interagency Collaboration

1. **Continue to forge robust partnerships among health agency department and staff.**

2. **Continue to improve and enhance internal and external communication.**

3. **Continue to investigate opportunities for horizontal collaboration (among local health departments) and vertical collaborations (at the federal, state, and local levels).**

4. **Continue create and enhance interagency partnerships to enhance local public health services.**

5. **Explore opportunities for larger public health departments to partner with smaller local health departments to share services, where and when this would allow a reduction in duplication and offer enhanced services to smaller departments.**

6. **Consider a regional approach to establish uniformity and consistency across county and tribal lines.**

Recommendation 3:
Advance Health Equity

1. **Weave equity into all aspects of health planning and policy.**

2. **Engage interested members of the community to be trusted partners on health planning concepts.**

3. **Continue to engage and include stakeholders with a focus on equity into all regional and state initiatives. This could include community members and non-traditional partners associated with social determinants of health (SDOH) such as planners, law enforcement, schools, and community organizations.**

4. **Continue to prioritize health equity and meaningful community engagement.**

5. **Continue to ensure that outreach and educational efforts address social and structural determinants of health equities.**

Recommendation 4:
Invest in Public Health

1. Encourage federal and state investment in local public health foundational capabilities.

2. Encourage legislatures to actively protect public health authority at the state and local levels so that experts can continue to promote solutions that encourage economic growth, reduce inequities, and address chronic health conditions.

3. Increase per capita health funding in the State of Wisconsin.

4. Secure more sustained and flexible local public health funding.

5. Bolster recruitment and retention of employees to continue to attract and maintain a talented and diverse workforce.

6. Continue to provide those in leadership roles with training and resources they need to lead a strong and diversified public health department.

7. Explore dynamic staffing models that allow local health departments to expand staffing resources in response to communicable disease threats.

North Central Wisconsin

Regional Health Pandemic Assessment Plan