Milwaukee County COVID-19 Data Summary

Milwaukee County COVID-19 Epidemiology Intel Team

This report was updated on July 16, 2020 and includes data through July 14, 2020. Note that data for recent weeks may be under-reported due to pending test results.

Milwaukee County COVID-19 Summary Statistics

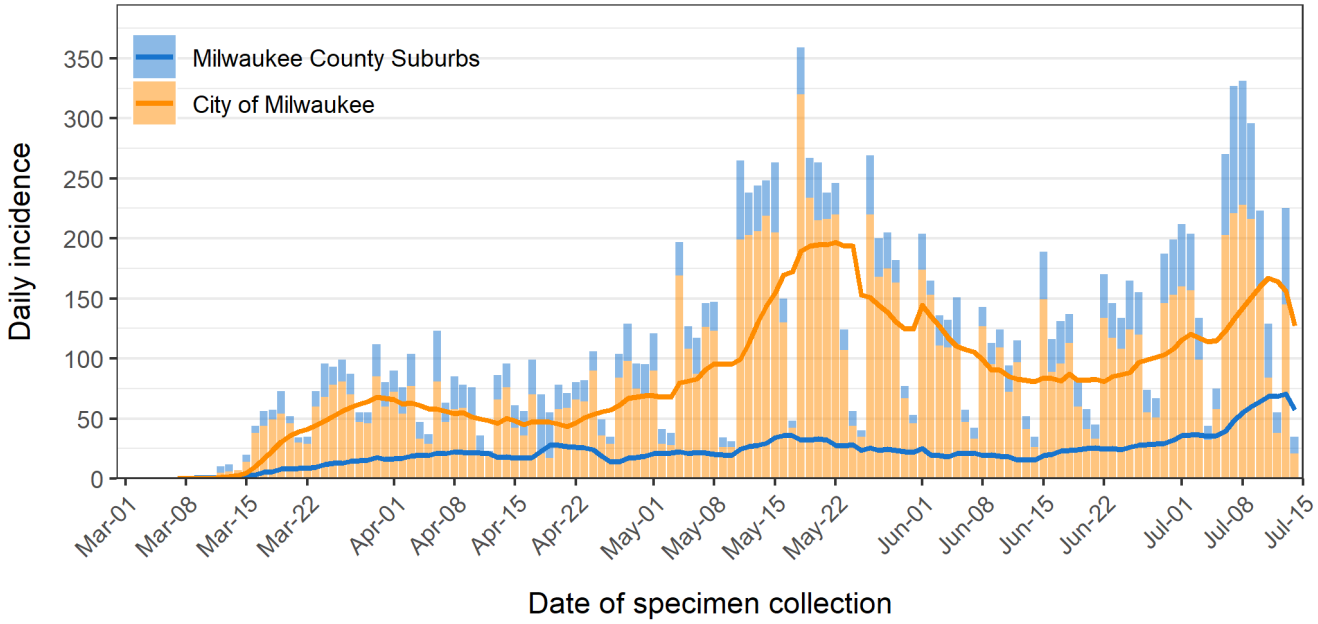
Overall Milwaukee County COVID-19 Summary Statistics March 1 - July 14	
Total tests performed	190,821
Percent positive of all tests performed	8.9%
Number of confirmed cases	14,653
Number of hospitalizations	1,579
Number of deaths	391
Case fatality rate	2.7%

Weekly Milwaukee County COVID-19 Summary Statistics July 8 - July 14	
Total tests performed	22,206
Percent positive of all tests performed	8.3%
Number of confirmed cases	1,294
Number of hospitalizations	73
Number of deaths	2

Total Cases and New Cases

There are now a total of 14653 cases in Milwaukee County, since the first confirmed case on March 6th, 2020. Over the last week, we observed 1294 new confirmed cases in Milwaukee County, including 892 new cases in the city of Milwaukee. **Figure 1** shows the daily incidence of new cases (bars) and the average daily incidence within the last 7 days (line), which provides a smoothing effect to enhance visualization, for both the city and the county. Over the last week, we have seen an increase in confirmed cases. The highest daily case count since the beginning of the epidemic occurred on May 18, 2020, with 359 cases in the county overall and 320 cases in the city. Two free testing sites opened to the public within the City of Milwaukee on May 11th, which may have resulted in the identification of a large number of new cases around this time. Of note, the highest daily case count over the entire period in the suburbs occurred in the last week, on July 7, 2020, with a total of 106 cases confirmed.

Figure 1: Milwaukee Co. daily number of COVID-19 cases

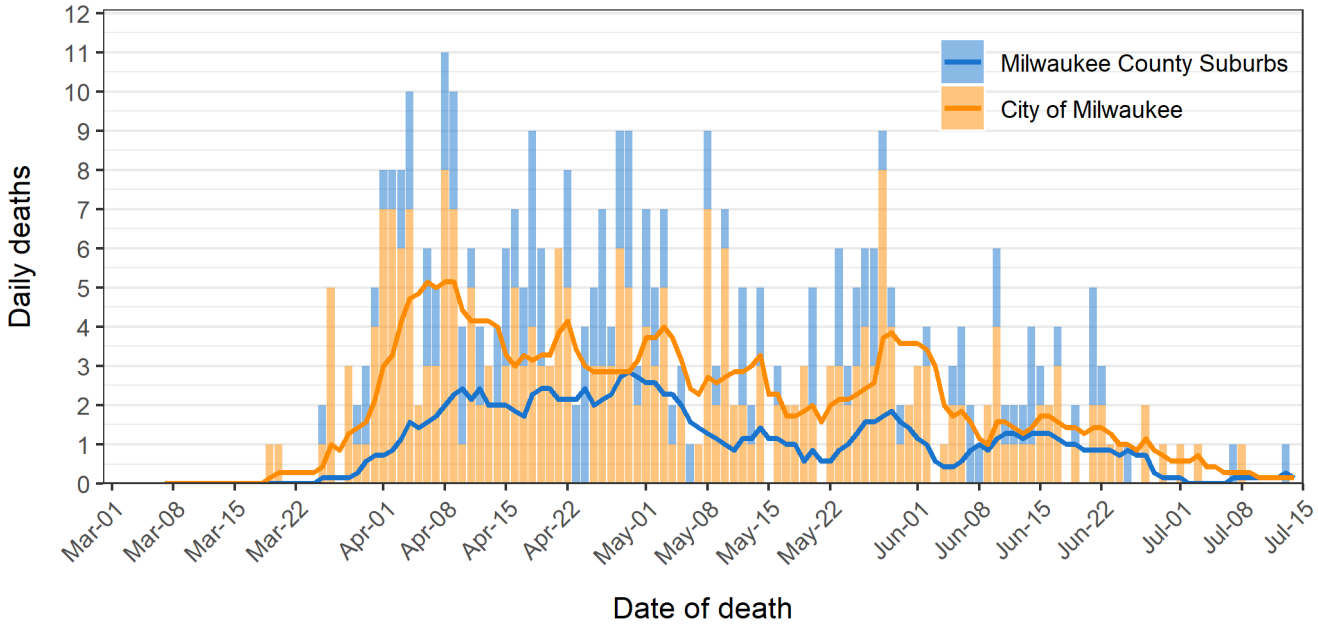


Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

Total Deaths and New Deaths

There are a total of 391 COVID-19 related deaths in Milwaukee County. Over the last week, we observed 2 deaths, including 1 in the City of Milwaukee. **Figure 2** shows the number of daily COVID-19 related deaths among Milwaukee County and City of Milwaukee residents. The overlaid lines show the average daily deaths within the last 7 days for each jurisdiction. Overall, there appears to be a decrease in the daily number of deaths observed, from a peak of 11 deaths on April 8, 2020. Several smaller peaks in deaths are notable since April 8th.

Figure 2: Milwaukee Co. COVID-19 daily deaths

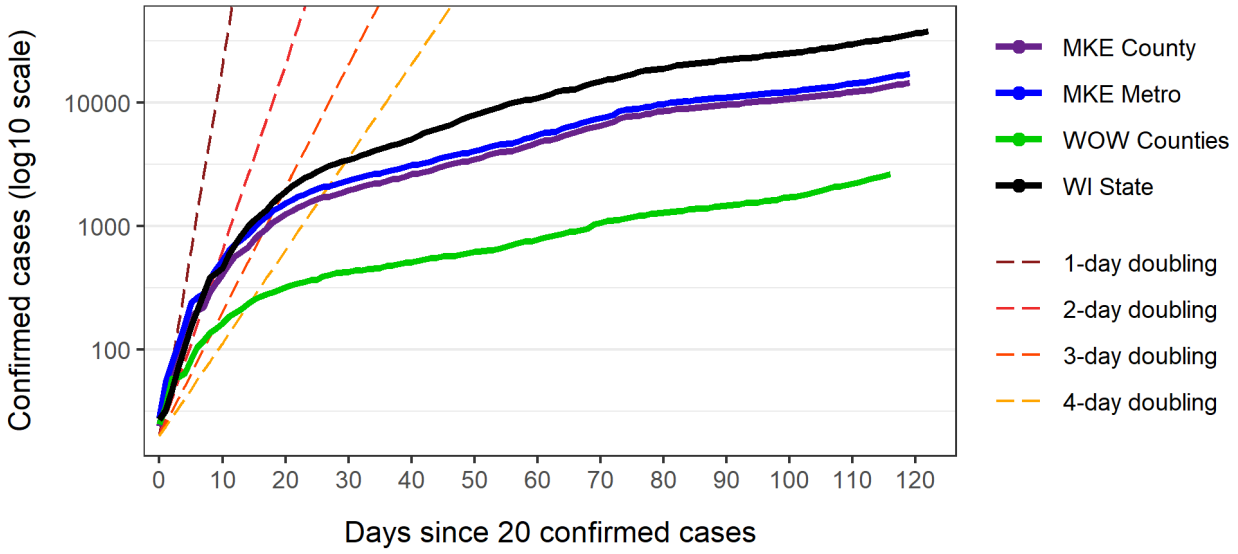


Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

The COVID-19 Growth Rate

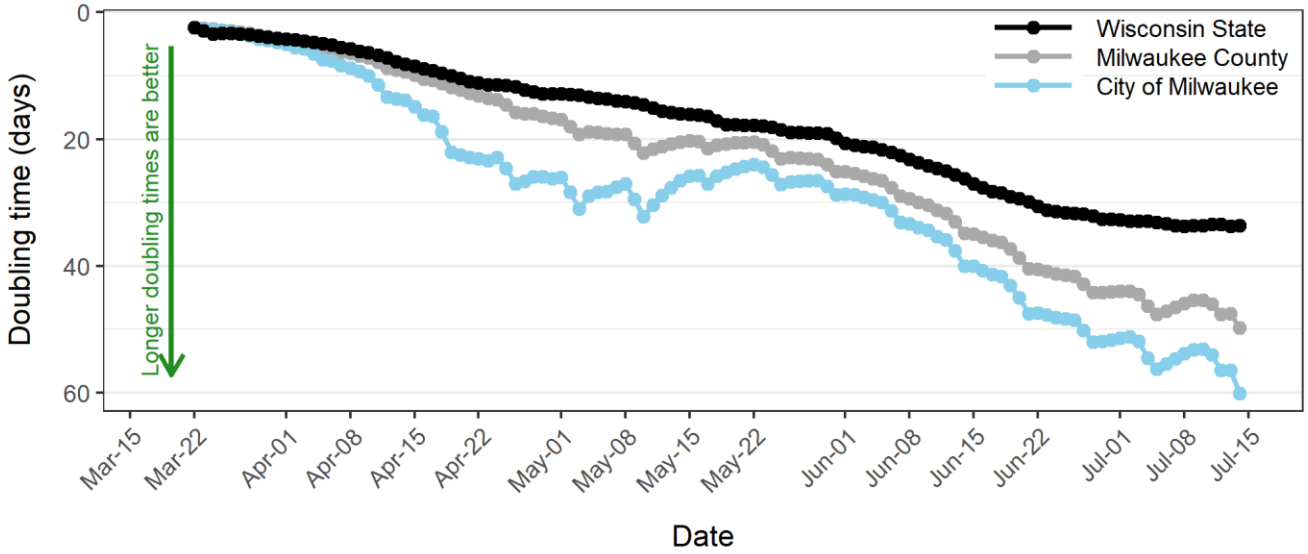
The time it takes for the number of cases to double is called the doubling time. **Figure 3** shows doubling times for Milwaukee County, the surrounding Waukesha, Ozaukee and Walworth (WOW) counties, the M7 (7-county) metropolitan area, and the state of Wisconsin. Dotted lines indicate doubling times of 1, 2 3 and 4 days, which are generally associated with a condition of exponential growth. The current doubling time in Milwaukee County is 49.75 days. The current doubling time for WOW counties is 36.21 days. The current doubling time for the state of Wisconsin is 33.63 days. **Figure 4** shows the trend in doubling times for Milwaukee County and the City of Milwaukee as compared to the state, over the course of the epidemic. As illustrated, the epidemic initially doubled more quickly in Milwaukee County and the city, but has since slowed (improved) more in the city and county than in the state as a whole.

Figure 3: Cumulative cases after 20 confirmed



Data source: Wisconsin Department of Health Services
Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Figure 4: Trend in doubling times

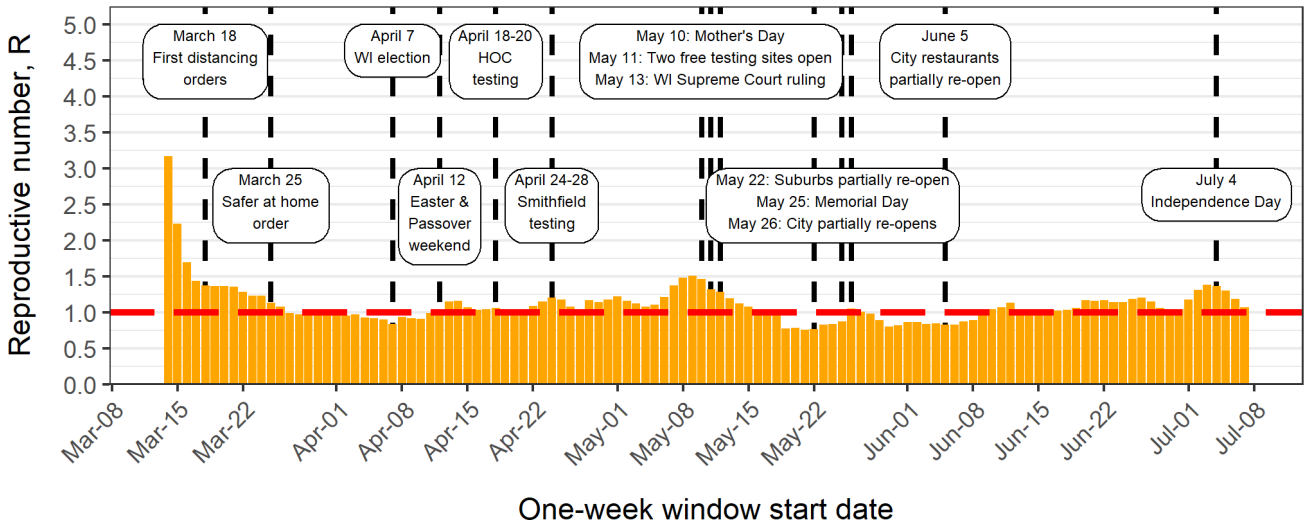


Data sources: WI Department of Health Services & WI Electronic Disease Surveillance System
Created by the Milwaukee County Covid-19 Epidemiology Intel Team

The COVID-19 Reproductive Number

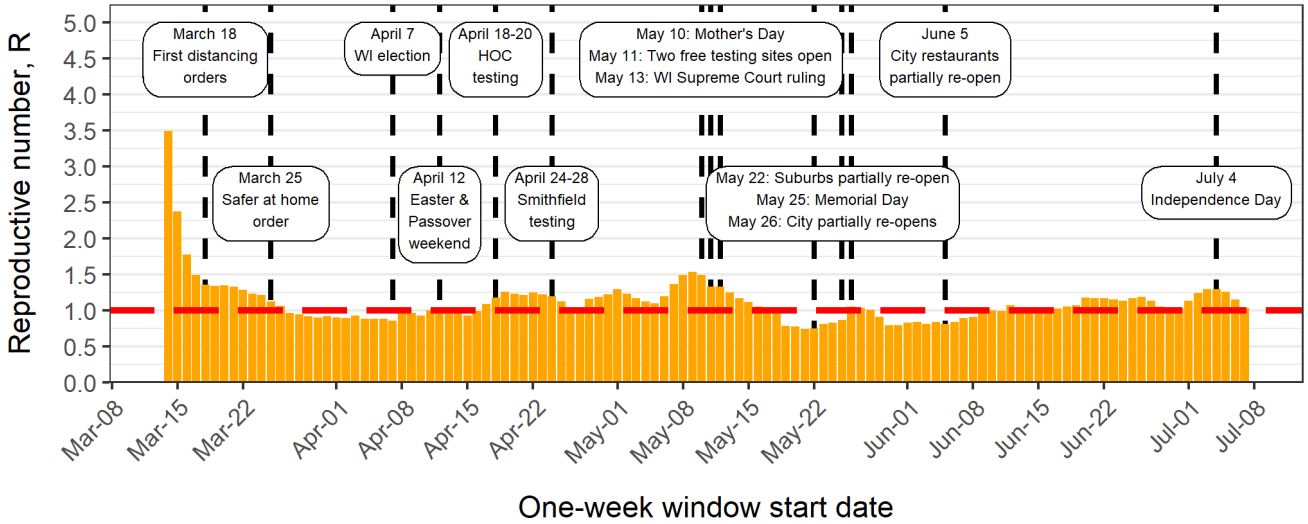
Another way of examining the growth rate of the infection is to examine the reproductive number (R). This number captures the number of new cases that are the result of an existing case. For example, an R of 2 would indicate that each infected person infects 2 new people. The following plots show the change in R over time for Milwaukee County, **Figure 5**, the City of Milwaukee, **Figure 6a**, and Milwaukee County suburbs, **Figure 6b**. Each plot includes key dates related to physical distancing or focused testing campaigns affecting residents. The R for each date is calculated to represent the R for a 7-day period with the start day of that 7-day period represented on the graph. After the first minimum R value in Milwaukee County observed (R = 0.84 on April 7, 2020), we observed an increase in R to a high of 1.51 on May 9, 2020 and then a decrease to a low of 0.76 in the county on May 21, 2020. The R has since increased again to a recent high of 1.38 on July 3, 2020. Patterns in the City of Milwaukee are very similar to those in the county as a whole. Patterns in the suburbs show more fluctuation.

Figure 5: One week reproductive number for Milwaukee County



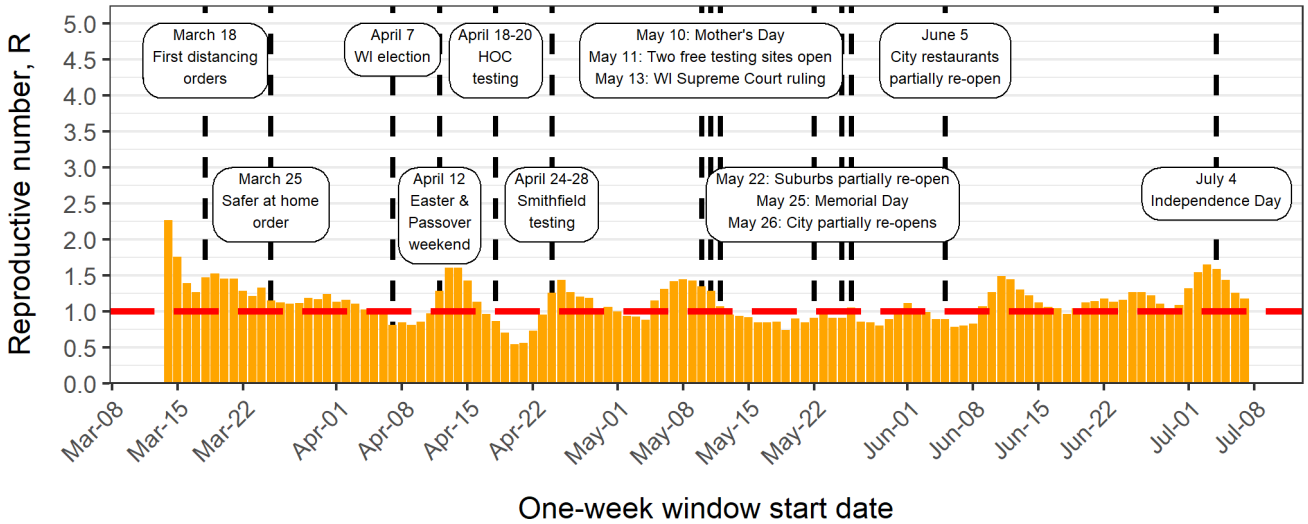
Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

Figure 6a: One week reproductive number for City of Milwaukee



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

Figure 6b: One week reproductive number for Milwaukee County suburbs



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

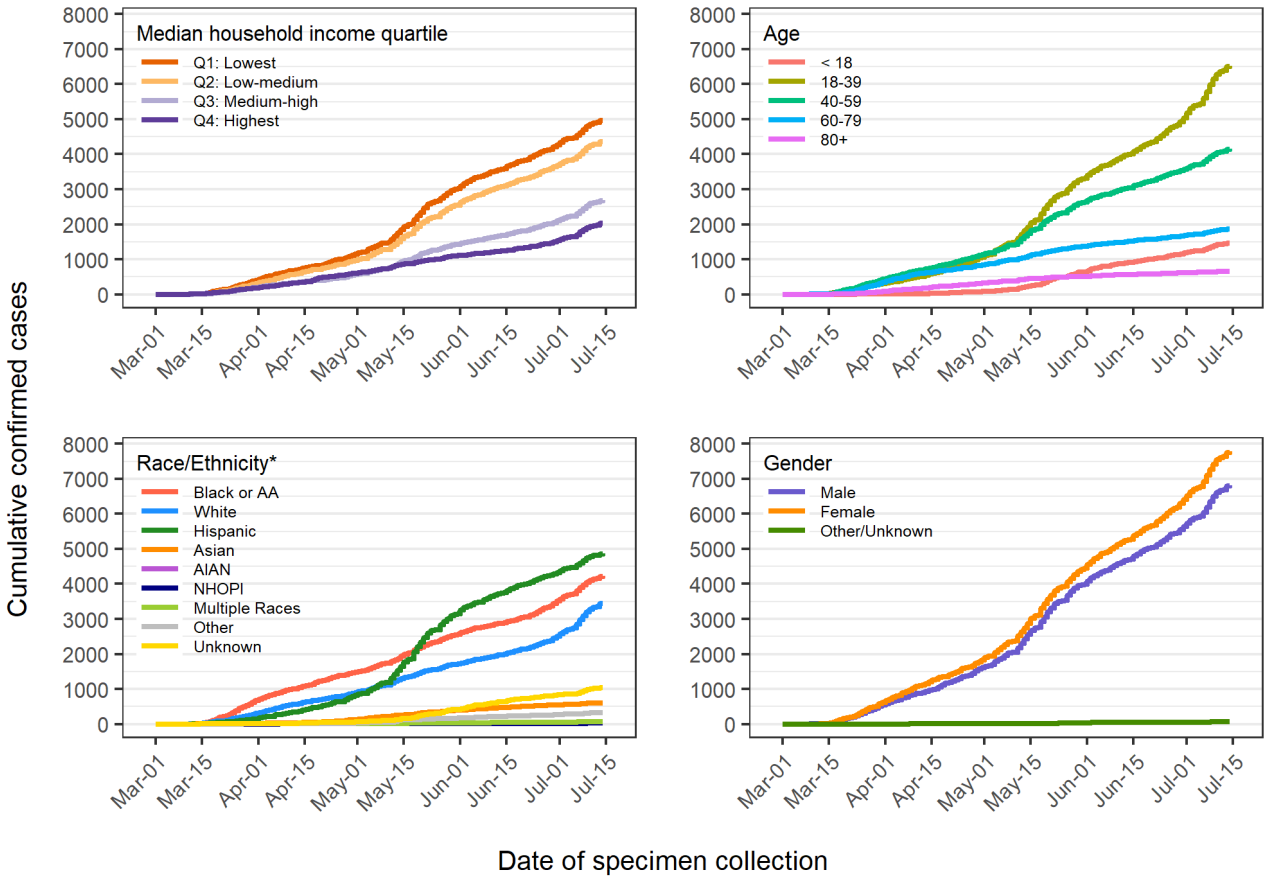
Demographic Patterns – Age, Sex, Race and Ethnicity

Confirmed cases

COVID-19 cases vary by demographic characteristics. **Figure 7** shows cumulative case plots including confirmed positive cases with an available specimen collection date, plotted by census block group (CBG) median household income, sex, age, and race/ethnicity groups. Most diagnosed cases fall within the ages of 18-79. Of all confirmed cases, 46% are male and 53% are female. The largest number of cases have been diagnosed among the Hispanic population (N = 4865), followed by the Black/AA population (N = 4226). The lower two quartiles of median household income ($0 - $35,833, and $35,834 to $50,096) have a larger number of cases than the higher two quartiles ($50,097 to $68,393, and $68,394 to $250,001), with the fewest cases identified among the highest income group.

Over the past week, we have further observed increases among individuals in all income groups, those ages 18-39 and to a lesser degree those 40-59 and those under 18, and among non-Hispanic Black and White groups and to a lesser degree Hispanics, with similar increases for both sexes. The cumulative number of cases among those ages 18-39 (N = 6518) now far exceeds the number among those ages 40-59 (N = 4148). In the last few weeks, we saw the number of cases under age 18 (N = 1463) increase to more than double the number of cases among those 80 or older (N = 652).

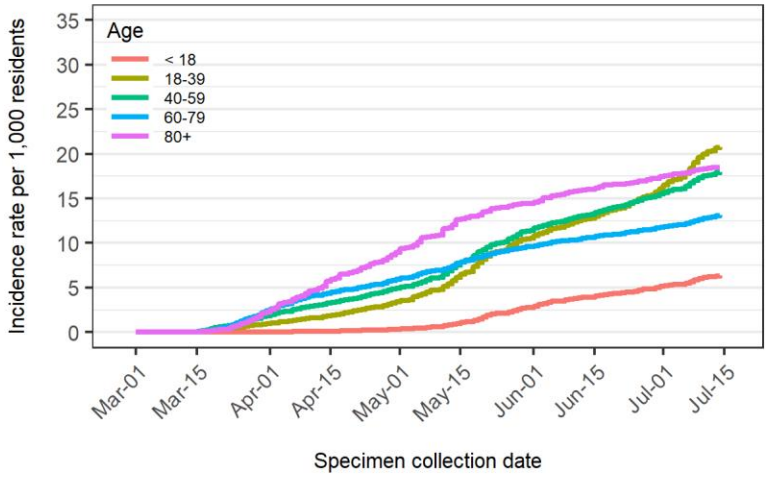
Figure 7: Cumulative confirmed cases in Milwaukee County



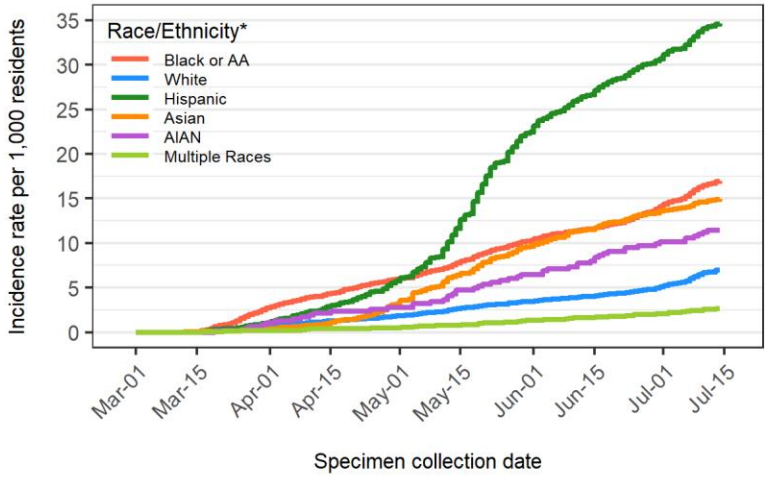
Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team
**Race and ethnicity were combined into one variable where the Hispanic category includes Hispanics of any race.*
AIAN stands for American Indian or Alaska Native and NHOPI stands for Native Hawaiian or Other Pacific Islander.

When examined as population-based rates in **Figure 8**, demographic patterns are also apparent. For most of the epidemic, we saw a clear age gradient in population-based rates, with older populations experiencing greater rates. However, in the last weeks, we have seen a deviation from this pattern, with rates among two younger, working age groups (18-39, 40-59) exceeding the rate among the 60-79 age group. Over the last week, the rate among those ages 18-39 exceeded the rate of those ages 80+, and the rate among those 40-59 has now approached the rate of those 80+. By race and ethnicity, the rate was highest among Black/AA populations until the beginning of May, when we observed a surge among Hispanics resulting in the Hispanic rate (34.61 per 1,000 people) exceeding that among all other racial and ethnic groups. We observe a recent increase in the rate among Black/AA populations, to exceed the rate among Asians, with lower rates among all other racial and ethnic groups. Rates are very similar among males and females.

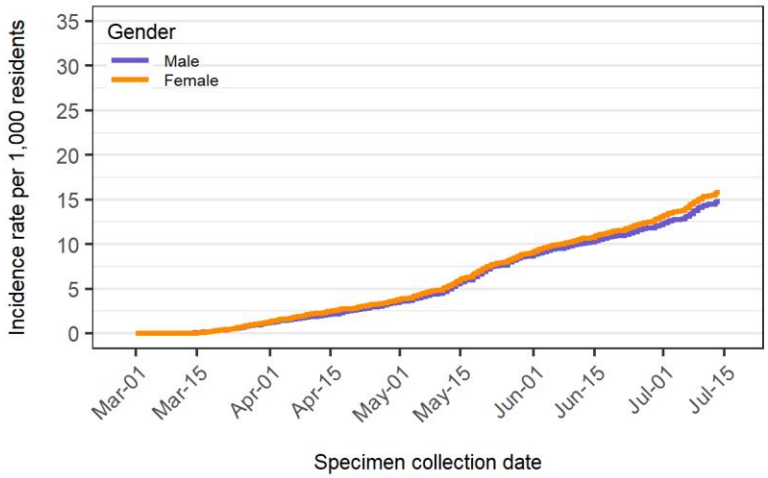
Figure 8: Population based incidence rates in Milwaukee County



Age	N Cases	Population	Rate per 1,000 residents
< 18	1463	231111	6.33
18-39	6518	314141	20.75
40-59	4148	230887	17.97
60-79	1870	142783	13.10
80+	652	35287	18.48



Race/Ethnicity*	N Cases	Population	Rate per 1,000 residents
Black or AA	4226	249011	16.97
White	3448	493723	6.98
Hispanic	4865	140575	34.61
Asian	604	40443	14.93
AIAN	53	4647	11.41
Multiple Races	64	24224	2.64



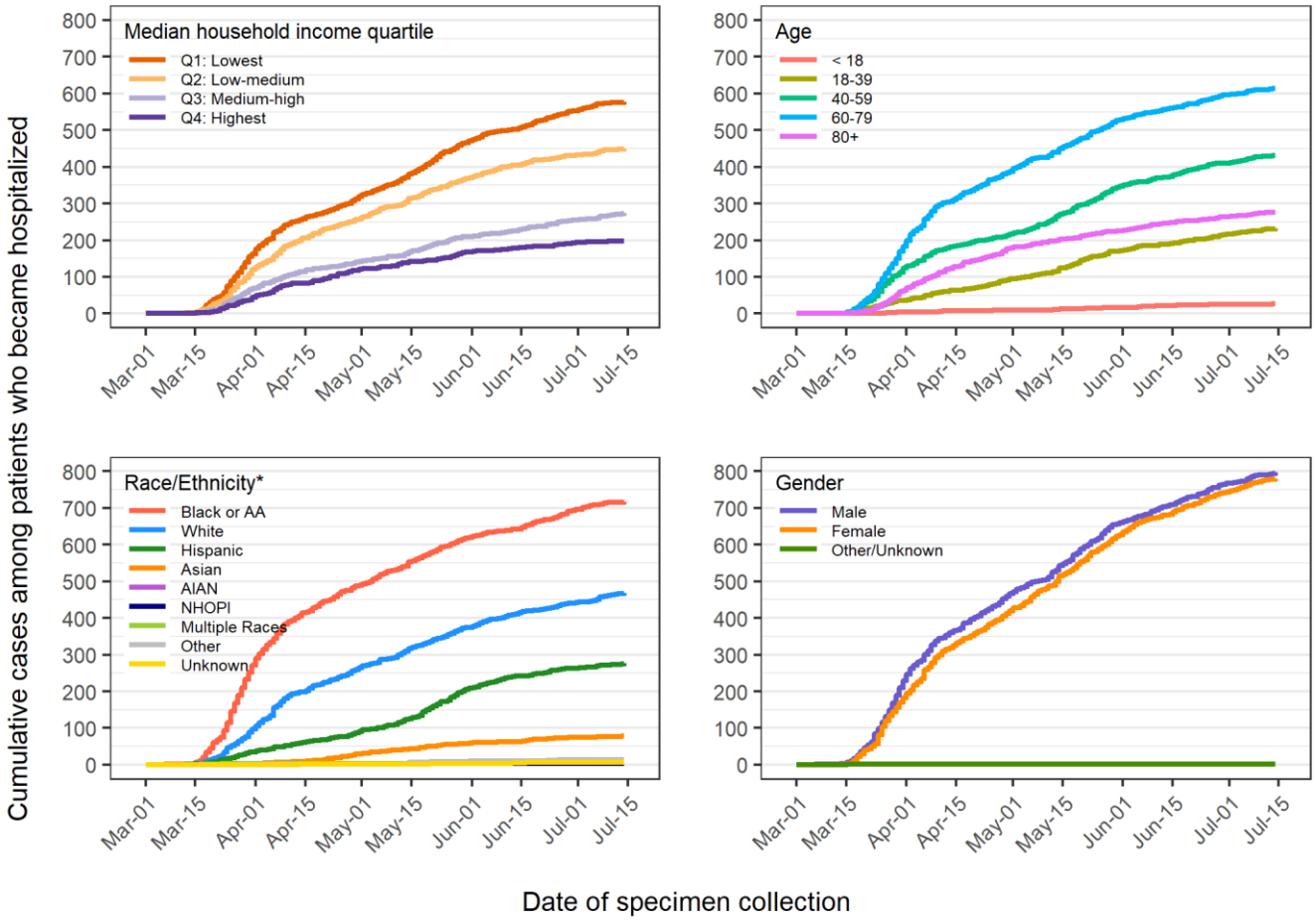
Gender	N Cases	Population	Rate per 1,000 residents
Male	6813	461670	14.76
Female	7780	492539	15.80

Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team
**Race and ethnicity were combined into one variable where the Hispanic category includes Hispanics of any race.*
AIAN stands for American Indian or Alaska Native and NHOPI stands for Native Hawaiian or Other Pacific Islander.

Hospitalizations

A total of 1579 individuals have been hospitalized due to COVID-19 in the county. **Figure 9** shows cumulative hospitalizations based on lab specimen collection date (as admission dates are incomplete). The highest number of hospitalizations continues to be among those ages 60-79 (N = 614). The highest number of hospitalizations have occurred among the Black/AA community (N = 717), followed by the Non-Hispanic White community (N = 468) and then the Hispanic community (N = 277) Overall, counts are lower among other racial and ethnic groups. By sex, males are hospitalized more often than females, comprising 50% of the total hospitalized cases. More individuals among lower income than higher income groups have been hospitalized, with a clear income gradient observed.

Figure 9: Cumulative hospitalizations in Milwaukee County



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team
**Race and ethnicity were combined into one variable where the Hispanic category includes Hispanics of any race.*
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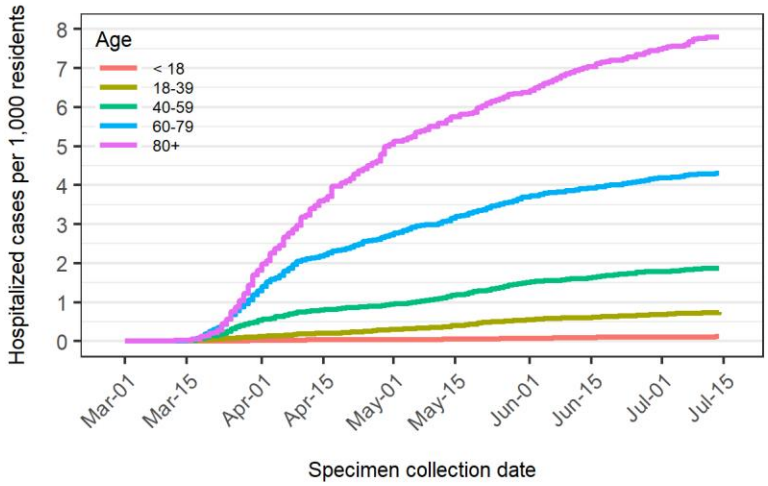
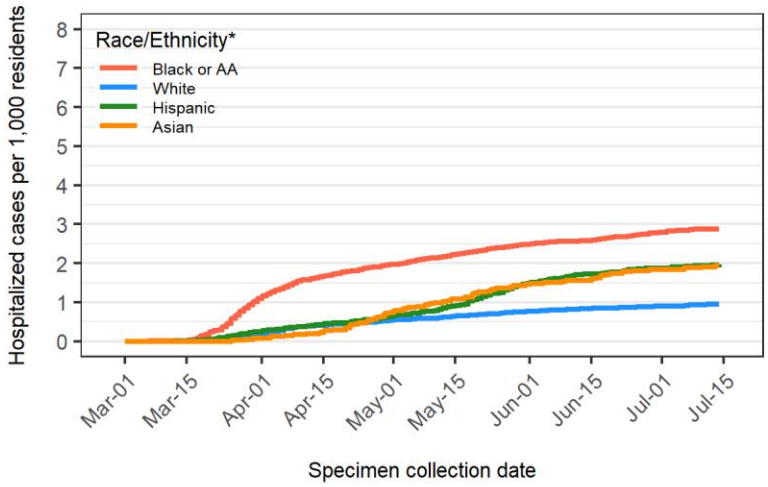
When examined as population-based rates and case-based rates in **Figure 10**, hospitalization patterns are also apparent by demographic characteristics. Both population- and case-based hospitalization rates exhibit a clear age group gradient, with older age groups experiencing higher rates. By race and ethnicity, population and case-based hospitalization rates are highest among the Black/AA population. For non-Hispanic whites, the case-based rate is the second highest, at 13.57 per 100 cases, whereas the population-based hospitalization rate is lowest (0.95 per 1,000 residents). Rates by gender are very similar, with higher hospitalization rates among males. All rates presented are crude rates and only groups with 10 or more total hospitalized cases are shown.

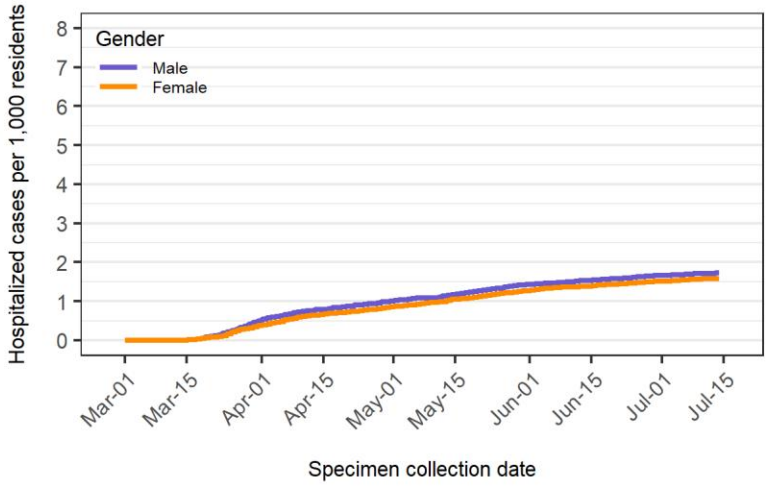
Figure 10: Population and case based hospitalization rates in Milwaukee County



Age	N Hospitalized Cases	Rate per 1,000 residents	Rate per 100 cases
< 18	27	0.12	1.85
18-39	232	0.74	3.56
40-59	431	1.87	10.39
60-79	614	4.30	32.83
80+	275	7.79	42.18



Race/Ethnicity*	N Hospitalized Cases	Rate per 1,000 residents	Rate per 100 cases
Black or AA	717	2.88	16.97
White	468	0.95	13.57
Hispanic	277	1.97	5.69
Asian	78	1.93	12.91



Gender	N Hospitalized Cases	Rate per 1,000 residents	Rate per 100 cases
Male	797	1.73	11.70
Female	780	1.58	10.03

Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team
**Race and ethnicity were combined into one variable where the Hispanic category includes Hispanics of any race.*
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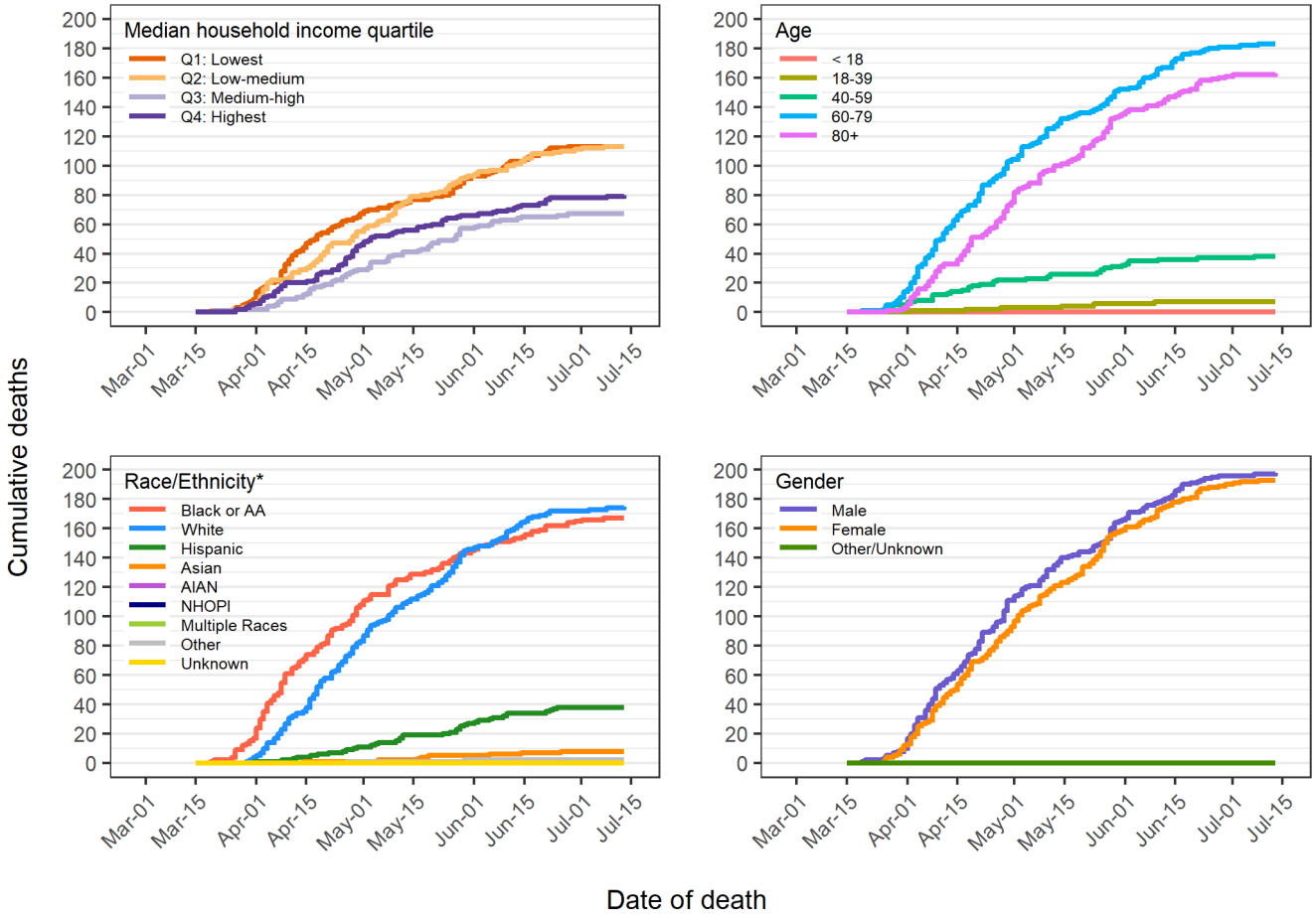
Deaths

There are now a total of 391 confirmed deaths in Milwaukee County, representing a case fatality rate of 2.7%. We observed 2 new deaths over the past week in the county. Mortality patterns differ by demographic characteristics, as shown in **Figure 11**. The largest number of deaths are recorded among those age 60 or older. The largest number of deaths are recorded for males (N = 198) and for non-Hispanic Whites (N = 175) followed closely by the Black/AA community (N = 167). By income, there are a larger number of deaths among the two lower income groups as compared to the two higher income groups. Deaths among Hispanics remain relatively low.

Figure 11: Cumulative deaths in Milwaukee County



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team
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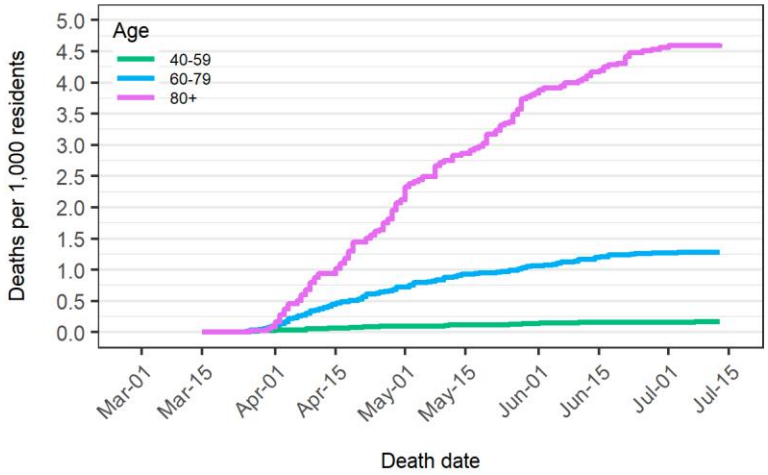
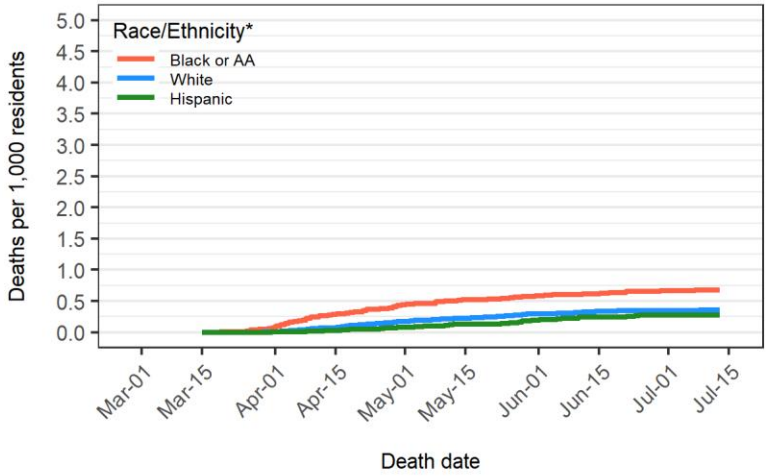
In terms of population- and case-based rates shown in **Figure 12**, there is a clear age category gradient, with higher death rates among older populations. Gender-based rates are very similar. Black/AA populations have the highest population-based death rates, and non-Hispanic Whites have the highest case-based death rates. All rates presented are crude rates and only groups with 10 or more total deaths are shown.

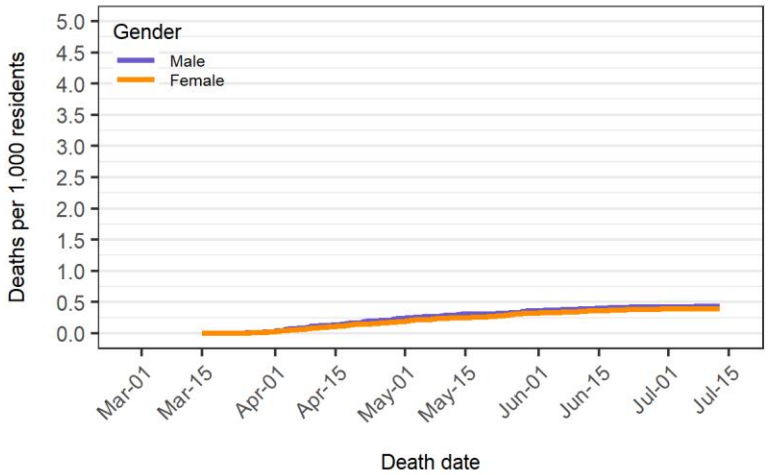
Figure 12: Population and case based death rates in Milwaukee County



Age	N Deaths	Rate per 1,000 residents	Rate per 100 cases
40-59	38	0.16	0.92
60-79	183	1.28	9.79
80+	163	4.62	25.00



Race/Ethnicity*	N Deaths	Rate per 1,000 residents	Rate per 100 cases
Black or AA	167	0.67	3.95
White	175	0.35	5.08
Hispanic	38	0.27	0.78



Gender	N Deaths	Rate per 1,000 residents	Rate per 100 cases
Male	198	0.43	2.91
Female	193	0.39	2.48

Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team
**Race and ethnicity were combined into one variable where the Hispanic category includes Hispanics of any race.*
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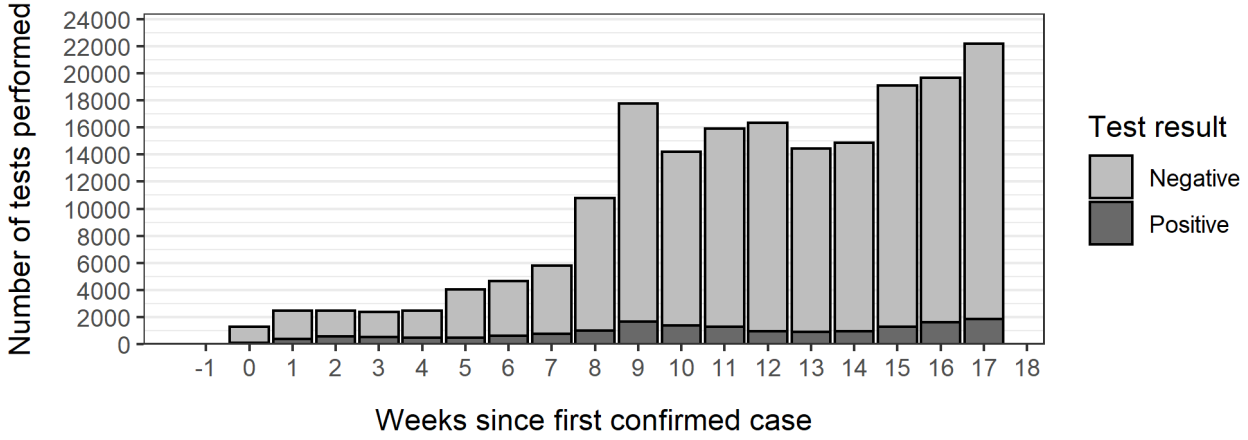
Testing Coverage

Testing for the novel coronavirus is an important public health response to limiting the spread of the infection. Testing capacity was limited in Milwaukee County and across the country earlier in the epidemic, but then increased. Since the first case of COVID-19 was diagnosed in Milwaukee County on March 6, 2020, a total of 190821 COVID-19 tests have been performed, with 173932 negative results and 16889 positive results. This represents a positive test rate of 8.9% since the beginning of the epidemic.

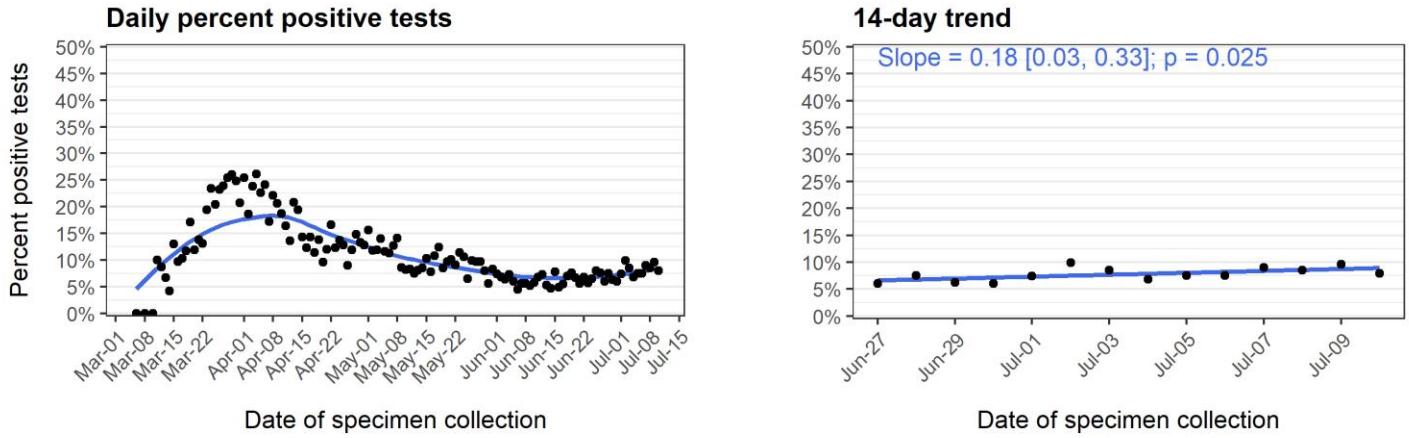
As shown in **Figure 13**, the total number of tests performed per week increased for several weeks and has now appeared to stabilize. As shown in **Figure 14**, the percentage of positive tests has varied over the course of the epidemic, with a high of 25-30% in early April. Since then, the percent positive has changed in tandem with expanded testing capacity. The percentage of positive tests was 8.3% over the past week compared to 8.2% the previous week. **Figure 14** also illustrates the 14-day trend in the percent positive tests, showing a statistically significant increase.

Figure 13: Milwaukee County number of tests per week



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

Figure 14: Milwaukee County percent positive tests (pending data shown in red)

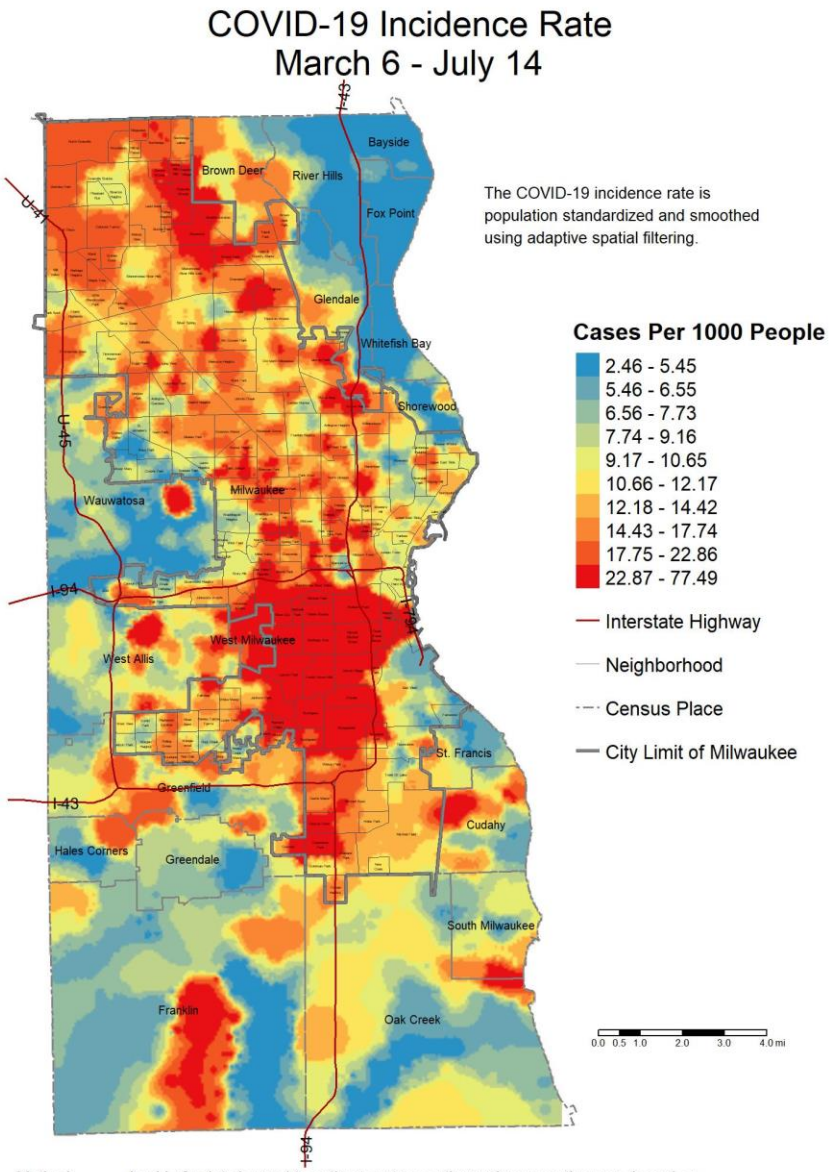


Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

Spatial Patterns of Cases and Testing

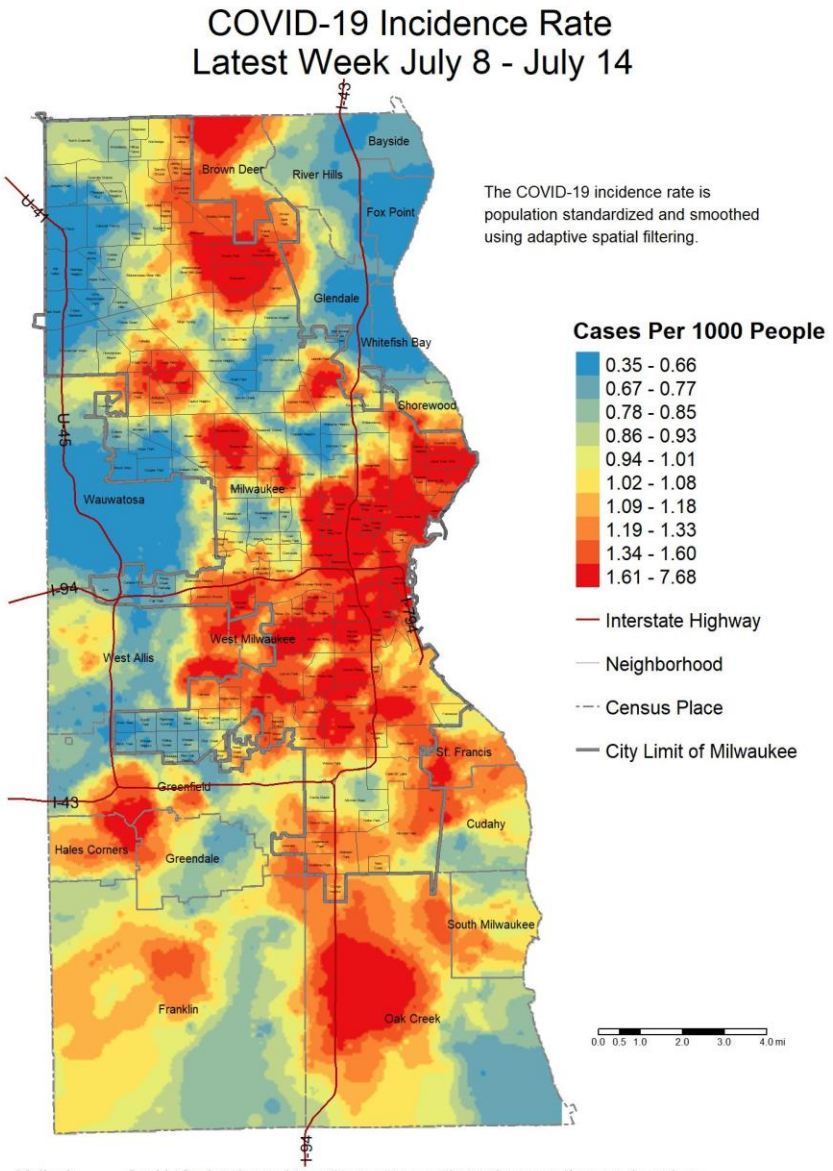
COVID-19 spread is spatially patterned. **Map 1** below illustrates the cumulative burden (all confirmed cases) of COVID-19 in Milwaukee County. **Map 2** shows only the cases confirmed over the last week. **Map 3** shows the rate of tested individuals across the population. **Map 4** depicts the percentage of tested individuals that were confirmed positive. **Map 5** shows cumulative COVID-19 related hospitalizations in Milwaukee County. **Map 6** shows the percentage of cases who have been hospitalized. All are crude rate maps created using census block group level COVID-19 data from WEDSS and population data from the US Census. The maps are smoothed to protect confidentiality and ensure that rates are stable while still providing geographic detail. High rates are depicted in red with lower rates depicted in blue. Of note, some of the higher rates observed can be attributed to infections that have spread within group quarters, such as a nursing home, prison, or long-term care facility. Note we have changed the shading conventions from previous reports to use decile cut-offs to provide more contrast in each map.

Decile Map 1: All confirmed cases of COVID-19



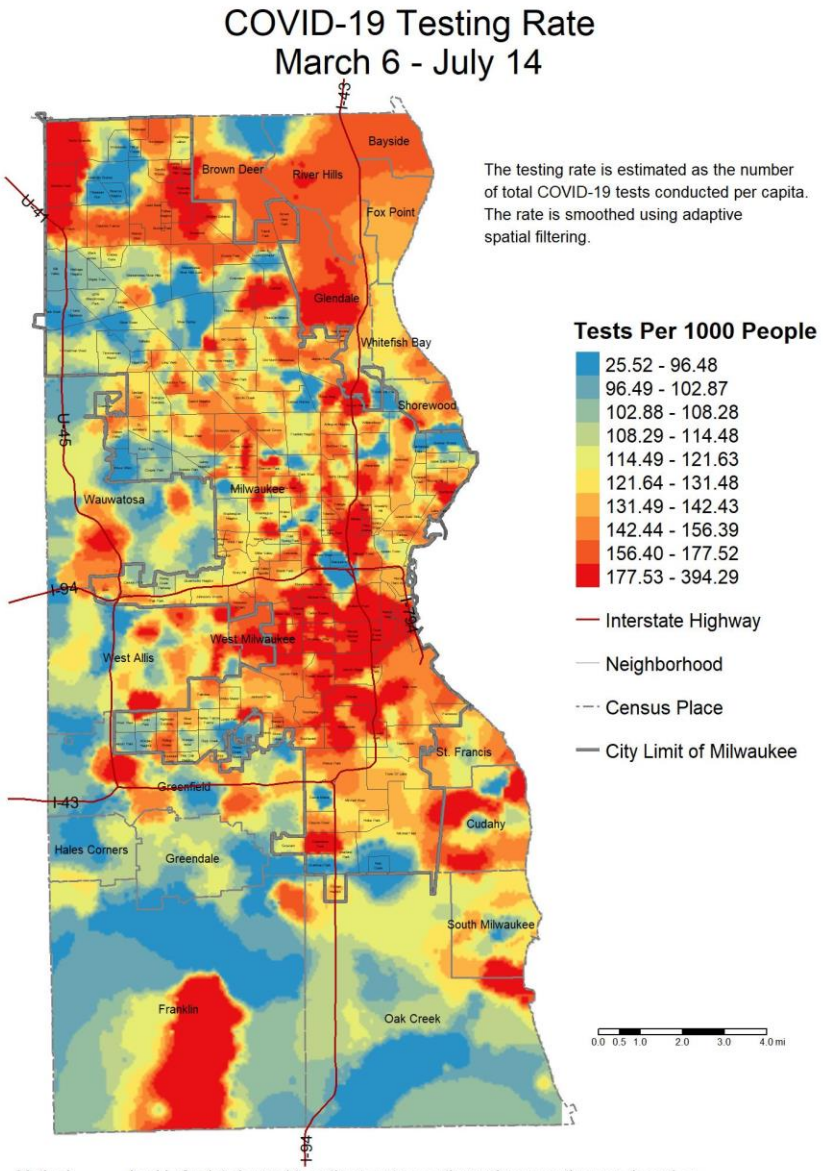
Method: A grid of points is used to estimate rates continuously across the map, based on the nearest cases with a minimum of 15 confirmed cases included.
Data Sources: Wisconsin Electronic Disease Surveillance System (WEDSS) (incidence data)
2018 American Community Survey (population data)
City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)
Census Bureau TIGER/Line Shapefiles (census place boundaries)
Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Decile Map 2: Confirmed cases of COVID-19 within the last week



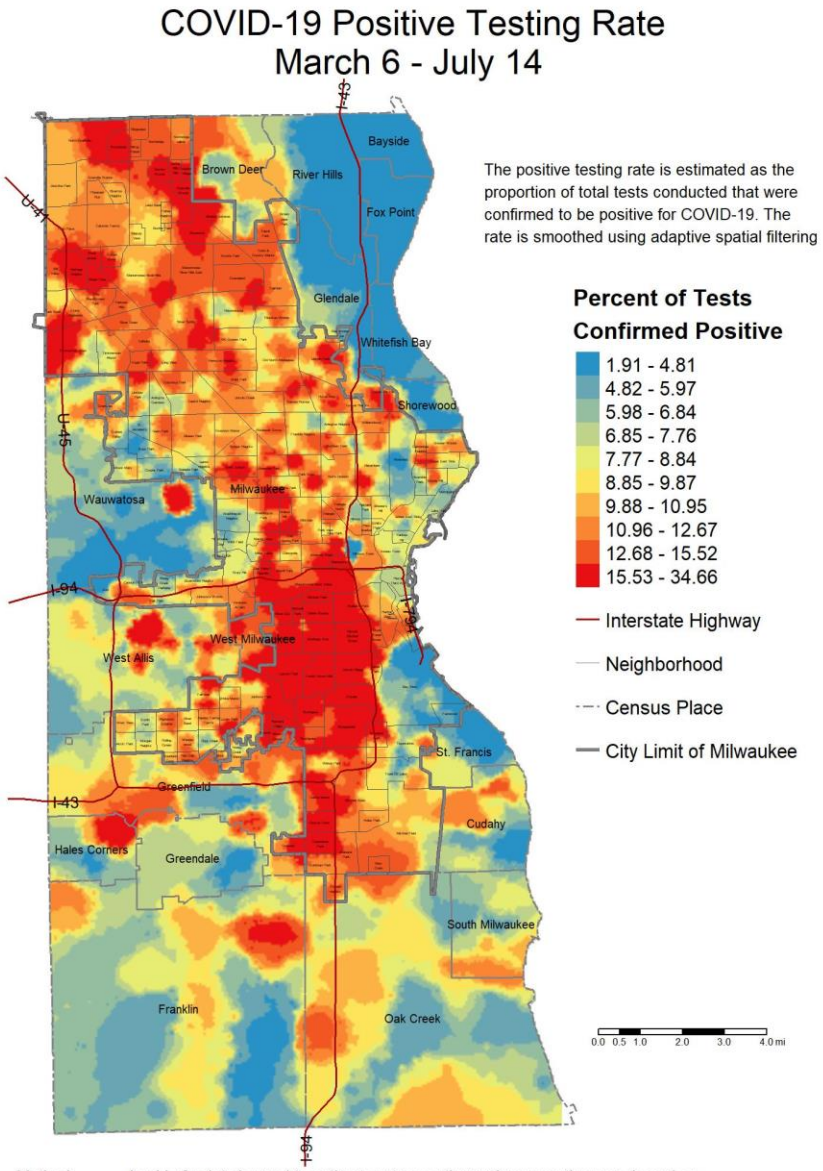
Method: A grid of points is used to estimate rates continuously across the map, based on the nearest cases with a minimum of 15 confirmed cases included.
Data Sources: Wisconsin Electronic Disease Surveillance System (WEDSS) (incidence data)
2018 American Community Survey (population data)
City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)
Census Bureau TIGER/Line Shapefiles (census place boundaries)
Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Decile Map 3: Rate of tested individuals



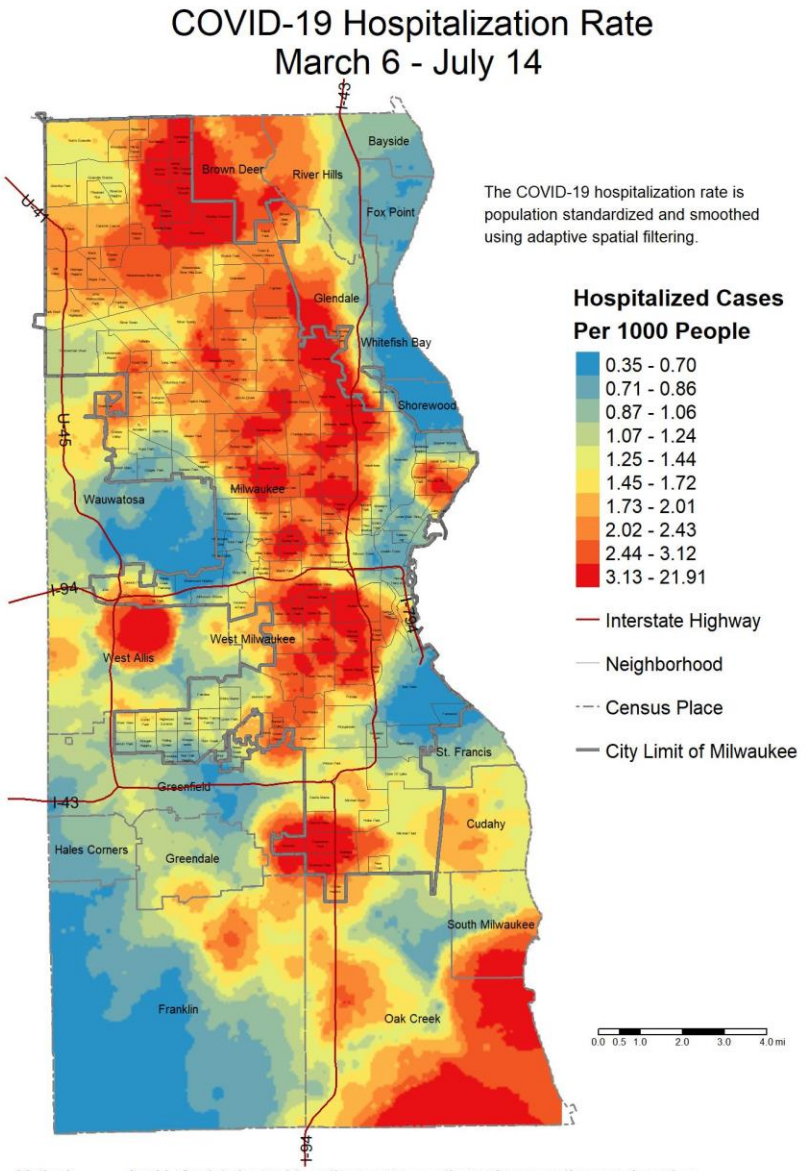
Method: A grid of points is used to estimate rates continuously across the map, based on the nearest cases with a minimum of 15 confirmed cases included.
Data Sources: Wisconsin Electronic Disease Surveillance System (WEDSS) (incidence data)
2018 American Community Survey (population data)
City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)
Census Bureau TIGER/Line Shapefiles (census place boundaries)
Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Decile Map 4: Percentage of tested individuals that were confirmed positive



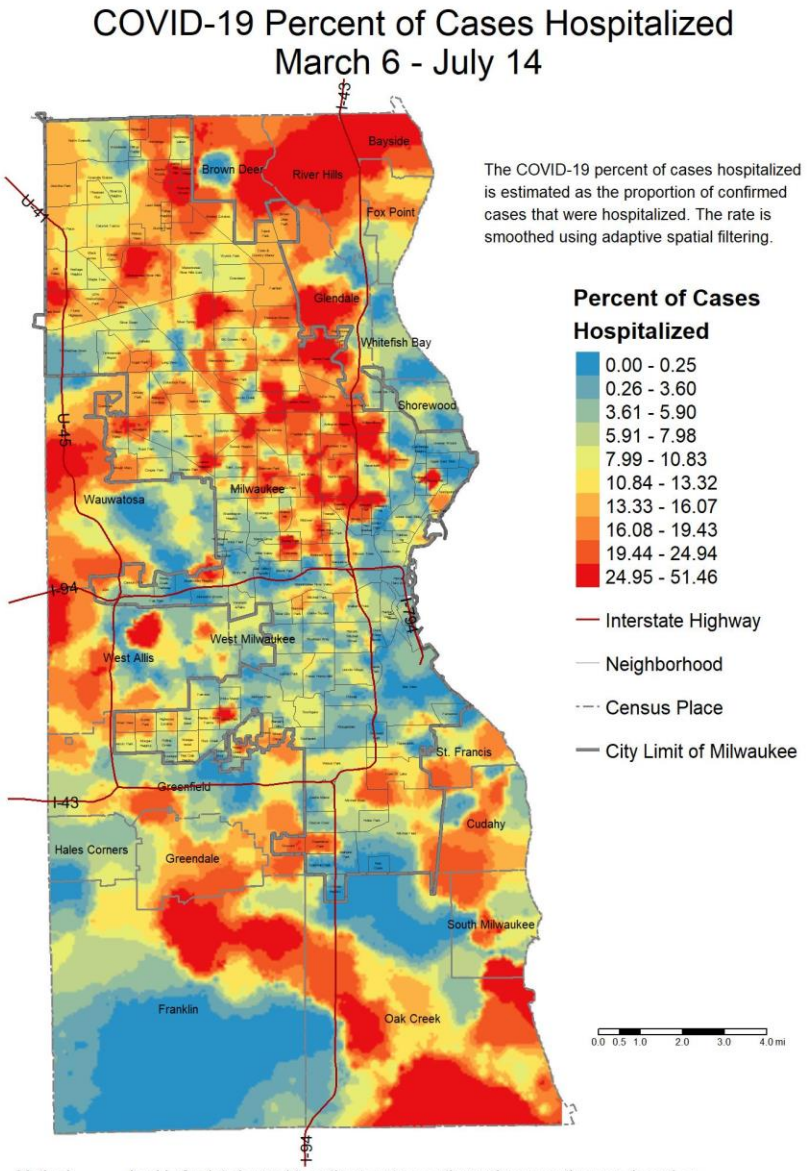
Method: A grid of points is used to estimate rates continuously across the map, based on the nearest cases with a minimum of 15 confirmed cases included.
Data Sources: Wisconsin Electronic Disease Surveillance System (WEDSS) (incidence data)
2018 American Community Survey (population data)
City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)
Census Bureau TIGER/Line Shapefiles (census place boundaries)
Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Decile Map 5: COVID-19 related hospitalizations



Method: A grid of points is used to estimate rates continuously across the map, based on the nearest cases with a minimum of 15 hospitalized cases included.
Data Sources: Wisconsin Electronic Disease Surveillance System (WEDSS) (incidence data)
2018 American Community Survey (population data)
City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)
Census Bureau TIGER/Line Shapefiles (census place boundaries)
Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Decile Map 6: Percentage of COVID-19 cases that were hospitalized



Method: A grid of points is used to estimate rates continuously across the map, based on the nearest cases with a minimum of 15 confirmed cases included.
Data Sources: Wisconsin Electronic Disease Surveillance System (WEDSS) (incidence data)
2018 American Community Survey (population data)
City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)
Census Bureau TIGER/Line Shapefiles (census place boundaries)
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Data Sources & Acknowledgments

This report was created by faculty and staff in the Medical College of Wisconsin (MCW) Institute for Health and Equity (IHE) in partnership with representatives from local health departments and faculty from the University of Wisconsin-Milwaukee Zilber School of Public Health. Data sources include the Wisconsin Electronic Disease Surveillance System (WEDSS), the US Census Bureau, the Milwaukee County Medical Examiner's office, the Emergency Medicine Resource, and publicly available data obtained from local health and emergency response agencies. Data from the Wisconsin Electronic Data Surveillance System (WEDSS) summarized for the week includes data from July 8, 2020 through July 14, 2020. This work was funded by the Advancing a Healthier Wisconsin Endowment at the Medical College of Wisconsin.

Contact Information

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