Milwaukee County COVID-19 Data Summary

Milwaukee County COVID-19 Epidemiology Intel Team

This report was updated on December 17, 2020 and includes data through December 15, 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 3 - December 15			
	Milwaukee County	**City of Milwaukee**	**Suburbs**
Total tests performed	845,842	537,540	308,302
Percent positive of all tests performed	10.4%	10.5%	10.3%
Number of confirmed cases	78,334	50,276	28,058
Number of hospitalizations	4,611	3,013	1,598
Number of deaths	809	411	398
Case fatality rate	1.0%	0.8%	1.4%

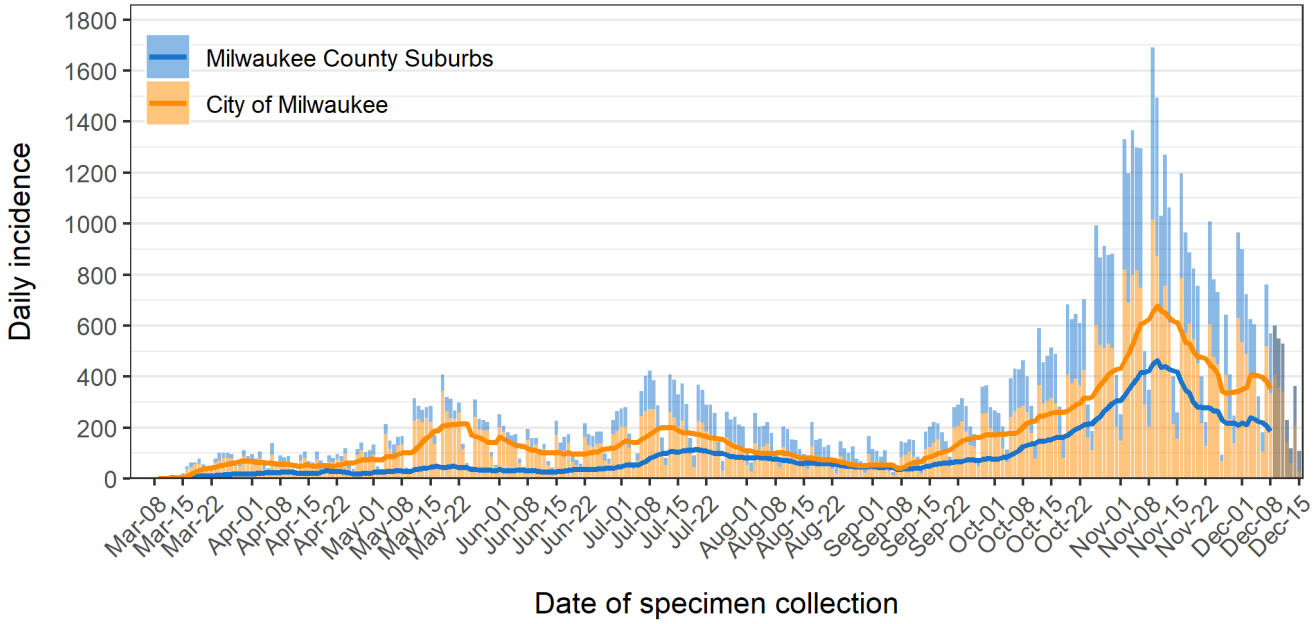
Weekly Milwaukee County COVID-19 Summary Statistics December 9 - December 15			
	Milwaukee County	**City of Milwaukee**	**Suburbs**
Total tests performed	27,858	17,364	10,494
Percent positive of all tests performed	11.1%	11.1%	11.0%
Number of confirmed cases	2,499	1,543	956
Number of hospitalizations	182	115	67
Number of deaths	12	2	10

Total Cases and New Cases

There are now a total of 78334 cases in Milwaukee County, since the first confirmed case on March 6th, 2020. Over the last week, we observed 2499 new confirmed cases in Milwaukee County, including 1543 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. To indicate a potential reporting delay, we shade the last seven days of data and exclude those days from the trend line.

Over the last week, we have seen a slight increase in confirmed cases. The highest daily case count since the beginning of the epidemic occurred on November 9, 2020, with 1691 cases in the county overall. The highest daily case count over the entire epidemic in the suburbs occurred on November 9, 2020, with a total of 676 cases confirmed. The highest case count in the city occurred on November 9, 2020, with a total of 1015 cases confirmed. Of note, the magnitude of the Fall surge in cases far outpaces the previous surges we observed earlier in the epidemic.

Figure 1: Milwaukee County daily number of COVID-19 cases

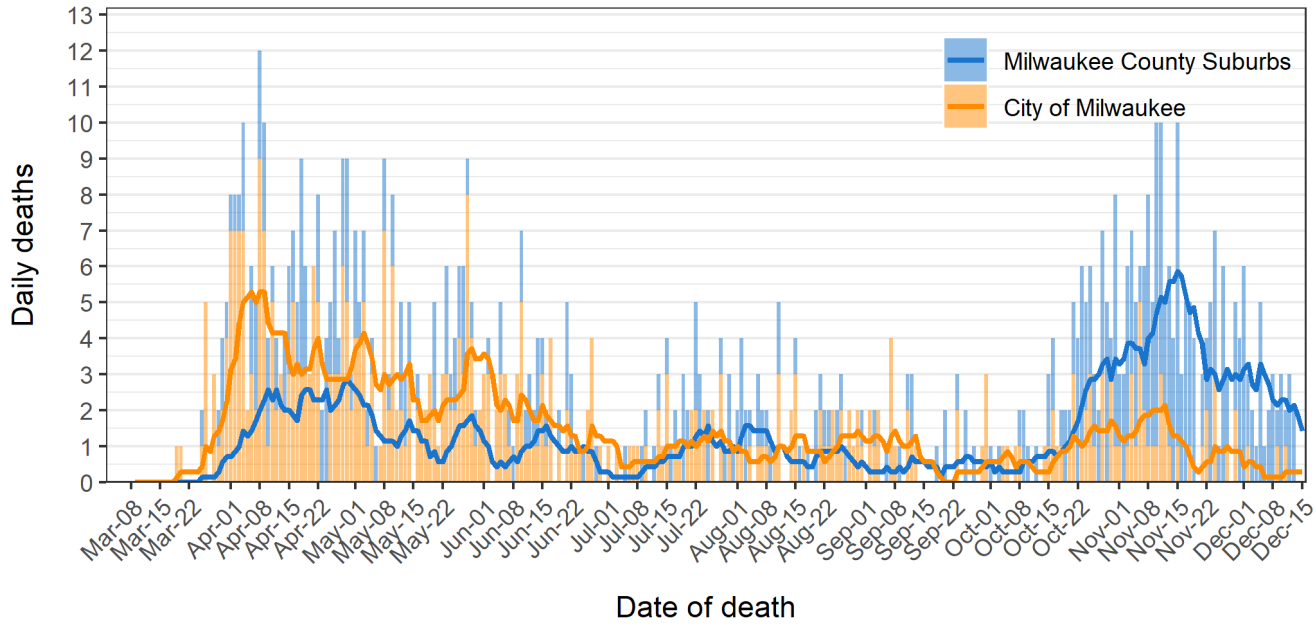


Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

Total Deaths and New Deaths

There are a total of 809 COVID-19 related deaths in Milwaukee County. Over the last week, we observed 12 deaths, with 2 from 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. Deaths in the county peaked on April 8, 2020. Several smaller peaks in deaths are notable since April 8th, with an overall decrease to a low number of deaths beginning in early June. Deaths in the city peaked on April 8, 2020 with 9 deaths, and in the suburbs on November 10, 2020 with 9 deaths. Over the last few weeks, the number of deaths in the suburbs rose to the highest level since the beginning of the epidemic, far outpacing deaths in the city.

Figure 2: Milwaukee County COVID-19 daily deaths

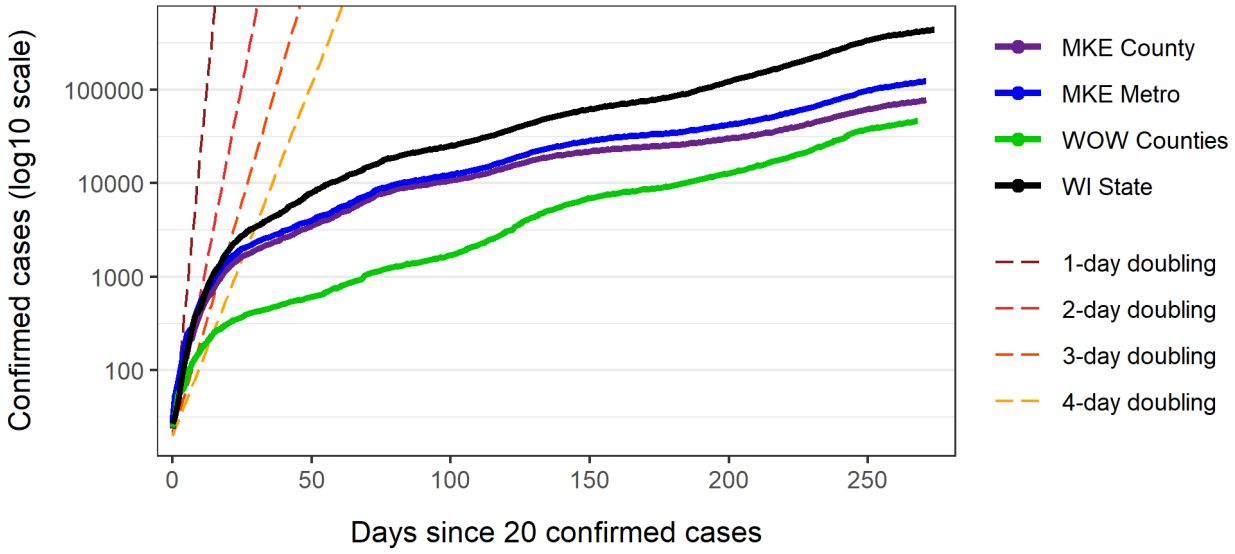


Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

The COVID-19 Growth Rate

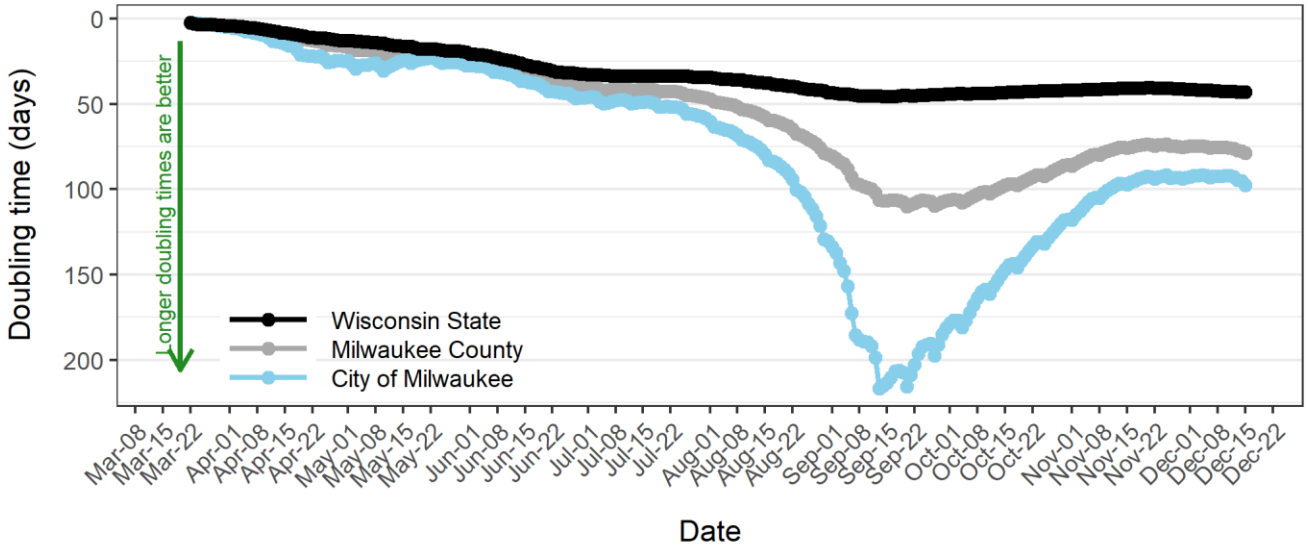
The time it takes for the number of cases to double is called the doubling time. **Figure 3** shows doubling times for Milwaukee County, the surrounding Waukesha, Ozaukee and Walworth (WOW) counties, the M7 (7-county) metropolitan area, and the state of Wisconsin. Dotted lines indicate doubling times 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 78.78 days. The current doubling time for WOW counties is 54.39 days. The current doubling time for the state of Wisconsin is 42.95 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



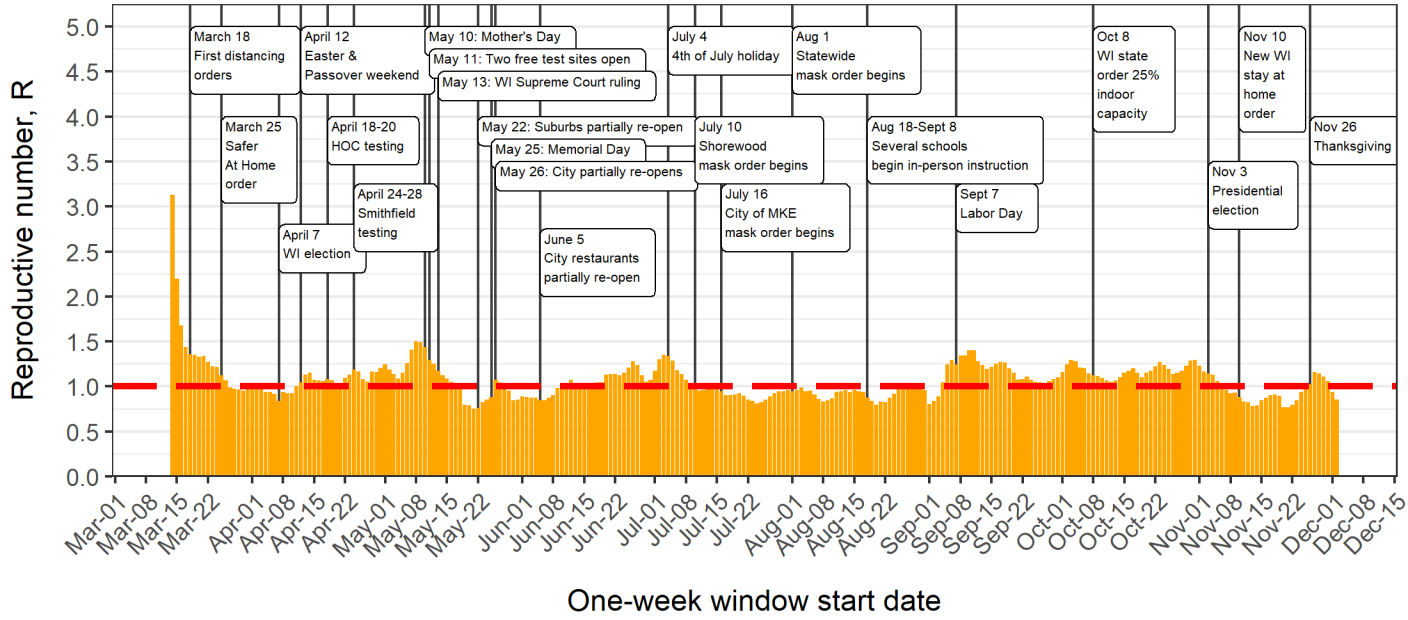
Data sources: WI Department of Health Services & WI Electronic Disease Surveillance System
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

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. We do not report estimates for the most recent seven days due to a potential data reporting delay.

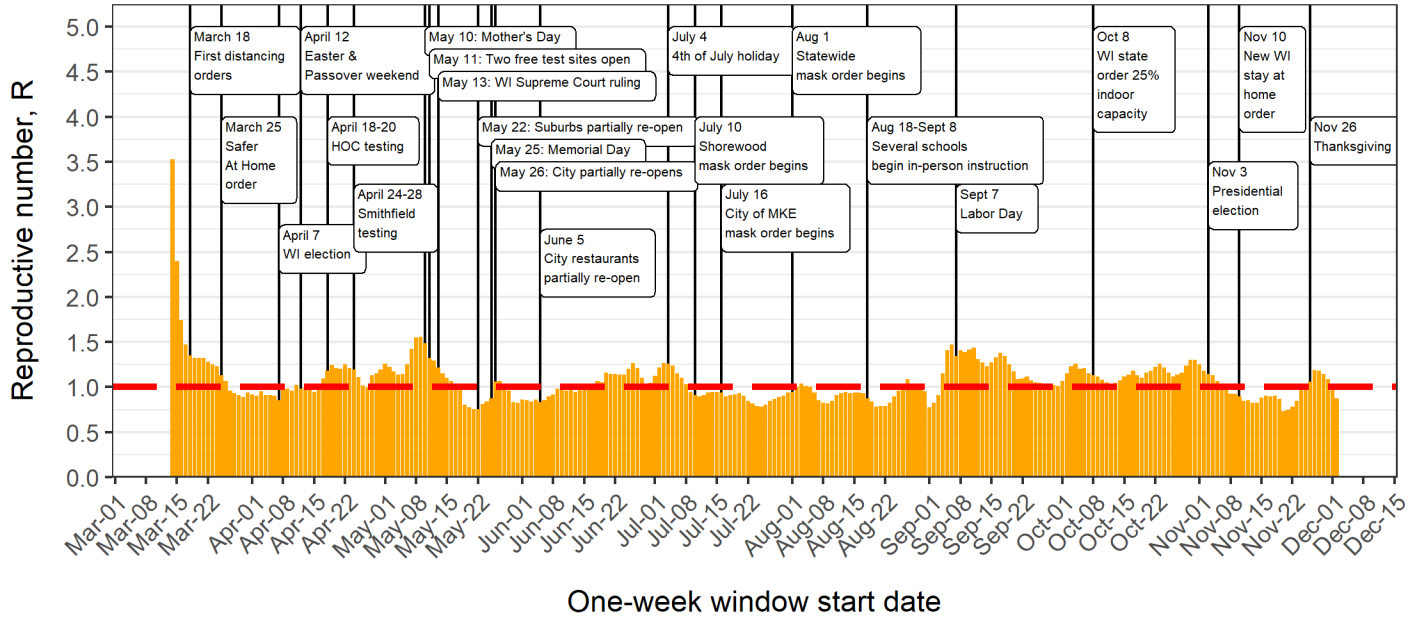
After the first minimum R value in Milwaukee County observed (R = 0.84 on April 7, 2020), we observed an increase in R to a high of 1.50 on May 8, 2020 and then a decrease to a low of 0.75 in the county on May 21, 2020. The R increased again to a more recent high of 1.40 on September 11, 2020. Patterns in the City of Milwaukee are very similar to those in the county overall. Patterns in the suburbs show more fluctuation. The R values for the week of December 2, 2020 through December 8, 2020 are 0.850 for the county, 0.876 in the city, and 0.805 in the suburbs.

Figure 5: One week reproductive number for Milwaukee County



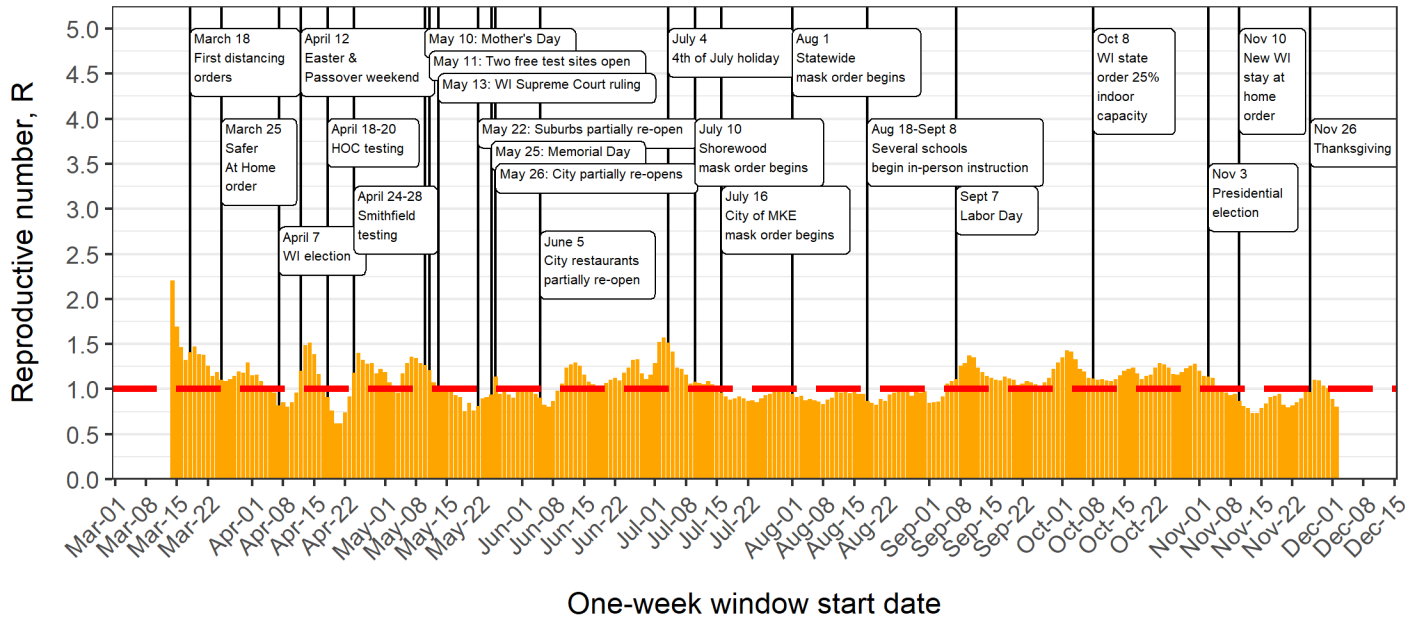
Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

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

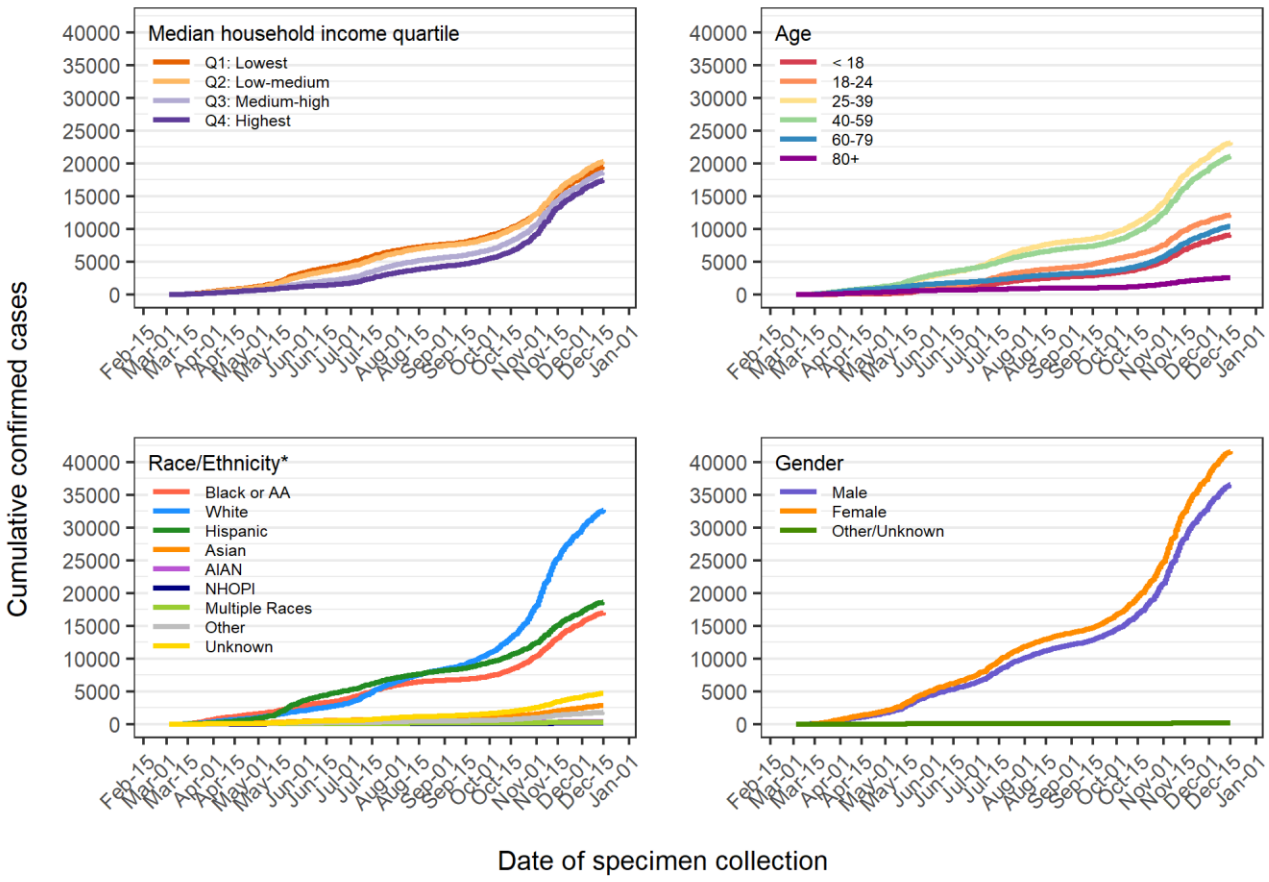
Demographic Patterns – Age, Sex, Race and Ethnicity

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, 47% are male and 53% are female. The largest number of cases have been identified among the non-Hispanic White population (N = 32693), followed by the Hispanic population (N = 18603), and the Black/AA population (N = 16983). The lower two quartiles of median household income ($0 to $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 observed increases among individuals in all income groups, most age groups, and among non-Hispanic Whites, non-Hispanic Black/AAs, and Hispanics, with similar increases for both sexes. The cumulative number of cases among those ages 25-39 (N = 23158) still exceeds the number among the next highest group, those ages 40-59 (N = 21075). The number of cases under age 18 (N = 9071) approaches the number diagnosed among those 60-79 (N = 10368).

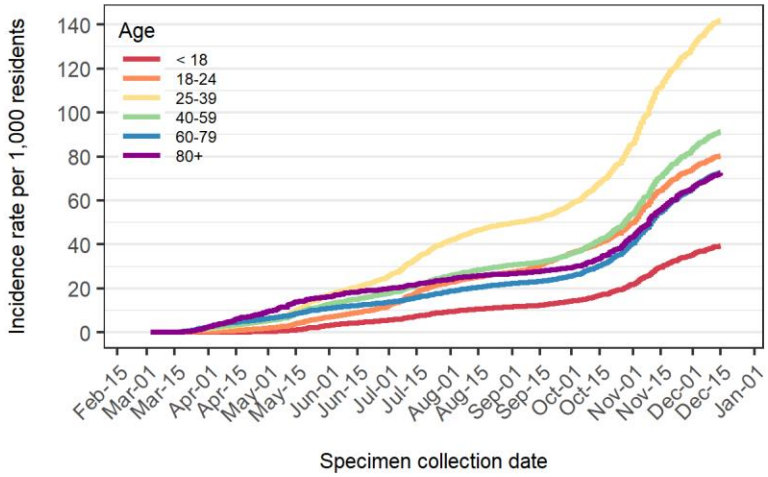
Figure 7: Cumulative confirmed cases in Milwaukee County



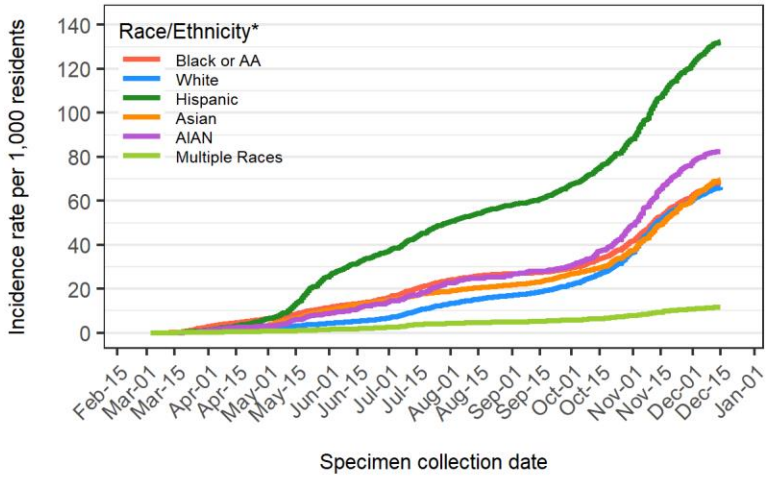
Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team
**Race and ethnicity were combined into one variable where the Hispanic category includes Hispanics of any race.*
AIAN stands for American Indian or Alaska Native and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

When examined as population-based rates in **Figure 8**, demographic patterns are also apparent. Early in the epidemic, we saw a clear age gradient in population-based rates, with older populations experiencing greater rates. However, in the last months, we have seen rates among the younger, working age groups (18-24, 25-39, and 40-59) exceed the rate of those aged 80+. The rate among those 60-79 now nearly equals that of those aged 80+ and the rate among those 40-59 exceeds that among those 18-24. 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 (132.34 per 1,000 people) exceeding that among all other racial and ethnic groups. The rate among AIANs (82.42 per 1,000 people) ranks second. Rates among Black/AAs, Asians, and Non-Hispanic Whites are similar. Rates are very similar among males and females.

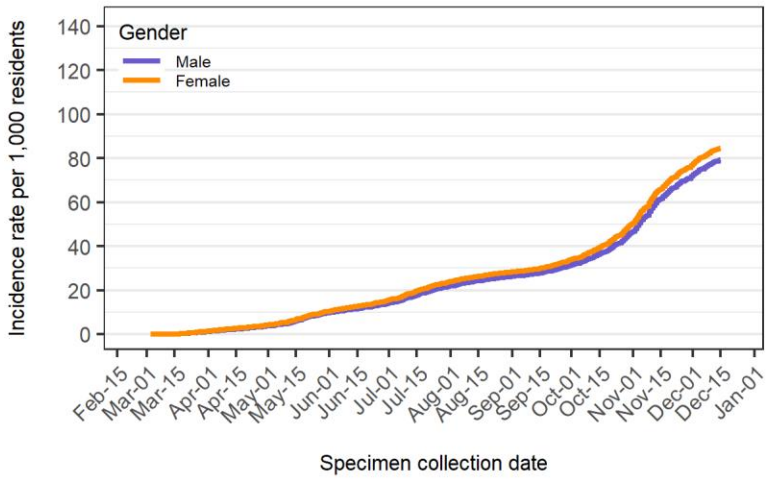
Figure 8: Population based incidence rates in Milwaukee County



Age	N Cases	Population	Rate per 1,000 residents
< 18	9071	231111	39.25
18-24	12104	150895	80.21
25-39	23158	163246	141.86
40-59	21075	230887	91.28
60-79	10368	142783	72.61
80+	2558	35287	72.49



Race/Ethnicity*	N Cases	Population	Rate per 1,000 residents
Black or AA	16983	249011	68.20
White	32693	493723	66.22
Hispanic	18603	140575	132.34
Asian	2814	40443	69.58
AIAN	383	4647	82.42
Multiple Races	280	24224	11.56



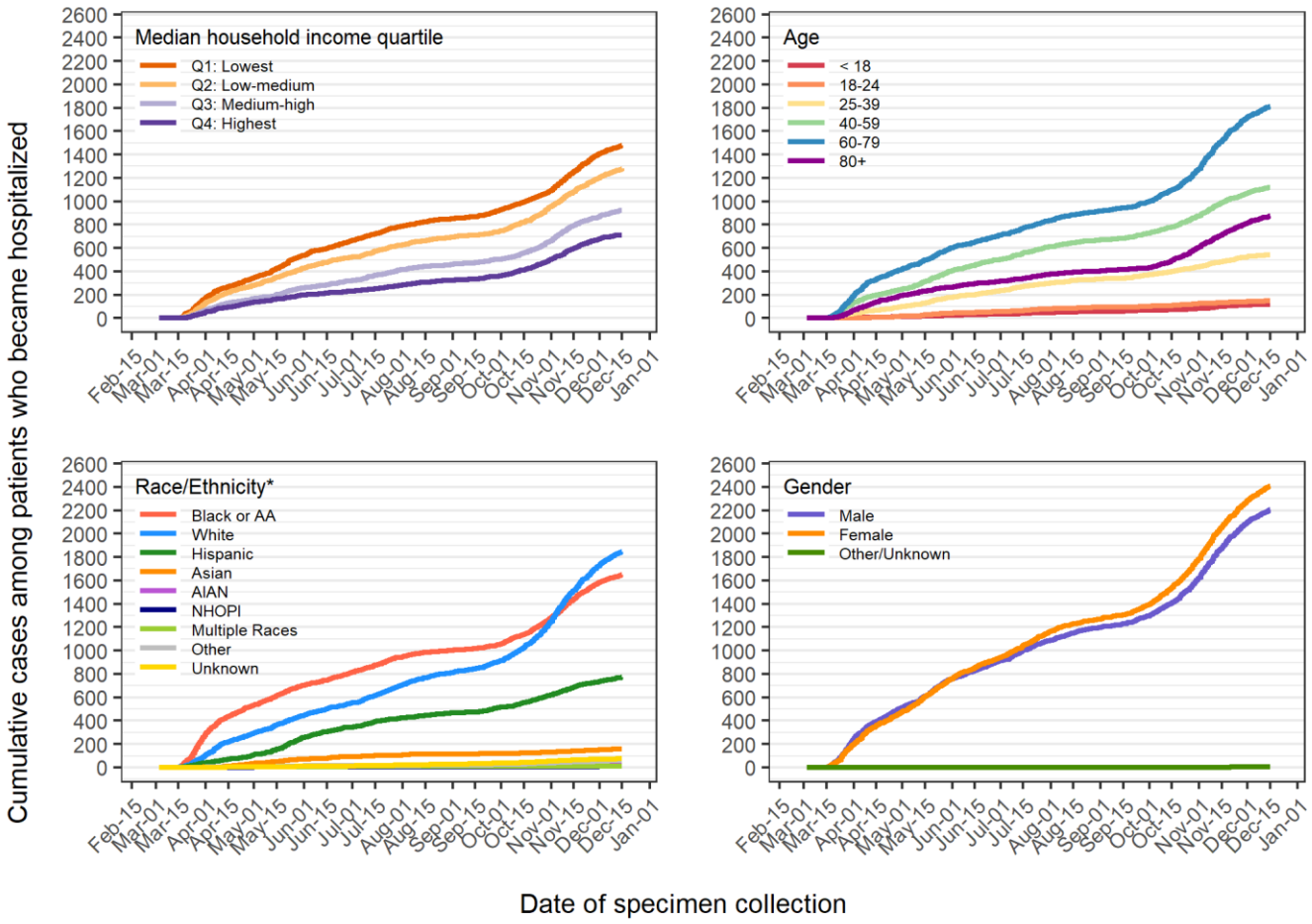
Gender	N Cases	Population	Rate per 1,000 residents
Male	36542	461670	79.15
Female	41634	492539	84.53

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 4611 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 = 1810). The highest number of hospitalizations have now occurred among Non-Hispanic White community (N = 1846), followed by the Black/AA community (N = 1650), and then the Hispanic community (N = 771). Overall, counts are lower among other racial and ethnic groups. Females slightly outnumber males, comprising 52.1% of all hospitalized cases. More individuals among lower income than higher income groups have been hospitalized, with a clear income gradient observed. Over the last week, we have seen an increase in hospitalizations among all income groups, those 60-79 and 80+, Non-Hispanic Black/AAs and Whites, and both sexes.

Figure 9: Cumulative hospitalizations in Milwaukee County



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
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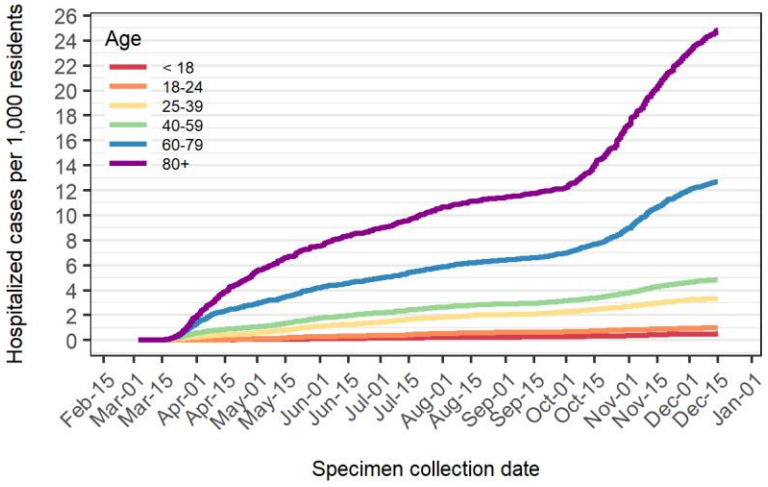
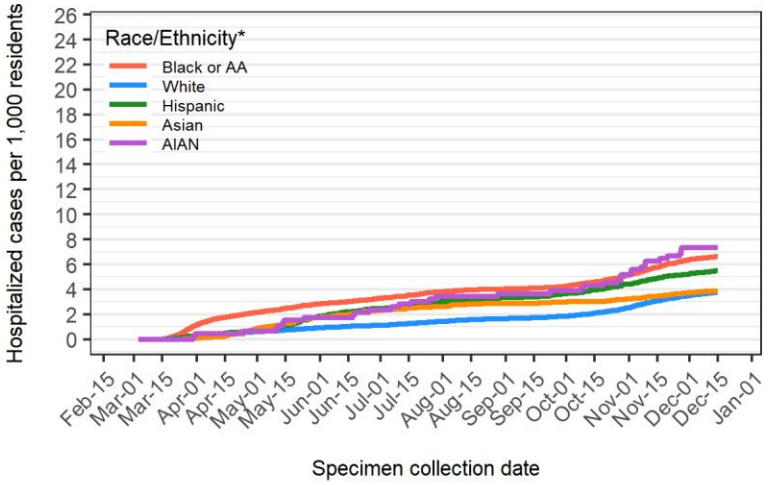
When examined as population-based rates and case-based rates in **Figure 10**, hospitalization patterns are also apparent by demographic characteristics. Both population- and case-based hospitalization rates exhibit a clear age group gradient, with older age groups experiencing higher rates. By race and ethnicity, population and case-based hospitalization rates are highest among the AIAN and Black/AA populations and the population-based rate is lowest for non-Hispanic Whites. 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. Over the last week, we have seen a continued concerning uptick in the hospitalization rate among those 80+, and to a lesser degree, those 60-79.

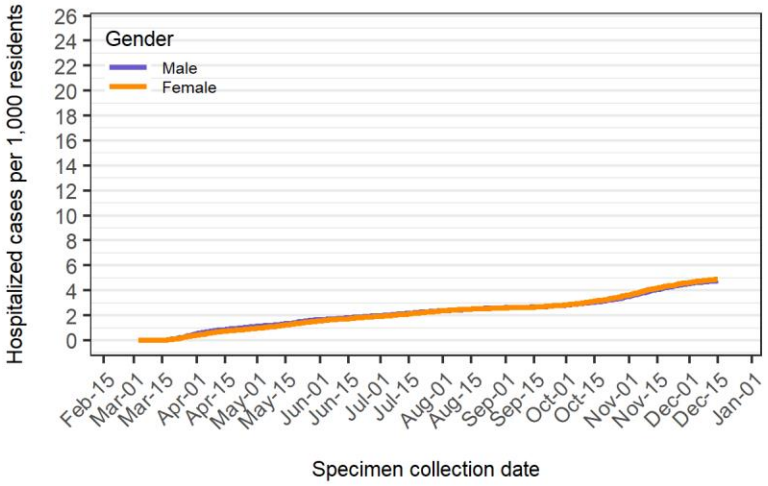
Figure 10: Population and case based hospitalization rates in Milwaukee County



Age	N Hospitalized Cases	Rate per 1,000 residents	Rate per 100 cases
< 18	117	0.51	1.29
18-24	148	0.98	1.22
25-39	541	3.31	2.34
40-59	1120	4.85	5.31
60-79	1810	12.68	17.46
80+	875	24.80	34.21



Race/Ethnicity*	N Hospitalized Cases	Rate per 1,000 residents	Rate per 100 cases
Black or AA	1650	6.63	9.72
White	1846	3.74	5.65
Hispanic	771	5.48	4.14
Asian	156	3.86	5.54
AIAN	34	7.32	8.88



Gender	N Hospitalized Cases	Rate per 1,000 residents	Rate per 100 cases
Male	2204	4.77	6.03
Female	2404	4.88	5.77

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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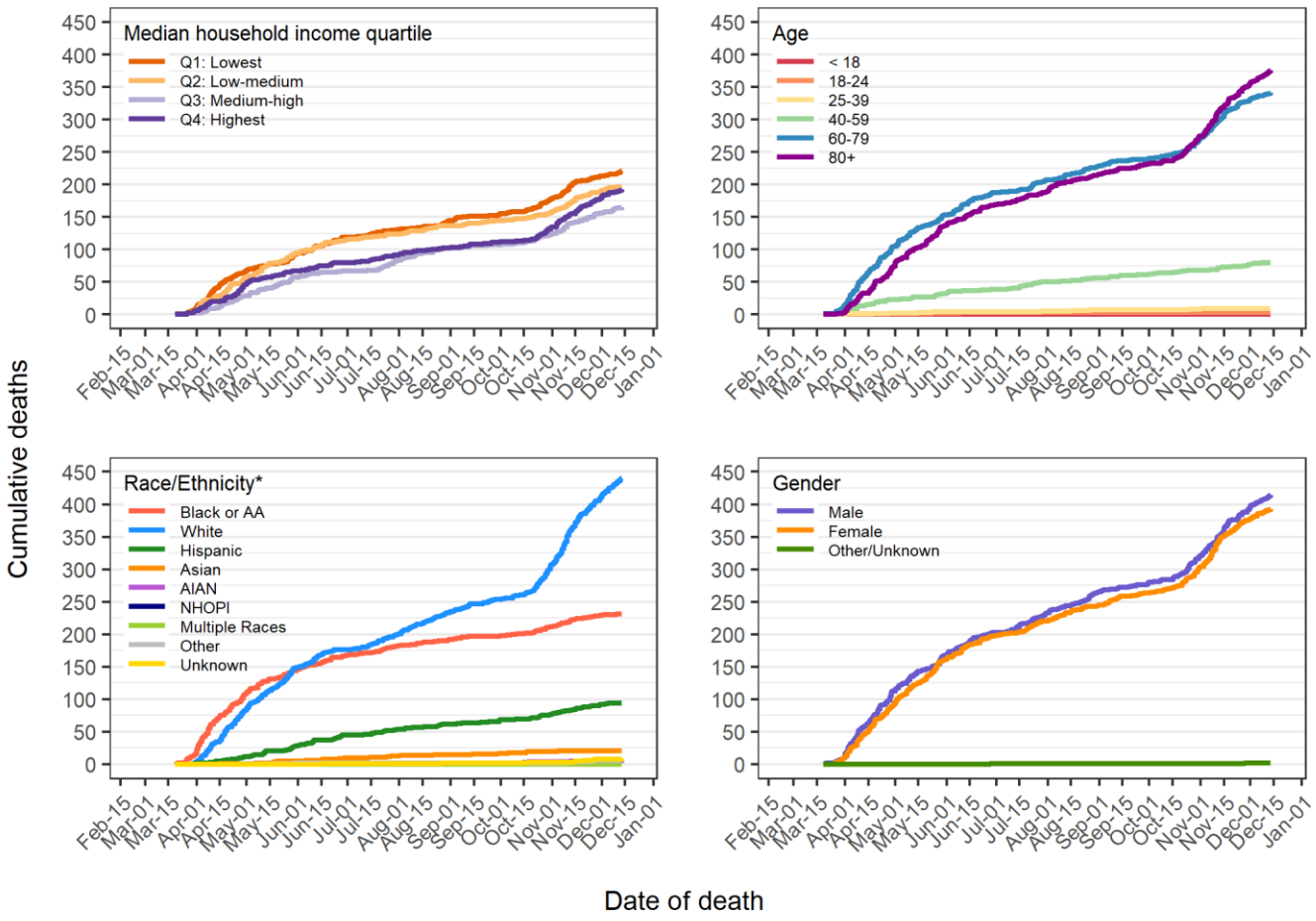
Deaths

There are now a total of 809 confirmed deaths in Milwaukee County, representing a case fatality rate of 1.0%. We observed 12 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 = 414) and for non-Hispanic Whites (N = 440) followed by Black/AA residents (N = 231). 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. In recent weeks, we have seen a marked increase in deaths among non-Hispanic Whites, both sexes, ages 60+, and all income groups with the largest increase among the highest income group. Of note, these increases correspond with a larger increase in deaths in the suburbs, relative to the city.

Figure 11: Cumulative deaths in Milwaukee County



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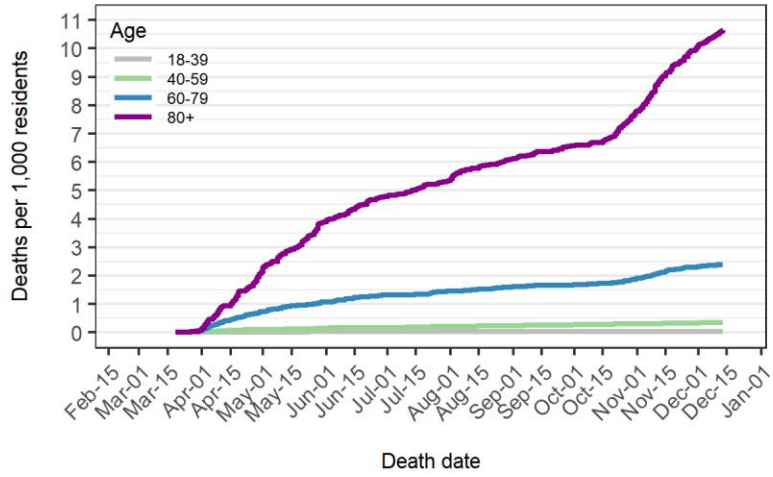
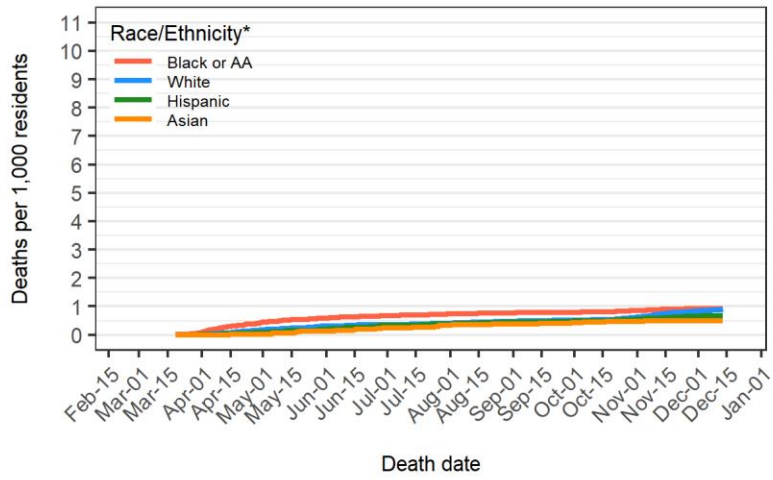
In terms of population- and case-based rates shown in **Figure 12**, there is a clear age category gradient, with higher death rates among older populations. Gender-based rates are very similar. Black/AA populations have the highest population and case-based death rates. All rates presented are crude rates and only groups with 10 or more total deaths are shown.

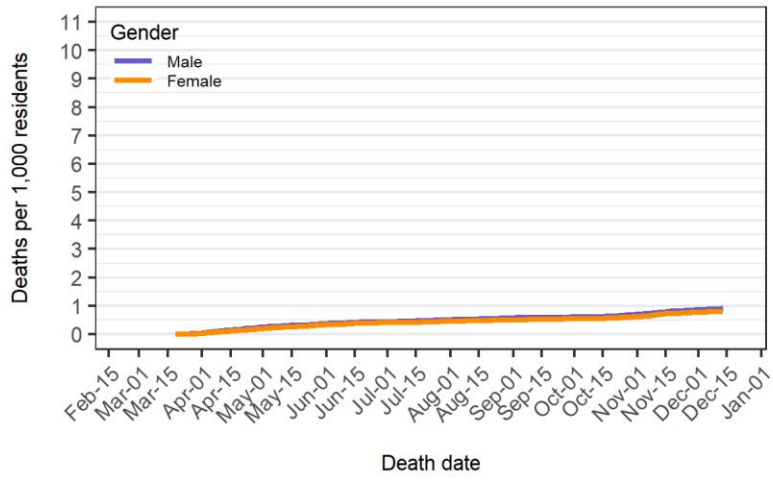
Figure 12: Population and case based death rates in Milwaukee County



Age	N Deaths	Rate per 1,000 residents	Rate per 100 cases
18-39	12	0.04	0.03
40-59	80	0.35	0.38
60-79	341	2.39	3.29
80+	376	10.66	14.70



Race/Ethnicity*	N Deaths	Rate per 1,000 residents	Rate per 100 cases
Black or AA	231	0.93	1.36
White	440	0.89	1.35
Hispanic	94	0.67	0.51
Asian	20	0.49	0.71



Gender	N Deaths	Rate per 1,000 residents	Rate per 100 cases
Male	414	0.90	1.13
Female	393	0.80	0.94

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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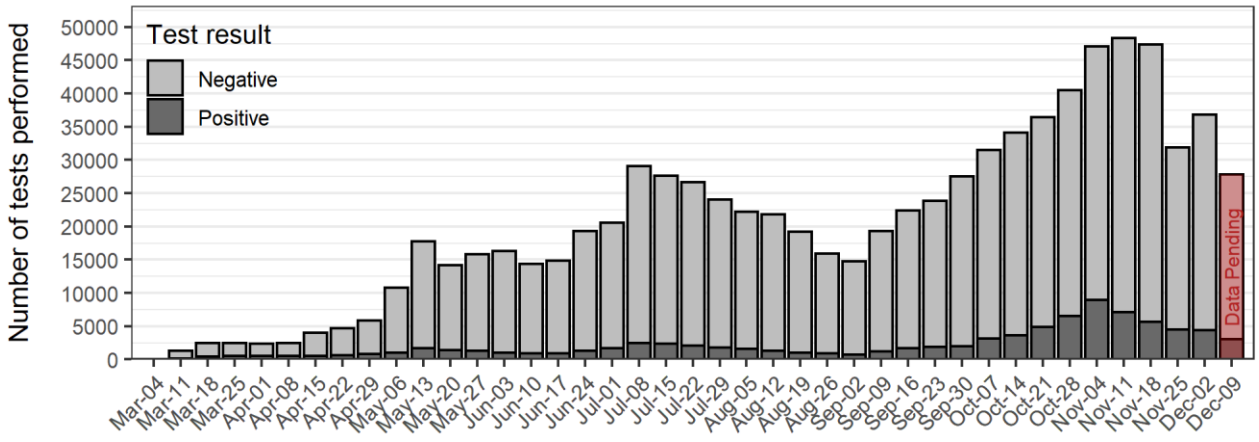
Testing Coverage

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 845842 COVID-19 tests have been performed, with 757824 negative results and 88018 positive results. This represents a positive test rate of 10.4% since the beginning of the epidemic.

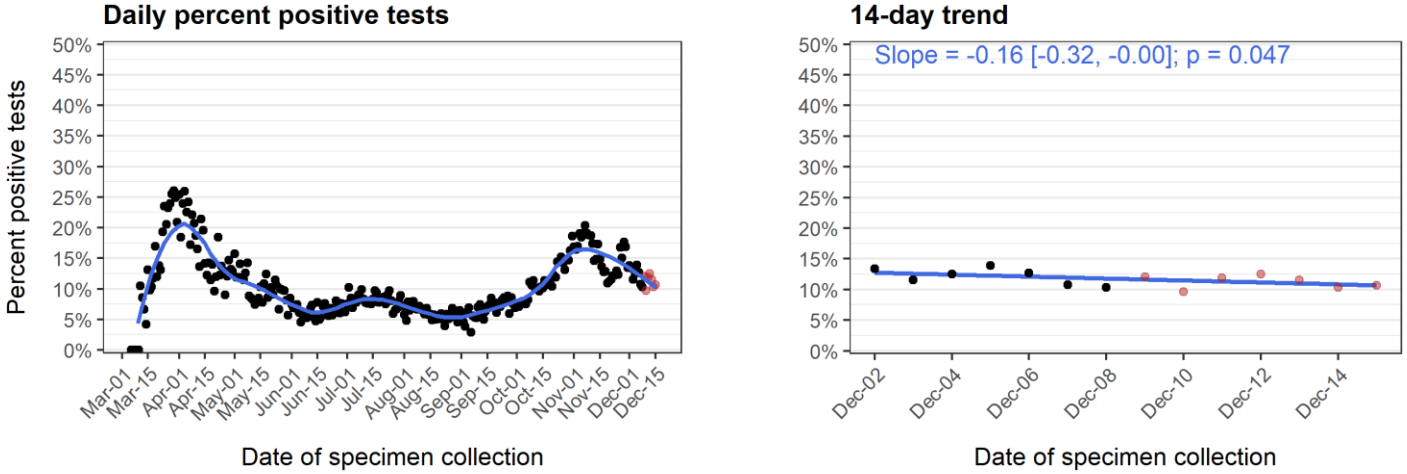
As shown in **Figure 13**, the total number of tests per week increased until early July and then declined, with another increase starting in early September and appearing to peak in early November, followed by a decline. Testing markedly decreased the week of Thanksgiving. As shown in **Figure 14**, the percentage of positive tests has varied over the course of the epidemic, with a high of 25-30% in early April. The percentage of positive tests was 11.1% over the past week compared to 11.8% the previous week. **Figure 14** also illustrates the 14-day trend in the percent positive tests, showing a significant decrease. Percent positive should be interpreted in the context of potential data delays given the large numbers of tests conducted in recent weeks, and considering that data entry for positive tests is prioritized.

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

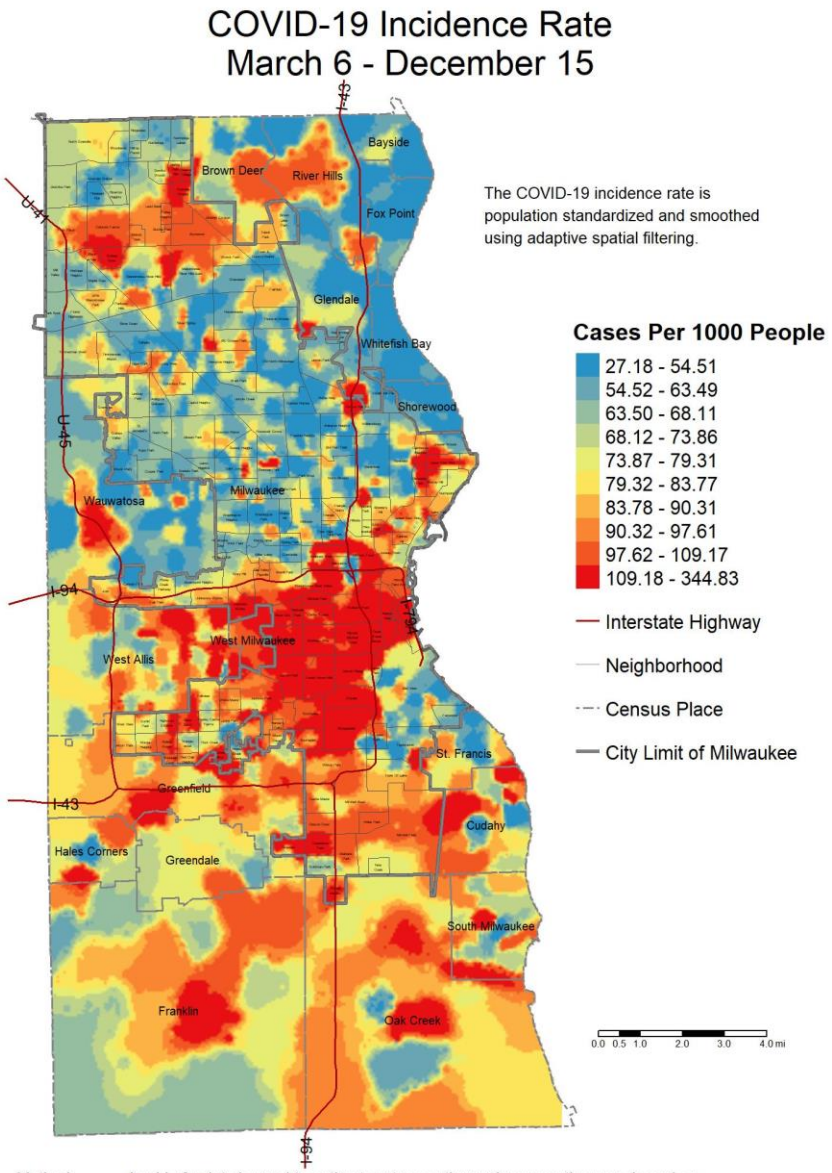


Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

Spatial Patterns of Cases and Testing

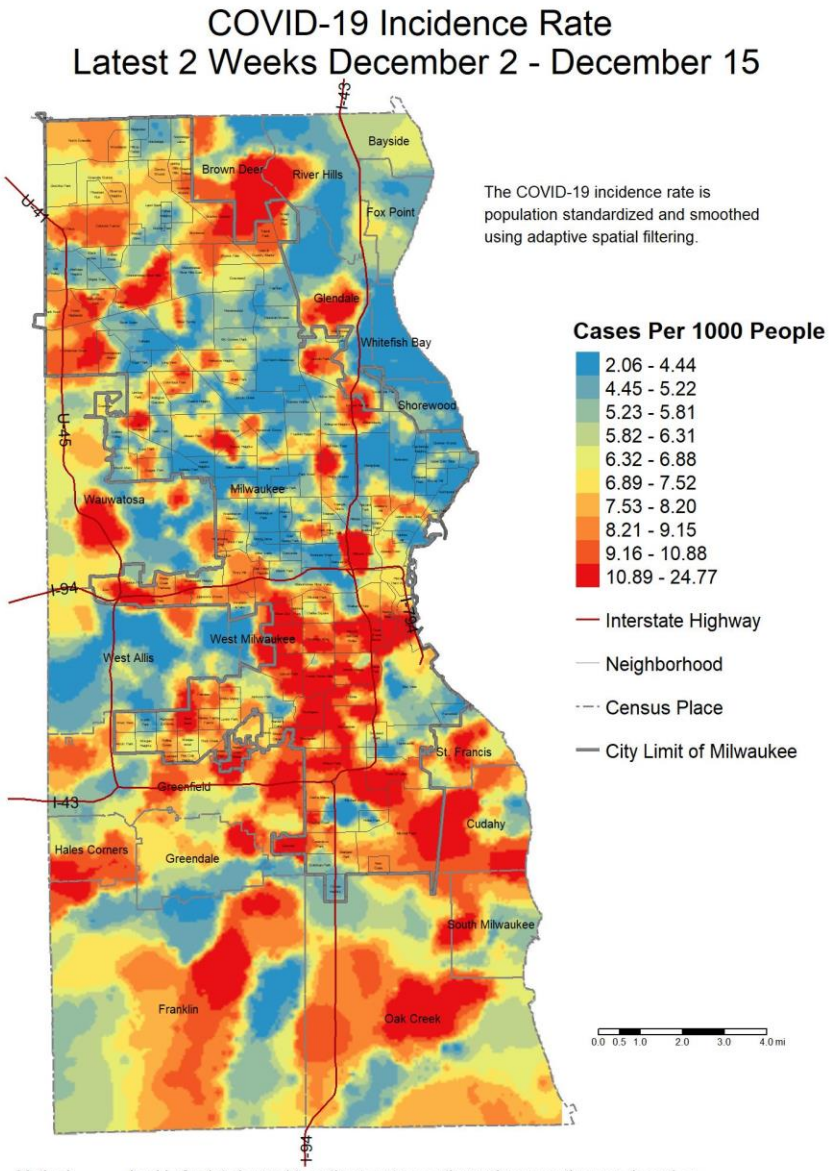
COVID-19 spread is spatially patterned. **Map 1** below illustrates the cumulative burden (all confirmed cases) of COVID-19 in Milwaukee County. **Map 2** shows cases confirmed over the last two weeks. **Map 3** shows the overall testing rate across the population. **Map 4** shows the testing rate over the last two weeks. **Map 5** depicts the percentage of tests that were confirmed positive. **Map 6** shows cumulative COVID-19 related hospitalizations. **Map 7** 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. Deciles are used to define categories. 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.

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 two weeks



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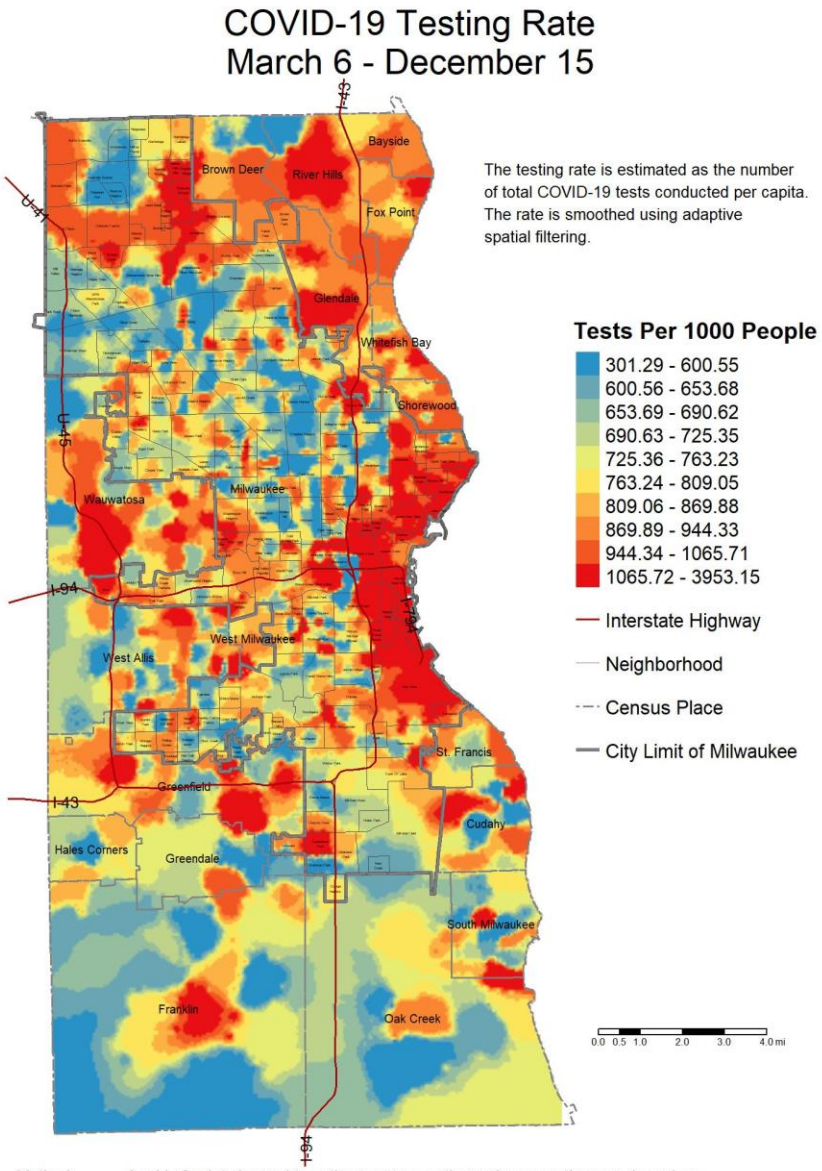
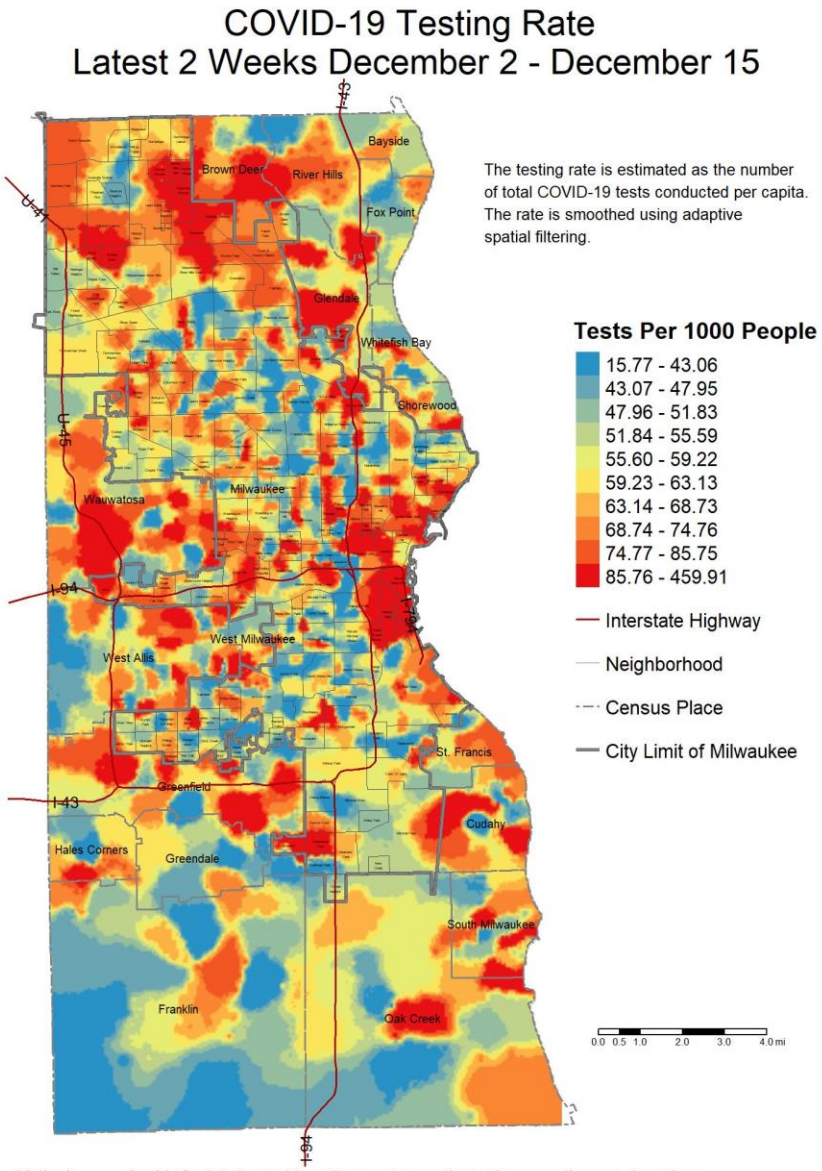
City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)
Census Bureau TIGER/Line Shapefiles (census place boundaries)
Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Decile Map 3: Overall testing rate



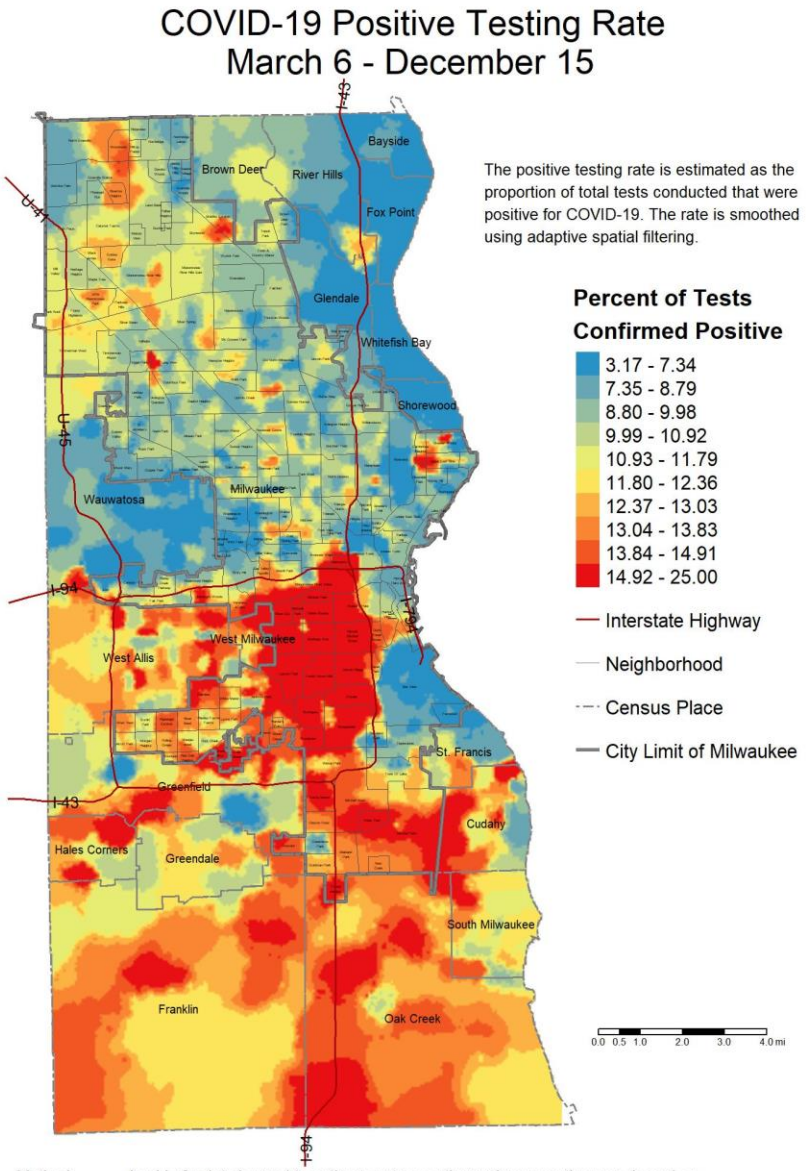
Method: A grid of points is used to estimate rates continuously across the map, based on the nearest cases with a minimum of 15 tests included.
Data Sources: Wisconsin Electronic Disease Surveillance System (WEDSS) (incidence data)
2018 American Community Survey (population data)
City of Milwaukee Map 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: Testing rate within the last two weeks



Method: A grid of points is used to estimate rates continuously across the map, based on the nearest cases with a minimum of 15 tests 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: Percentage of tests 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 positive tests 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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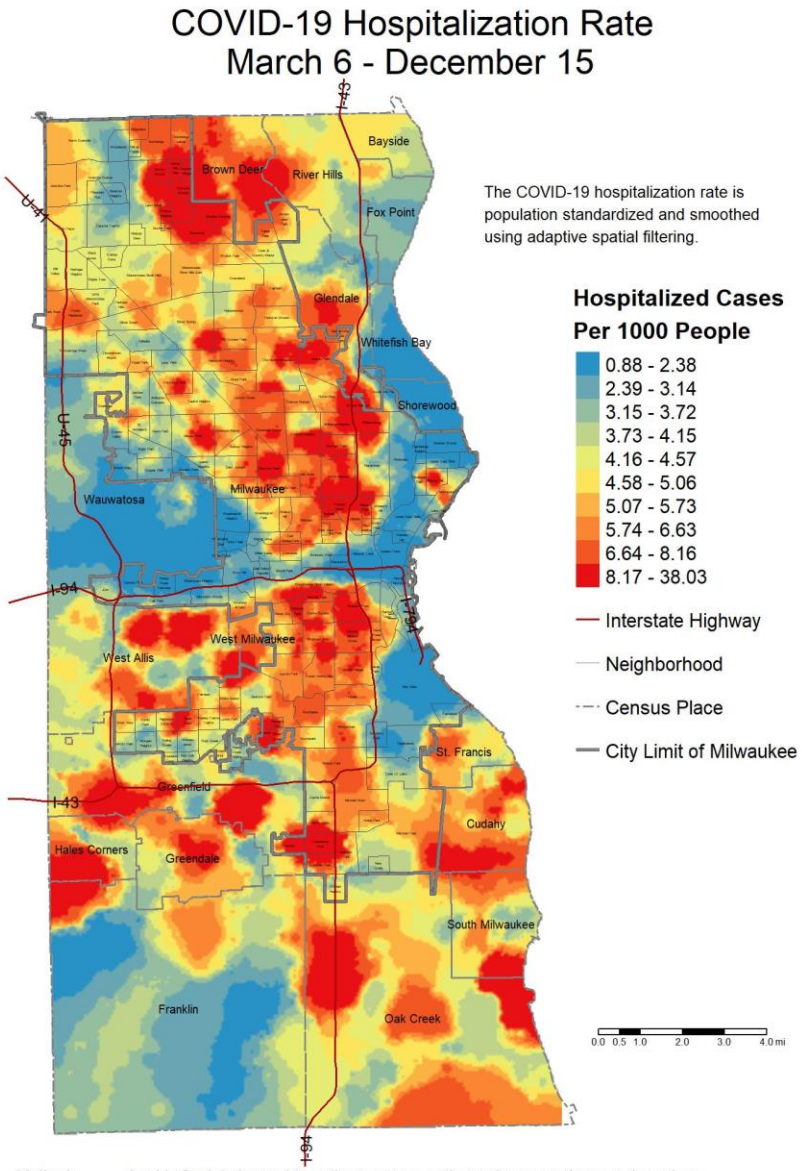
Decile Map 6: COVID-19 related hospitalizations



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)
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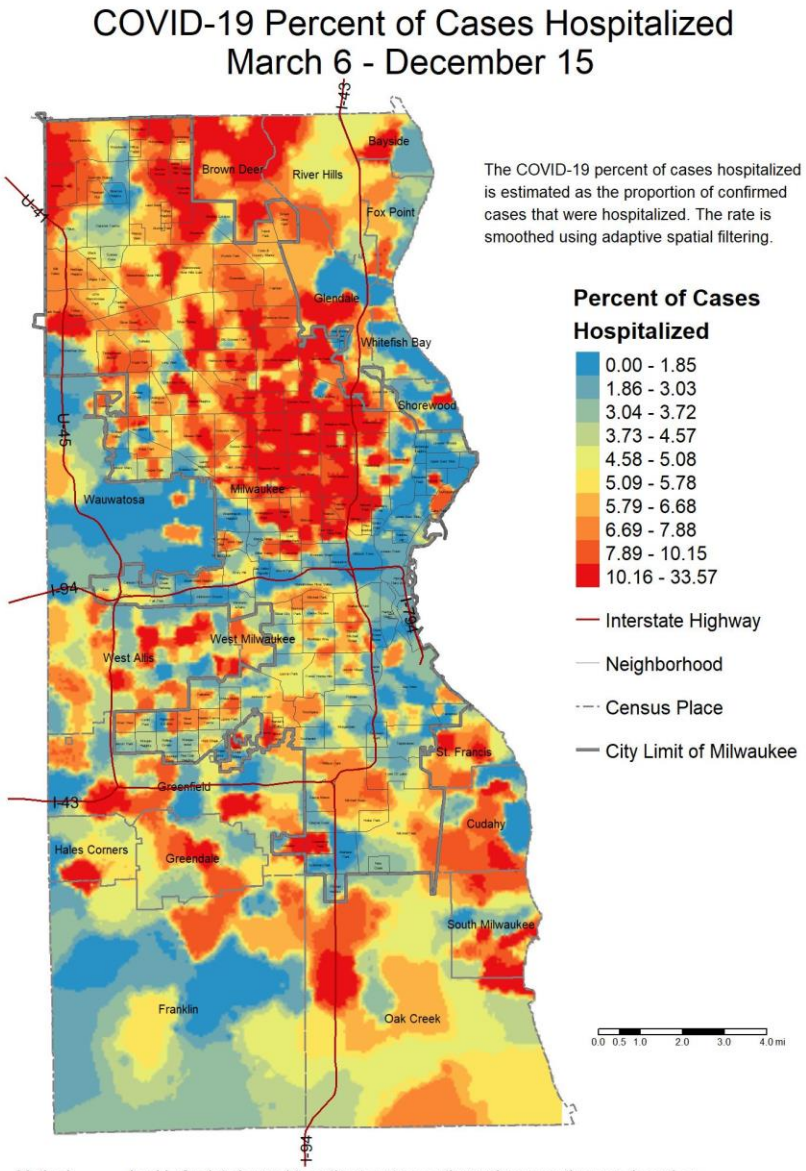
Decile Map 7: Percentage of COVID-19 cases that were hospitalized



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)
Created by the Milwaukee County Covid-19 Epidemiology Intel Team

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 December 9, 2020 through December 15, 2020. This work was funded by the Advancing a Healthier Wisconsin Endowment at the Medical College of Wisconsin.

Contact Information

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