Milwaukee County COVID-19 Data Summary

Milwaukee County COVID-19 Epidemiology Intel Team

This report was updated on October 14, 2020 and includes data through October 13, 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 - October 13

	Milwaukee County	City of Milwaukee	Suburbs
Total tests performed	487,243	320,733	166,510
Percent positive of all tests performed	7.9%	8.4%	6.9%
Number of confirmed cases	33,501	23,859	9,642
Number of hospitalizations	2,617	1,888	729
Number of deaths	546	350	196
Case fatality rate	1.6%	1.5%	2.0%

Weekly Milwaukee County COVID-19 Summary Statistics
October 7 - October 13

	Milwaukee County	City of Milwaukee	Suburbs
Total tests performed	23,095	14,984	8,111
Percent positive of all tests performed	10.2%	10.0%	10.5%
Number of confirmed cases	1,945	1,313	632
Number of hospitalizations	126	74	52
Number of deaths	2	1	1

Total Cases and New Cases

There are now a total of 33501 cases in Milwaukee County, since the first confirmed case on March 6th, 2020. Over the last week, we observed 1945 new confirmed cases in Milwaukee County, including 1313 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 four days of data and exclude those days from the trend line.

Over the last week, we have seen a continued increase in confirmed cases, particularly in the City of Milwaukee. The highest daily case count since the beginning of the epidemic occurred on October 8, 2020, with 428 cases in the county overall and 276 cases in the city. Of note, the highest daily case count over the entire period in the suburbs occurred on October 8, 2020, with a total of 152 cases confirmed, while the highest case count in the city occurred earlier, on May 18, 2020, with a total of 345 cases confirmed. 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.

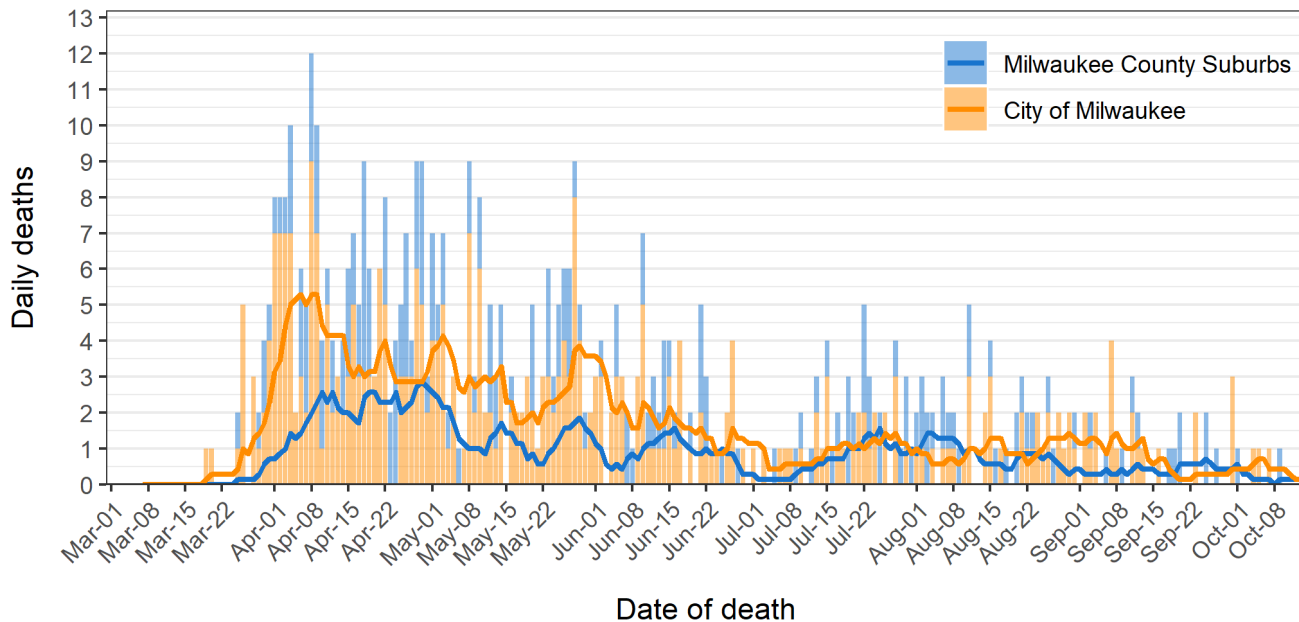### Figure 1: Milwaukee County daily number of COVID-19 cases
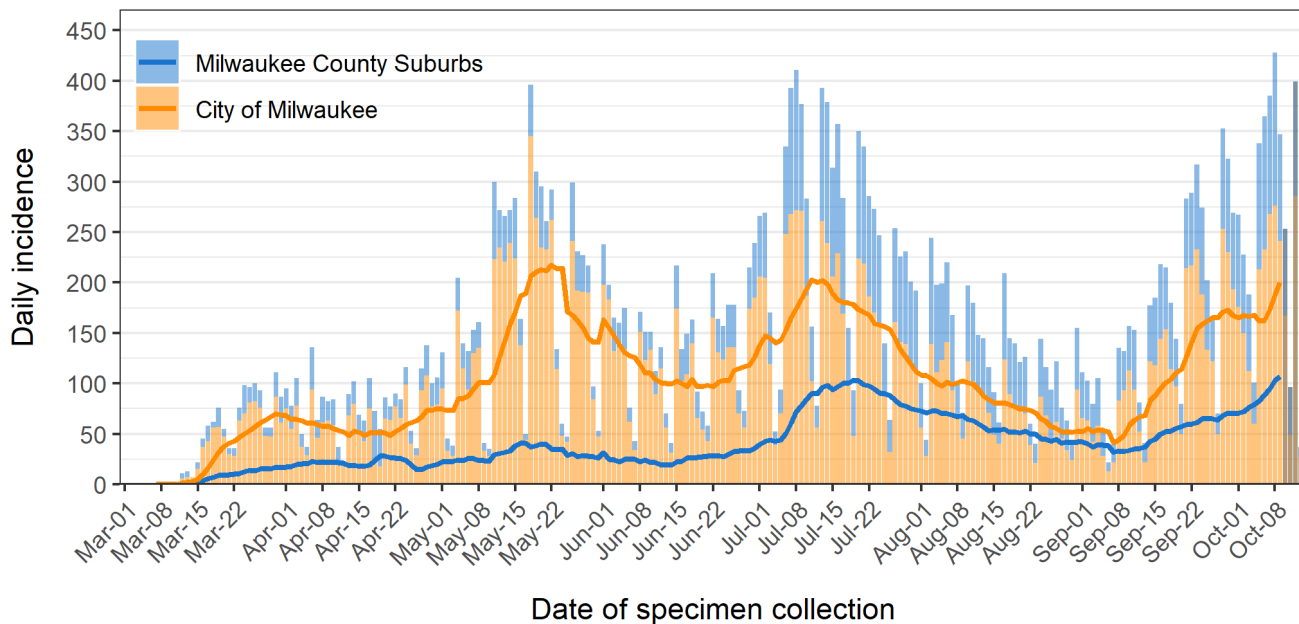
Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

Total Deaths and New Deaths

There are a total of 546 COVID-19 related deaths in Milwaukee County. Over the last week, we observed 2 deaths, with 1 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. Overall, daily deaths have remained relatively stable since mid-July. Deaths 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.

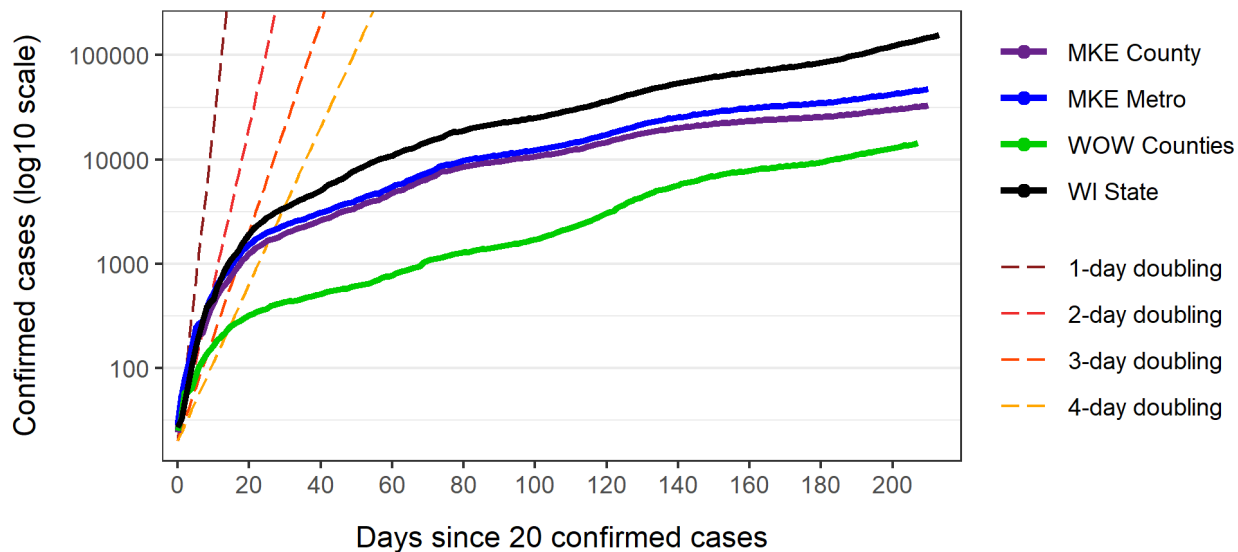**Figure 2: Milwaukee County COVID-19 daily deaths**

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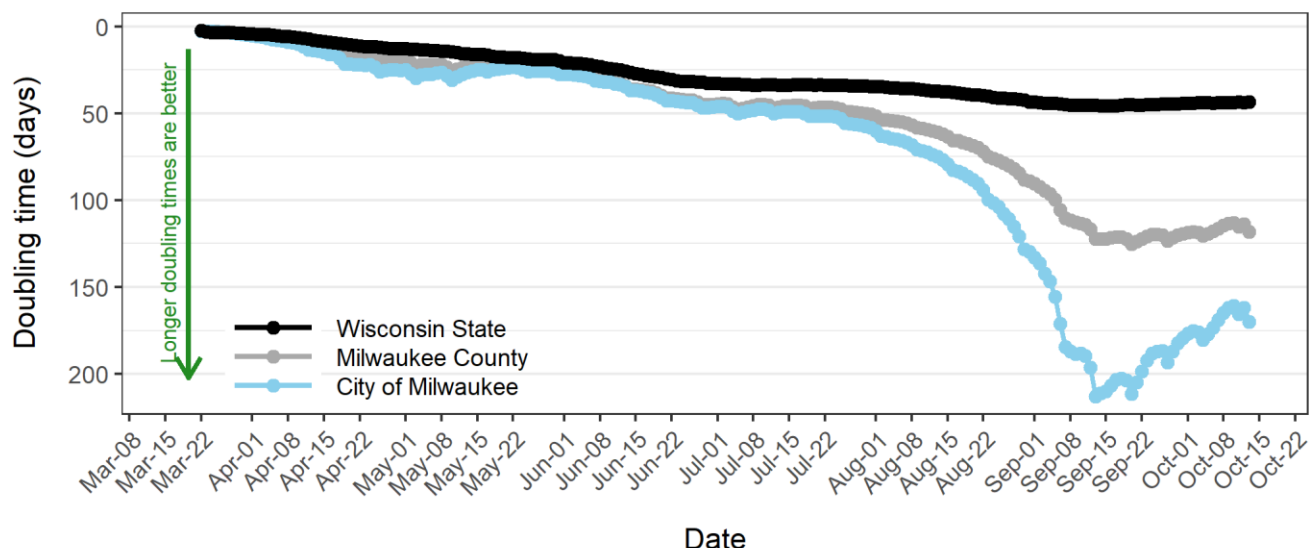
The COVID-19 Growth Rate

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 118.23 days. The current doubling time for WOW counties is 62.54 days. The current doubling time for the state of Wisconsin is 43.54 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
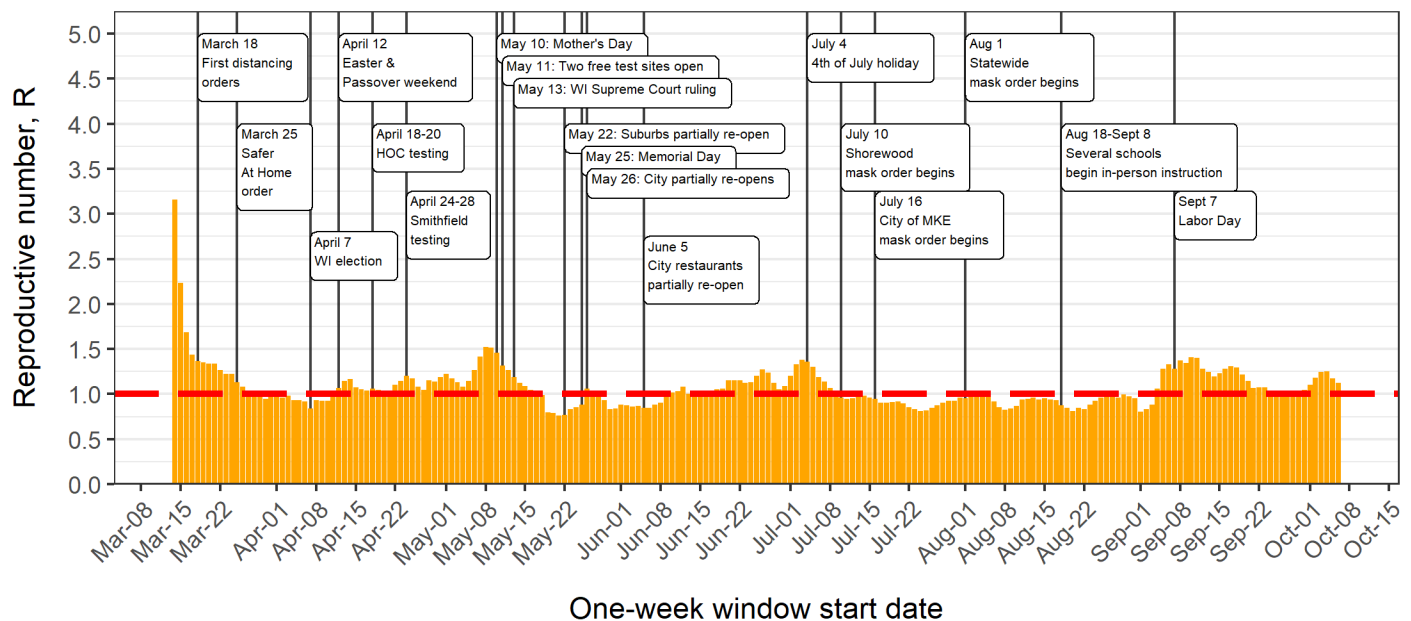

Figure 4: Trend in doubling times

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 1.52 on May 8, 2020 and then a decrease to a low of 0.76 in the county on May 21, 2020. The R increased again to a recent high of 1.41 on September 10, 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 most recent week are 1.123 for the county, 1.161 in the city, and 1.055 in the suburbs.

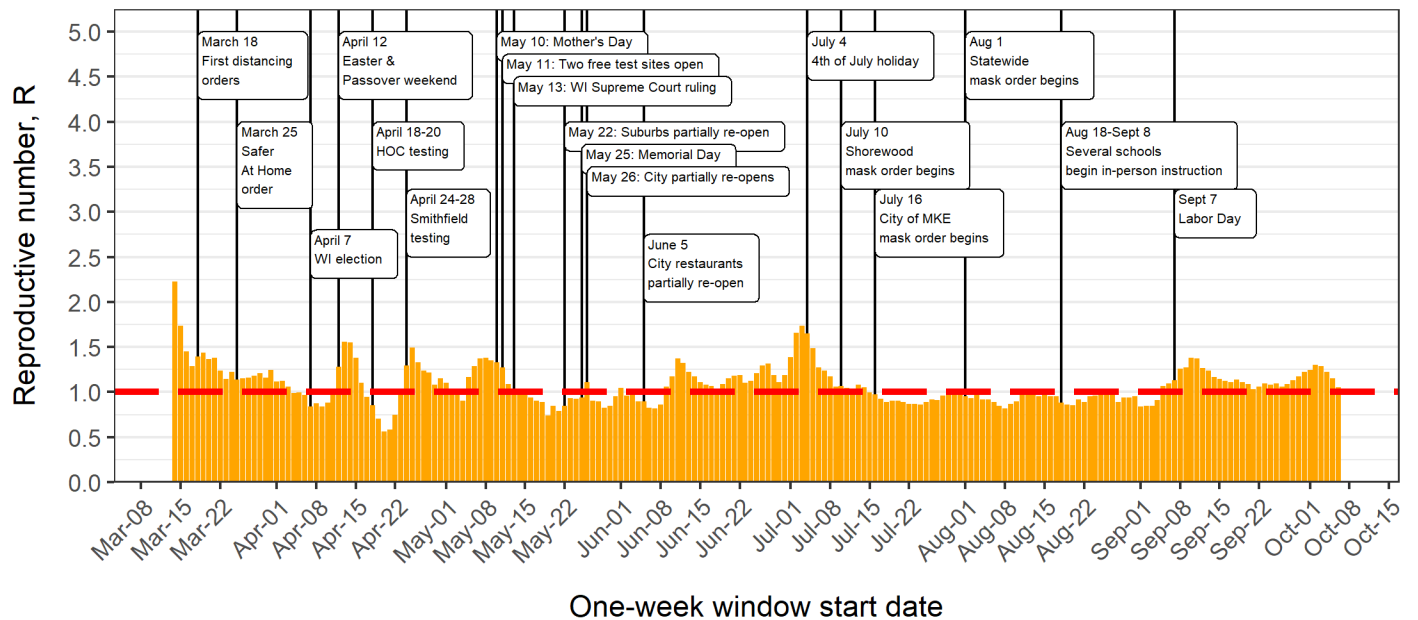## Figure 5: One week reproductive number for Milwaukee County

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
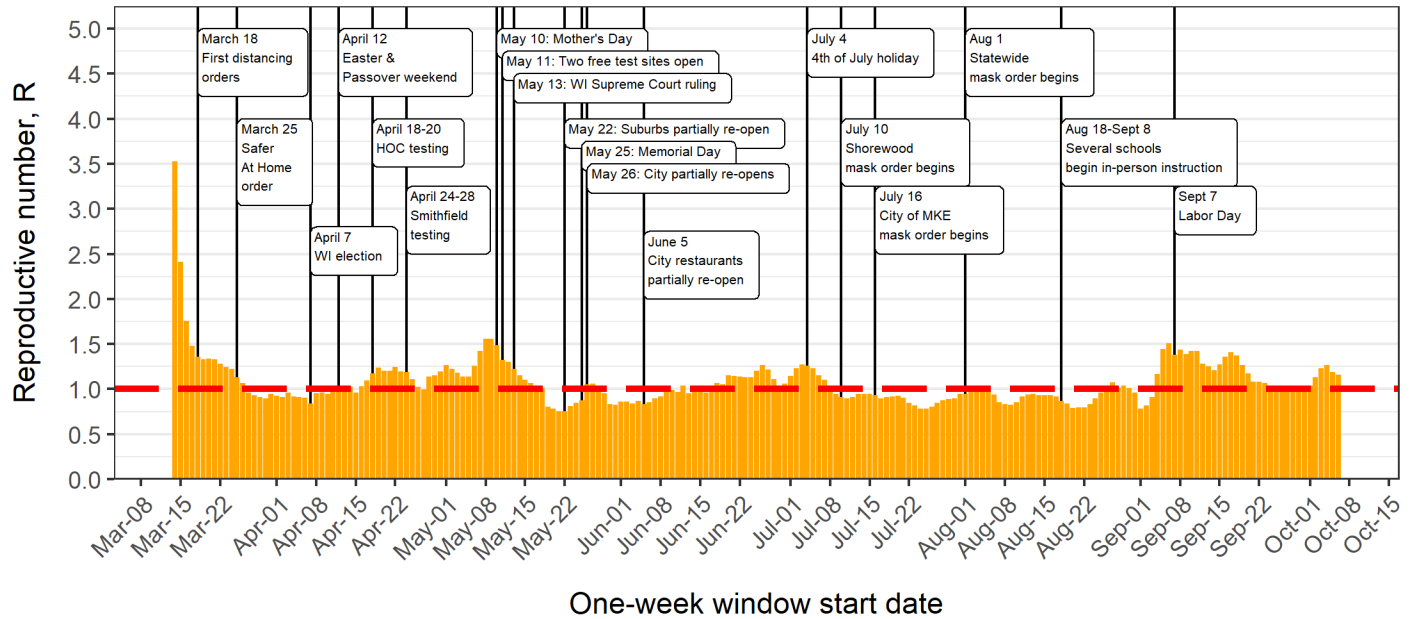
Reproductive number, R (y-axis)

One-week window start date (x-axis)

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

Reproductive number, R (y-axis)

One-week window start date (x-axis)

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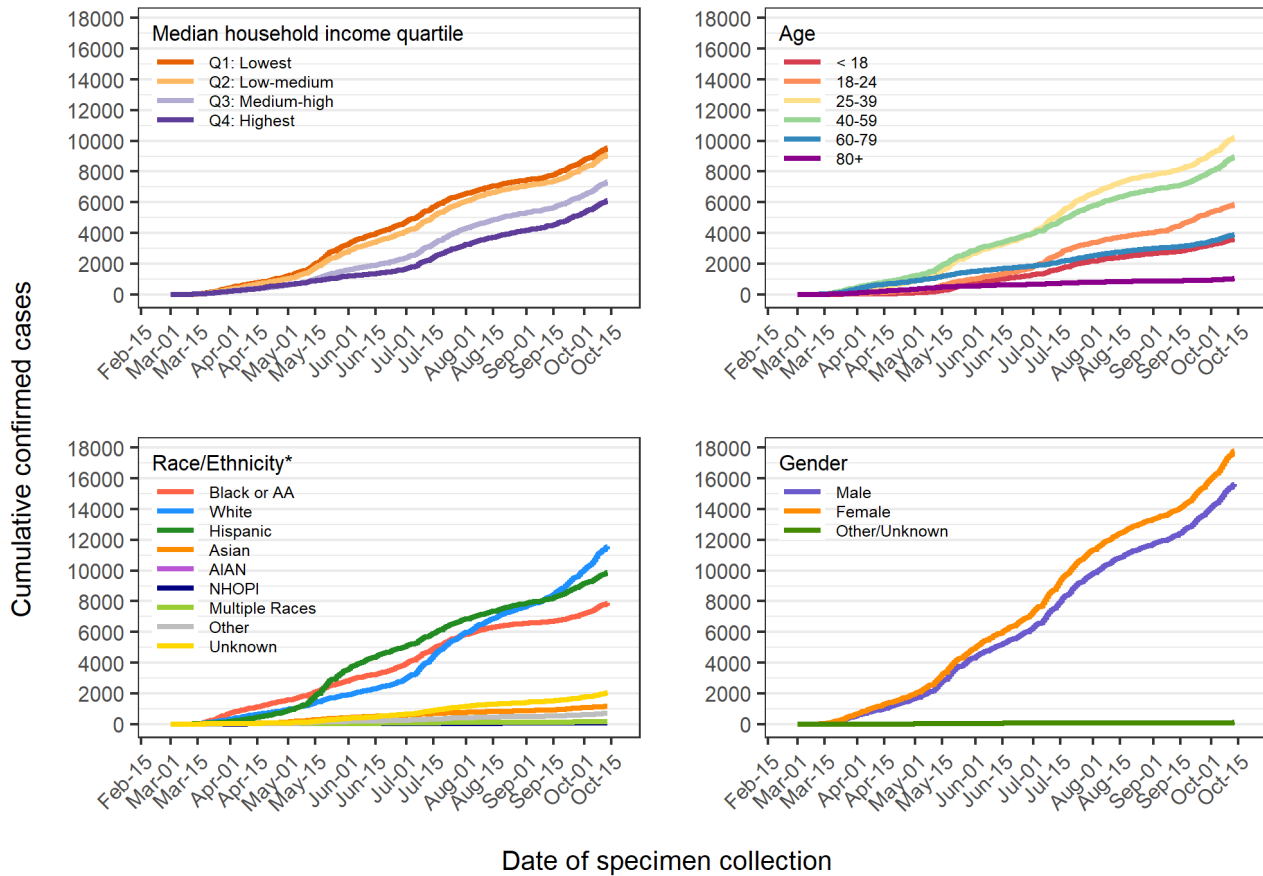Created by the Milwaukee County COVID-19 Epidemiology Intel Team

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 now been identified among the non-Hispanic White population (N = 11556), followed by the Hispanic population (N = 9859), and the Black/AA population (N = 7876). 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 observed increases among individuals in all income groups, those ages 18-59, and among non-Hispanic Whites, and to a lesser degree Hispanics and non-Hispanic Black/AAs with similar increases for both sexes. The cumulative number of cases among those ages 25-39 (N = 10208) far exceeds the number among the next highest group, those ages 40-59 (N = 8942). In the last few weeks, we saw the number of cases under age 18 (N = 3609) increase to approach the number diagnosed among those 60-79 (N = 3885).

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+. Of particular note, population based rates among those aged 18-24 and 25-39 are increasing the most, with a smaller increase among those aged 40-59. 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 (70.13 per 1,000 people) exceeding that among all other racial and ethnic groups. The rate among AIANs (32.92 per 1,000 people) is now approximately equal to that among Black/AAs (31.63 per 1,000 people), although the total number of cases among AIANs (N = 153) is much lower than the number among Black/AAs (N = 7876). The population-based rate among non-Hispanic Whites is relatively low compared to other racial and ethnic groups. Rates are very similar among males and females.

Figure 8: Population based incidence rates in Milwaukee County
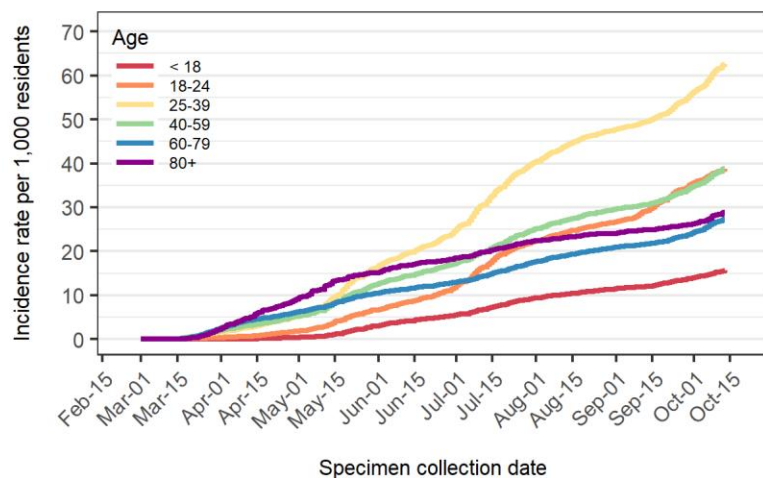
Age	N Cases	Population	Rate per 1,000 residents
< 18	3609	231111	15.62
18-24	5839	150895	38.70
25-39	10208	163246	62.53
40-59	8942	230887	38.73
60-79	3885	142783	27.21
80+	1018	35287	28.85
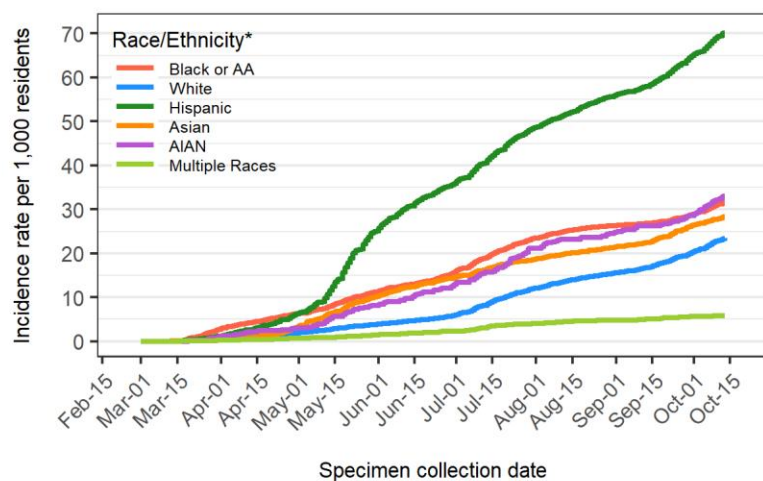
Race/Ethnicity*	N Cases	Population	Rate per 1,000 residents
Black or AA	7876	249011	31.63
White	11556	493723	23.41
Hispanic	9859	140575	70.13
Asian	1143	40443	28.26
AIAN	153	4647	32.92
Multiple Races	142	24224	5.86
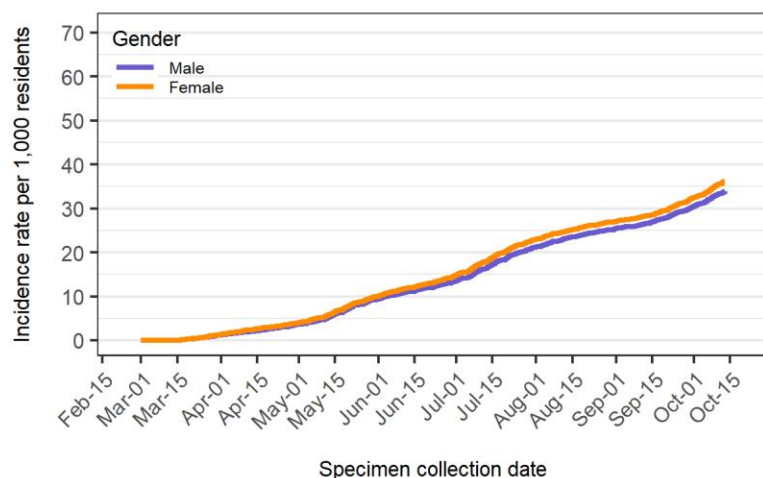
Gender	N Cases	Population	Rate per 1,000 residents
Male	15623	461670	33.84
Female	17790	492539	36.12

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 2617 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 = 974). The highest number of hospitalizations have occurred among the Black/AA community (N = 1051), followed by the Non-Hispanic White community (N = 852) and then the Hispanic community (N = 506). Overall, counts are lower among other racial and ethnic groups. Females now slightly outnumber males, comprising 51.4% of all 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

Date of specimen collection

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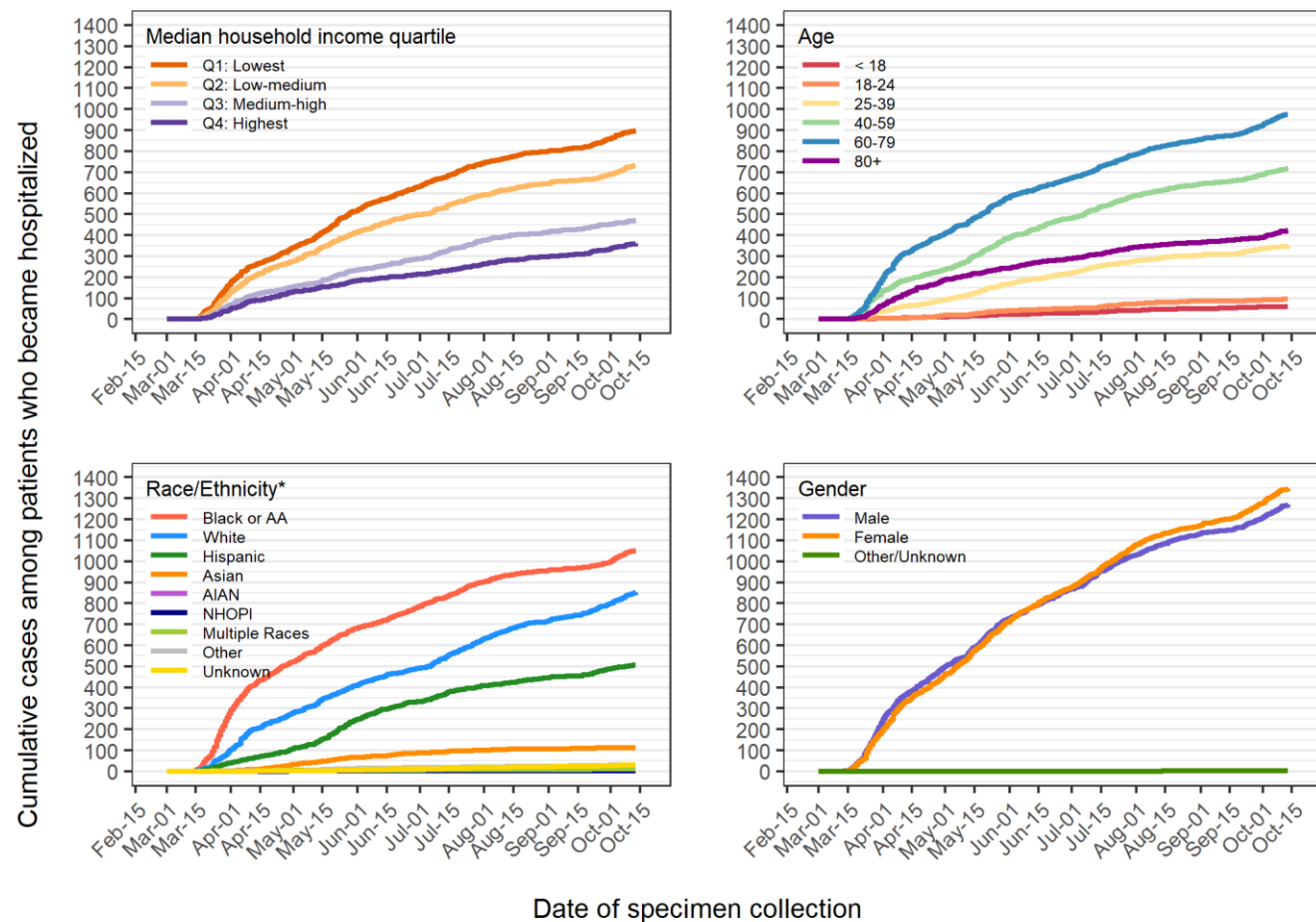Created by the Milwaukee County COVID-19 Epidemiology Intel Team
*Race and ethnicity were combined into one variable where the Hispanic category includes Hispanics of any race.
AIAN stands for American Indian or Alaska Native and NHOPI stands for Native Hawaiian or Other Pacific Islander.

When examined as population-based rates 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 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 an 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
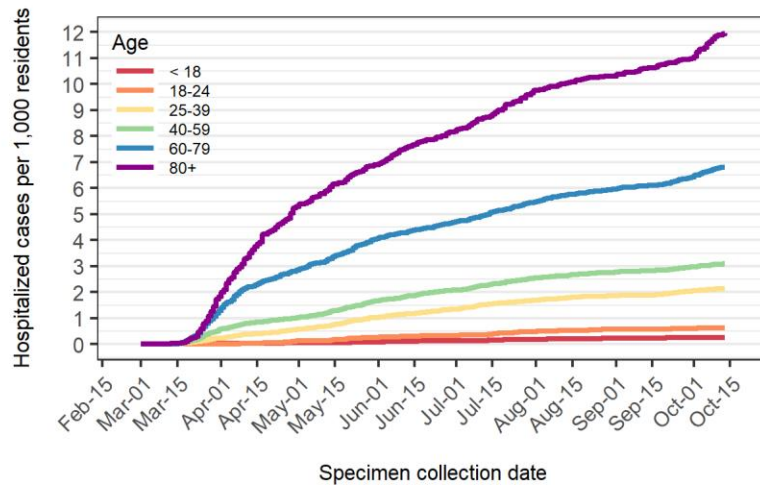
Age	N Hospitalized Cases	Rate per 1,000 residents	Rate per 100 cases
< 18	60	0.26	1.66
18-24	96	0.64	1.64
25-39	348	2.13	3.41
40-59	717	3.11	8.02
60-79	974	6.82	25.07
80+	422	11.96	41.45
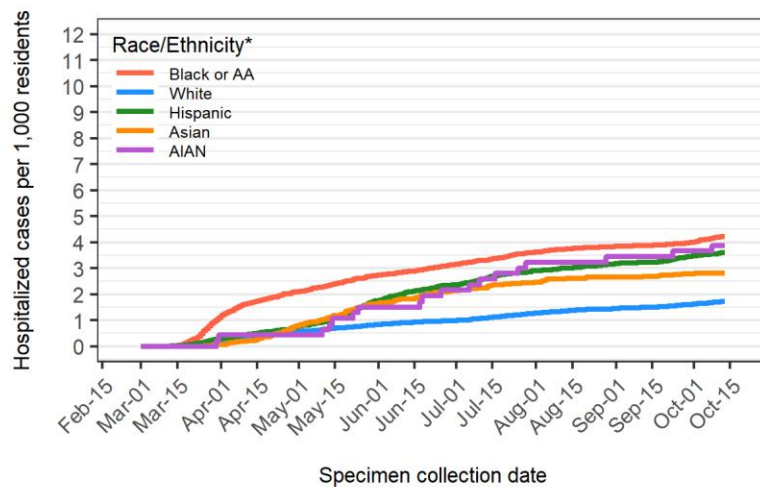
Race/Ethnicity*	N Hospitalized Cases	Rate per 1,000 residents	Rate per 100 cases
Black or AA	1051	4.22	13.34
White	852	1.73	7.37
Hispanic	506	3.60	5.13
Asian	113	2.79	9.89
AIAN	18	3.87	11.76
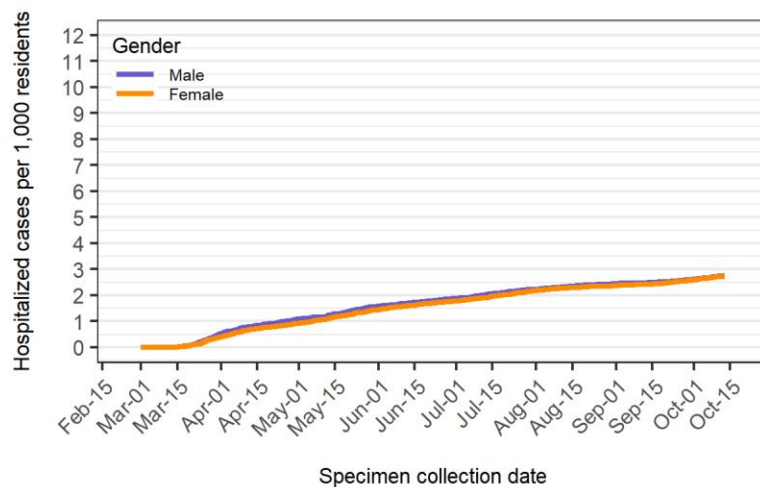
Gender	N Hospitalized Cases	Rate per 1,000 residents	Rate per 100 cases
Male	1269	2.75	8.12
Female	1346	2.73	7.57

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.*

Deaths

There are now a total of 546 confirmed deaths in Milwaukee County, representing a case fatality rate of 1.6%. 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 = 279) and for non-Hispanic Whites (N = 253) followed by Black/AA residents (N = 199). 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
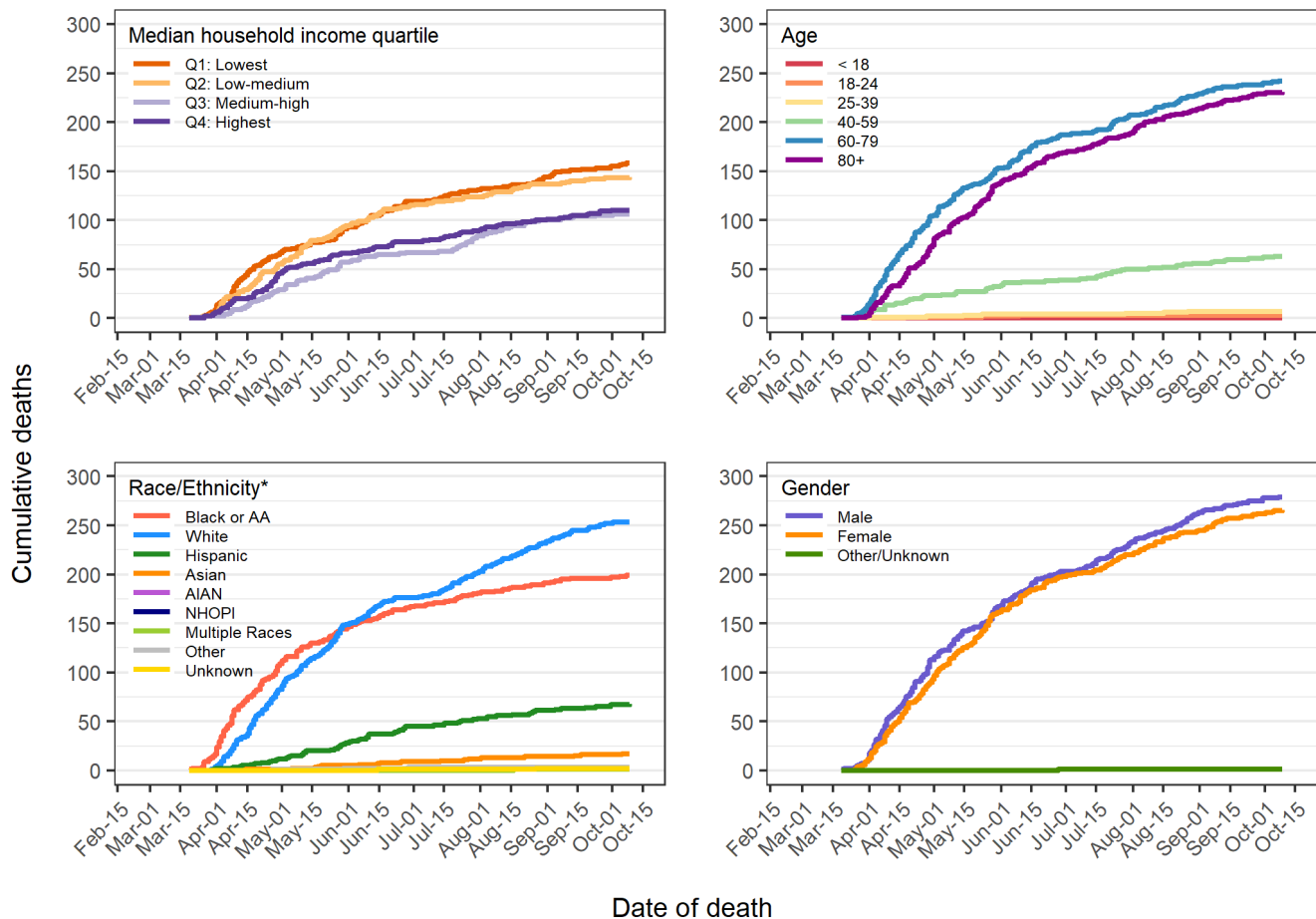
Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team
*Race and ethnicity were combined into one variable where the Hispanic category includes Hispanics of any race.
AIAN stands for American Indian or Alaska Native and NHOPI stands for Native Hawaiian or Other Pacific Islander.

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	10	0.03	0.06
40-59	63	0.27	0.70
60-79	242	1.69	6.23
80+	231	6.55	22.69
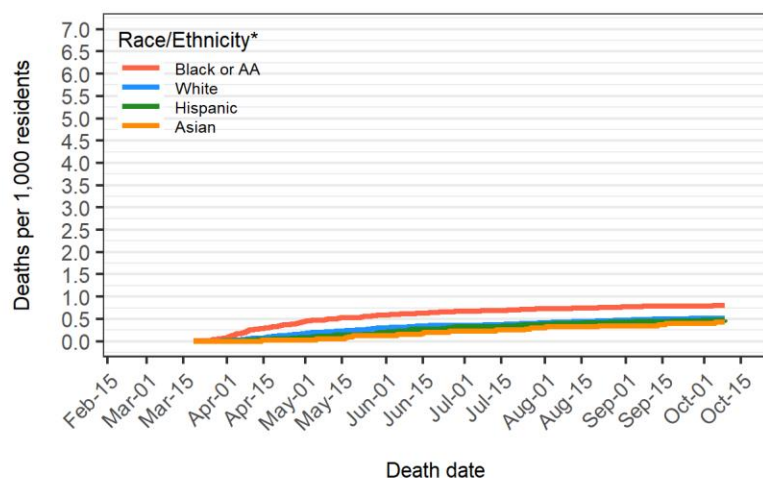
Race/Ethnicity*	N Deaths	Rate per 1,000 residents	Rate per 100 cases
Black or AA	199	0.80	2.53
White	253	0.51	2.19
Hispanic	68	0.48	0.69
Asian	17	0.42	1.49
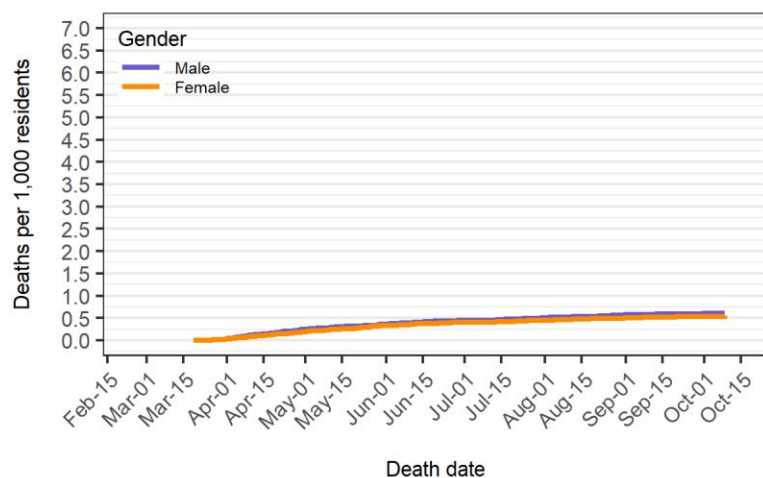
Gender	N Deaths	Rate per 1,000 residents	Rate per 100 cases
Male	279	0.60	1.79
Female	266	0.54	1.50

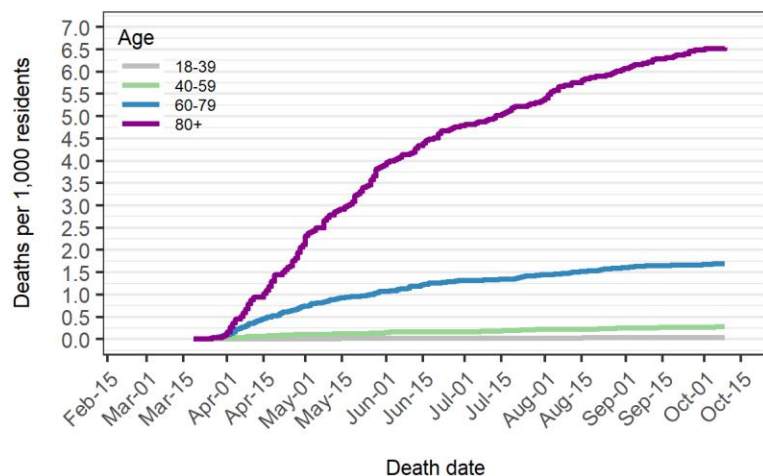*Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)*
Created by the Milwaukee County COVID-19 Epidemiology Intel Team
**Race and ethnicity were combined into one variable where the Hispanic category includes Hispanics of any race.*
AIAN stands for American Indian or Alaska Native and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

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 487243 COVID-19 tests have been performed, with 448738 negative results and 38505 positive results. This represents a positive test rate of 7.9% since the beginning of the epidemic.

As shown in **Figure 13**, the total number of tests performed per week increased until early July and then peaked and declined, with an increase observed in the last few weeks. 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 10.2% over the past week compared to 7.3% the previous week. **Figure 14** also illustrates the 14-day trend in the percent positive tests, showing no significant change.

Figure 13: Milwaukee County number of tests per week
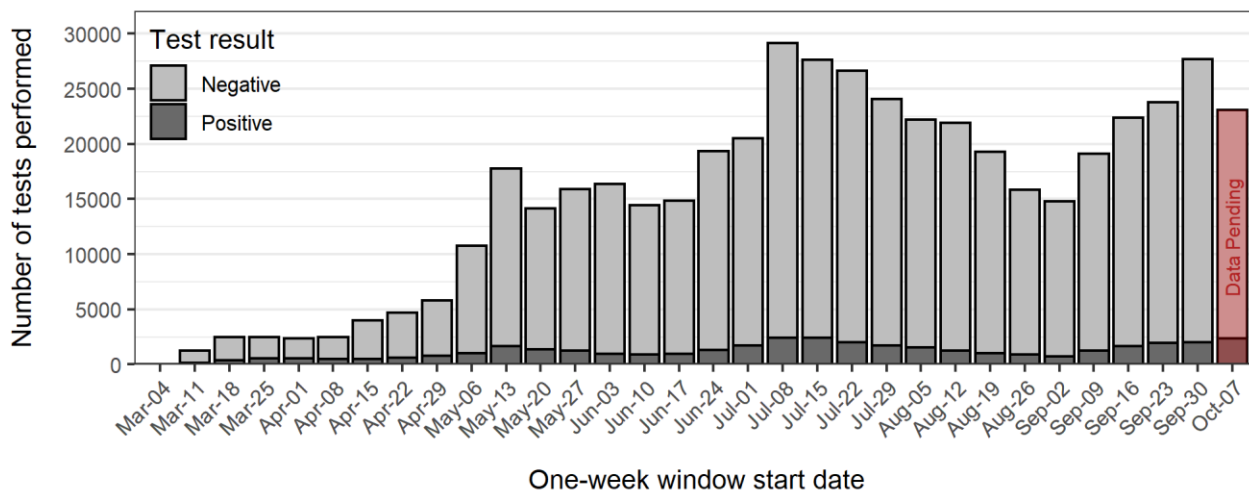
Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

Figure 14: Milwaukee County percent positive tests
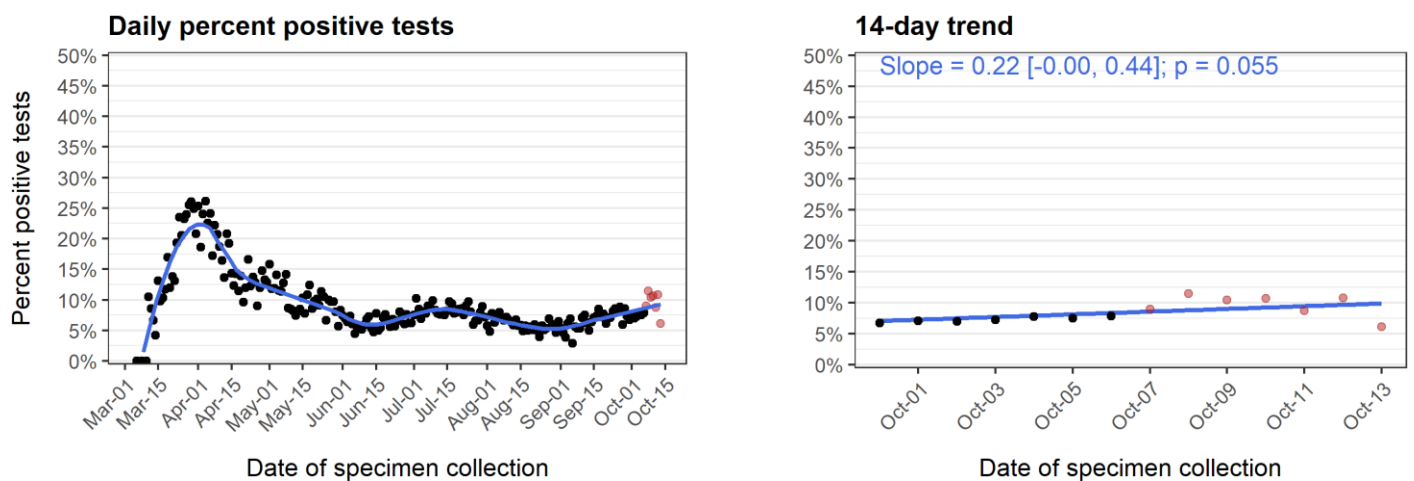
Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

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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 week. **Map 3** shows the overall testing rate across the population. **Map 4** shows the testing rate over the last week. **Map 5** depicts the percentage of tests that were confirmed positive. **Map 6** shows cumulative COVID-19 related hospitalizations. 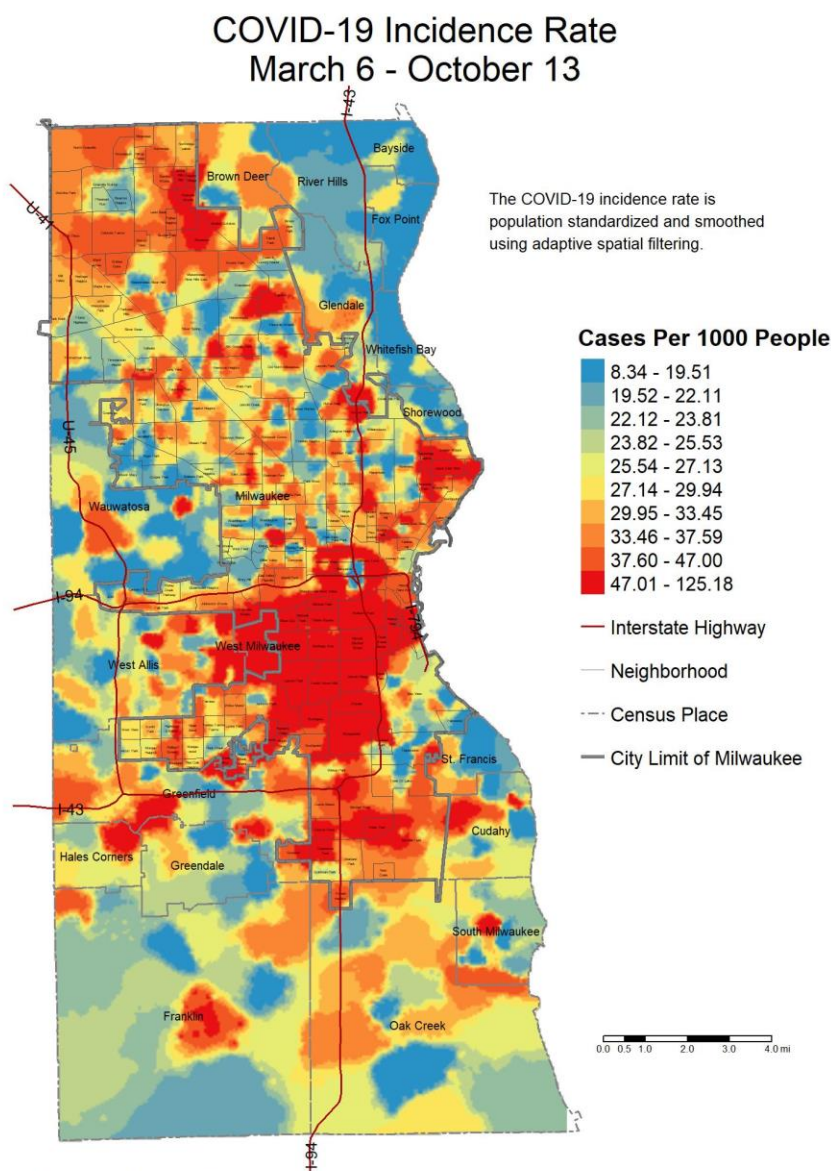**Map 7** shows the percentage of cases who have been hospitalized. All are crude rate maps created using census block group level COVID-19 data from WEDSS and population data from the US Census. The maps are smoothed to protect confidentiality and ensure that rates are stable while still providing geographic 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

COVID-19 Incidence Rate
March 6 - October 13

The COVID-19 incidence rate is population standardized and smoothed using adaptive spatial filtering.

Cases Per 1000 People

■	8.34 - 19.51
■	19.52 - 22.11
■	22.12 - 23.81
■	23.82 - 25.53
■	25.54 - 27.13
■	27.14 - 29.94
■	29.95 - 33.45
■	33.46 - 37.59
■	37.60 - 47.00
■	47.01 - 125.18

— Interstate Highway
Neighborhood
--- Census Place
— City Limit of Milwaukee

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

COVID-19 Incidence Rate
Latest Week October 7 - October 13
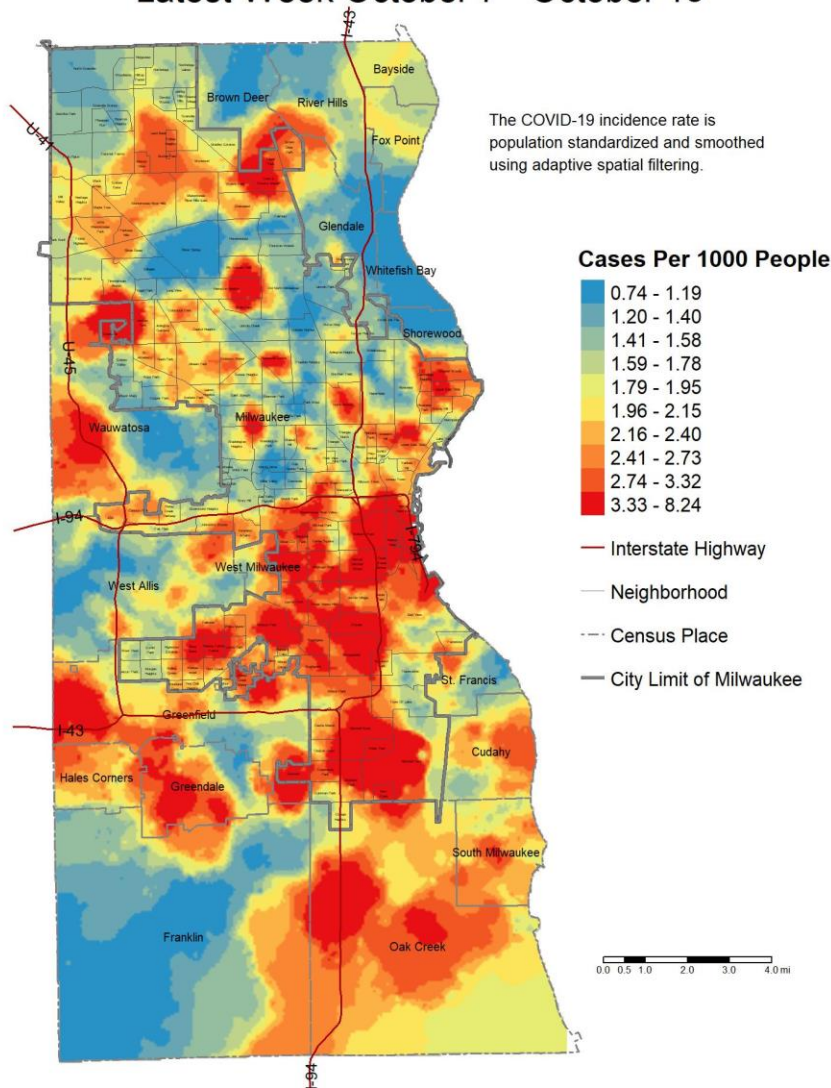
The COVID-19 incidence rate is population standardized and smoothed using adaptive spatial filtering.

Cases Per 1000 People

■	0.74 - 1.19
■	1.20 - 1.40
■	1.41 - 1.58
■	1.59 - 1.78
■	1.79 - 1.95
■	1.96 - 2.15
■	2.16 - 2.40
■	2.41 - 2.73
■	2.74 - 3.32
■	3.33 - 8.24

— Interstate Highway

— Neighborhood

--- Census Place

— City Limit of Milwaukee

0.0 0.5 1.0   2.0   3.0   4.0 mi

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: Overall testing rate

COVID-19 Testing Rate
March 6 - October 13

The testing rate is estimated as the number of total COVID-19 tests conducted per capita. The rate is smoothed using adaptive spatial filtering.

Tests Per 1000 People

- 123.65 - 318.43
- 318.44 - 342.26
- 342.27 - 364.26
- 364.27 - 382.79
- 382.80 - 406.80
- 406.81 - 434.73
- 434.74 - 466.71
- 466.72 - 514.91
- 514.92 - 576.08
- 576.09 - 2062.16

— Interstate Highway

— Neighborhood

—·— Census Place

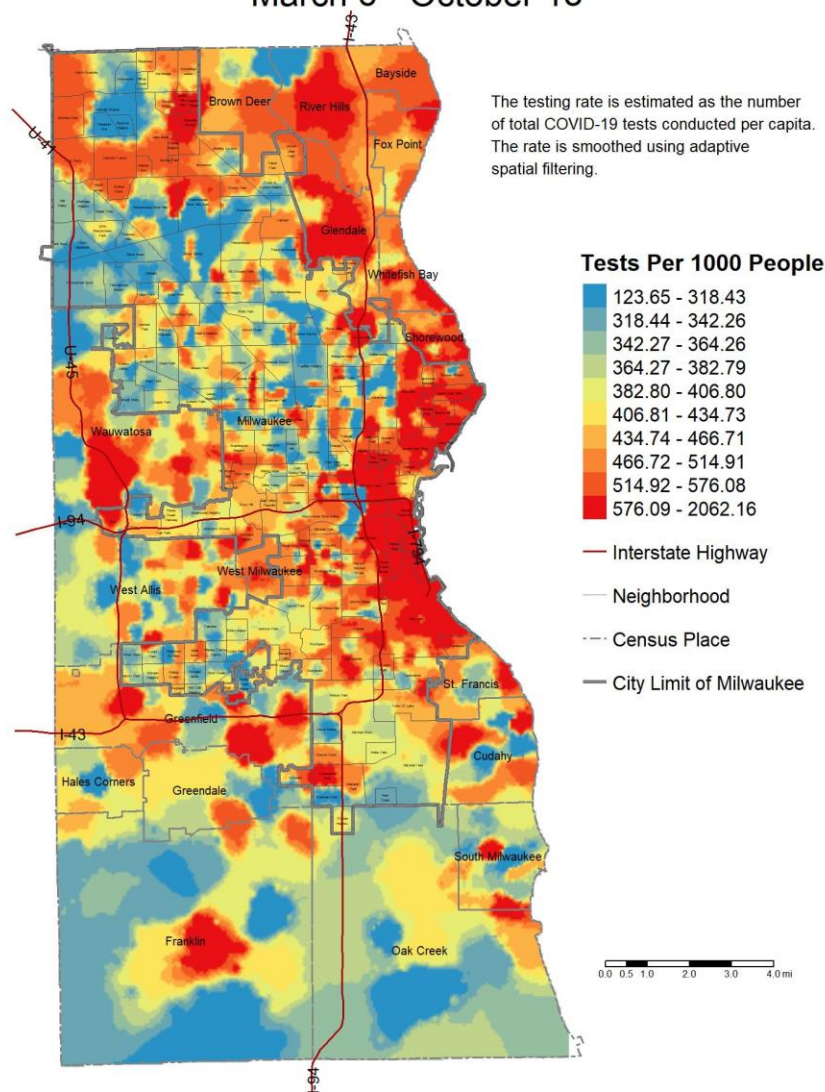— City Limit of Milwaukee

0.0 0.5 1.0   2.0   3.0   4.0 mi

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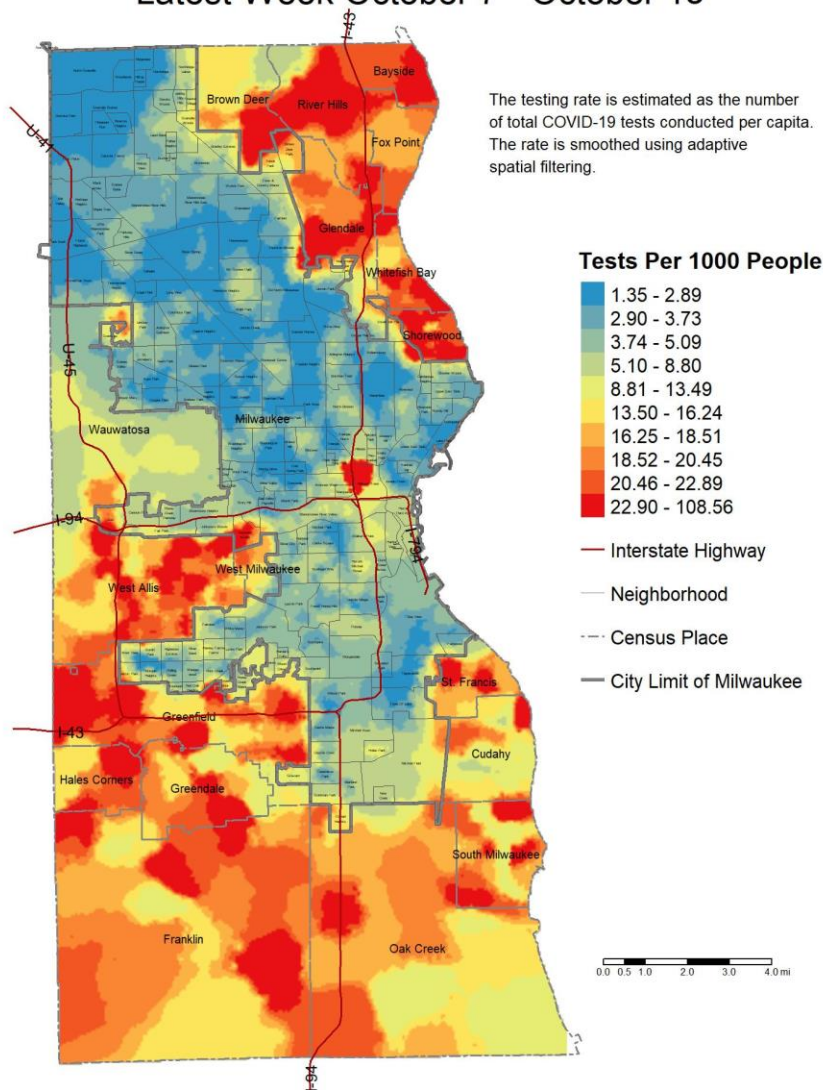   City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)
                Census Bureau TIGER/Line Shapefiles (census place boundaries)
Created by the Milwaukee County Covid-19 Epidemiology Intel Team

COVID-19 Testing Rate
Latest Week October 7 - October 13

The testing rate is estimated as the number
of total COVID-19 tests conducted per capita.
The rate is smoothed using adaptive
spatial filtering.

Tests Per 1000 People

	1.35 - 2.89
	2.90 - 3.73
	3.74 - 5.09
	5.10 - 8.80
	8.81 - 13.49
	13.50 - 16.24
	16.25 - 18.51
	18.52 - 20.45
	20.46 - 22.89
	22.90 - 108.56

— Interstate Highway

— Neighborhood

--- Census Place

— City Limit of Milwaukee

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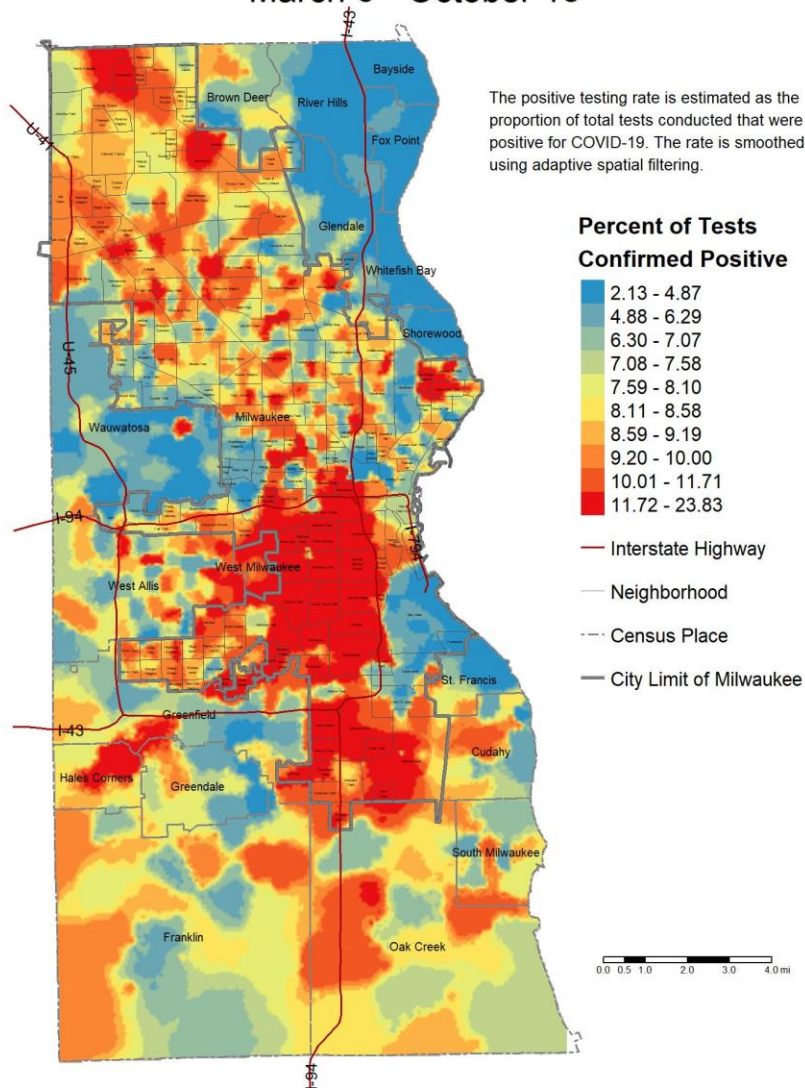   City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)
             Census Bureau TIGER/Line Shapefiles (census place boundaries)
Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Decile Map 5: Percentage of tests that were confirmed positive

COVID-19 Positive Testing Rate
March 6 - October 13

The positive testing rate is estimated as the proportion of total tests conducted that were positive for COVID-19. The rate is smoothed using adaptive spatial filtering.

Percent of Tests Confirmed Positive

- 2.13 - 4.87
- 4.88 - 6.29
- 6.30 - 7.07
- 7.08 - 7.58
- 7.59 - 8.10
- 8.11 - 8.58
- 8.59 - 9.19
- 9.20 - 10.00
- 10.01 - 11.71
- 11.72 - 23.83

— Interstate Highway

— Neighborhood

--- Census Place

— City Limit of Milwaukee

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)
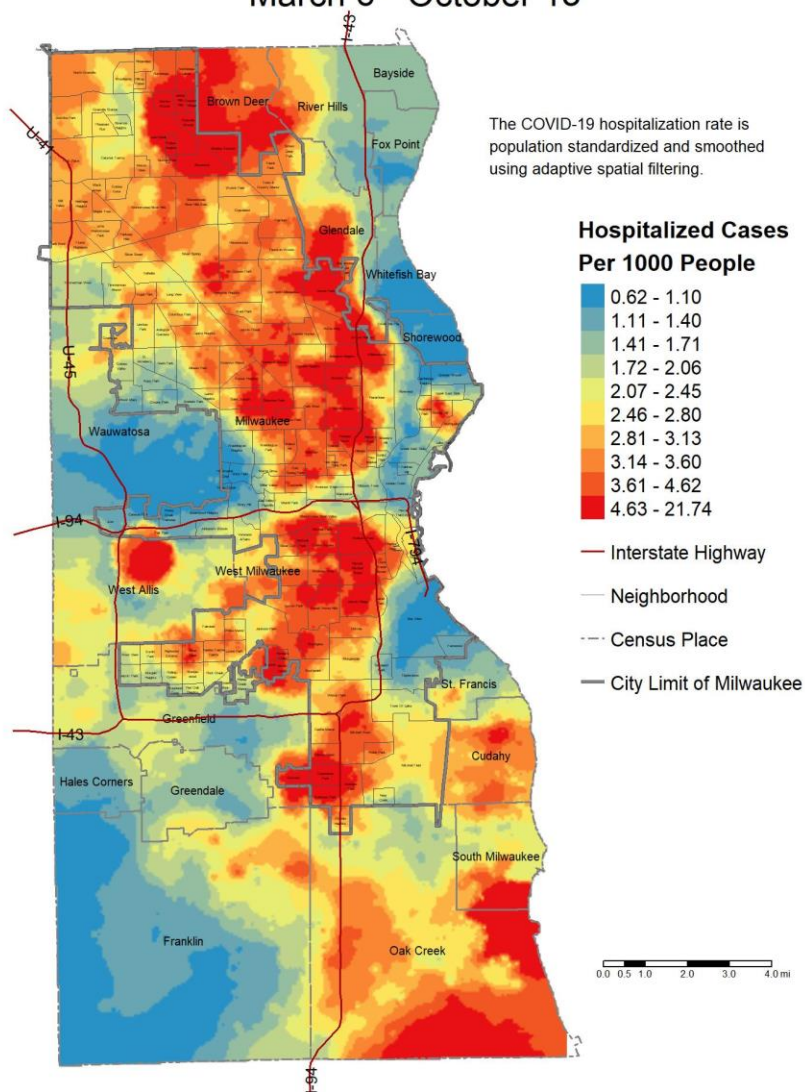2018 American Community Survey (population data)
City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)
Census Bureau TIGER/Line Shapefiles (census place boundaries)
Created by the Milwaukee County Covid-19 Epidemiology Intel Team

COVID-19 Hospitalization Rate
March 6 - October 13

The COVID-19 hospitalization rate is population standardized and smoothed using adaptive spatial filtering.

Hospitalized Cases Per 1000 People

- 0.62 - 1.10
- 1.11 - 1.40
- 1.41 - 1.71
- 1.72 - 2.06
- 2.07 - 2.45
- 2.46 - 2.80
- 2.81 - 3.13
- 3.14 - 3.60
- 3.61 - 4.62
- 4.63 - 21.74

— Interstate Highway

— Neighborhood

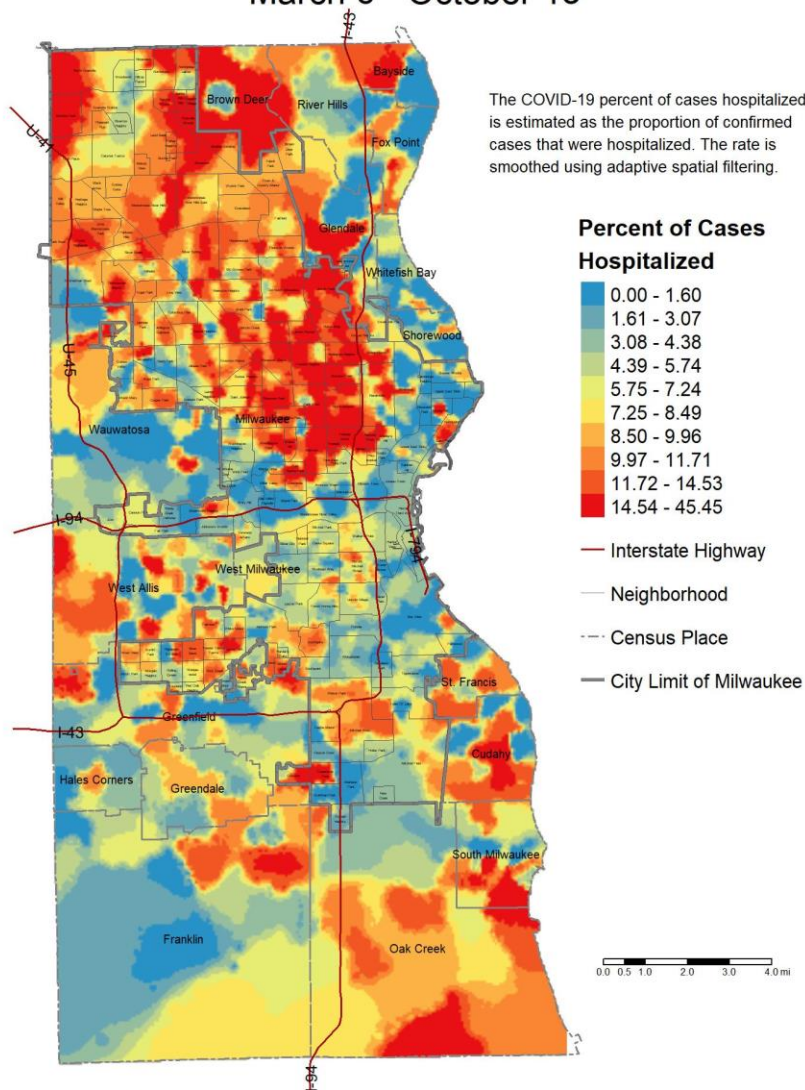--- Census Place

— City Limit of Milwaukee

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 7: Percentage of COVID-19 cases that were hospitalized

COVID-19 Percent of Cases Hospitalized
March 6 - October 13

The COVID-19 percent of cases hospitalized is estimated as the proportion of confirmed cases that were hospitalized. The rate is smoothed using adaptive spatial filtering.

Percent of Cases Hospitalized

- 0.00 - 1.60
- 1.61 - 3.07
- 3.08 - 4.38
- 4.39 - 5.74
- 5.75 - 7.24
- 7.25 - 8.49
- 8.50 - 9.96
- 9.97 - 11.71
- 11.72 - 14.53
- 14.54 - 45.45

—— Interstate Highway

—— Neighborhood

--- Census Place

—— City Limit of Milwaukee

0.0 0.5 1.0   2.0   3.0   4.0 mi

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

Contact Information

For additional questions on this report, please contact Darren Rausch, Health Officer/Director, Greenfield Health Department, and Lead, Milwaukee County COVID-19 Epidemiology Intel Team: Darren.Rausch@greenfieldwi.us or (414) 329-5275.