



18-Month Report
February 2020–August 2021



Produced through a collaboration between the Case Western Reserve University Master of Public Health Program and the Cleveland Department of Public Health Office Epidemiology and Population Health.

An Overview of COVID-19 IN CLEVELAND, OH

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ACKNOWLEDGMENTS

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EXECUTIVE SUMMARY:

COVID-19 is a highly infectious, communicable disease circulating in individuals and populations and causing significant public health impact in Cleveland, Ohio. COVID-19 is caused by a viral infection known as SARS-CoV-2, an emerging disease of unknown origins first reported by China to the World Health Organization in December, 2019 before rapidly spreading around the world in early 2020. The United States declared a Public Health Emergency January 31, 2020 and Ohio declared a State of Emergency on March 9, 2020 when the first local cases were reported. On March 11, 2020, Mayor Frank Jackson declared a State of Civil Emergency in the City of Cleveland to mitigate, “to mitigate the severity and duration of COVID-19 in our City”.

Since the emergency declaration in March of 2020, the City of Cleveland has led the effort to detect, monitor, prevent, and treat this new disease through systematic, science-driven and community-focused approaches to public health. The City has partnered with local hospital systems, universities, community groups, businesses, and regional partners to coordinate the best expertise in this public health crisis. This document presents epidemiological data and summaries from this experience during the first 18 months of the pandemic in our City. Additional detail and context are provided in subsequent sections. Public health activities continue beyond the timeframe of this report as the pandemic continues to evolve with new variants, changes in human susceptibility through vaccination, and changes in transmission due to seasons, masking, distancing behaviors, and waves of exposure. We encourage readers to supplement this report with further updates via the weekly public reports at [Clevelandhealth.org](https://clevelandhealth.org) on the COVID-19 page, and the Cleveland COVID-19 Dashboard found at clevelandhealth.org/dashboard.

In the tradition of the CDPH weekly public-facing COVID-19 reports, we provide key take-aways from this year and a half- of local COVID-19 experience under the summary title of “What Matters Most”.

WHAT MATTERS MOST:

1. The COVID-19 pandemic has been and continues to be a public health crisis, significantly affecting the health and well-being among residents of The City of Cleveland.
2. During the first 18 months of the pandemic, COVID-19 caused 33,760 detected cases, 2,592 hospitalizations, and 522 deaths in the City of Cleveland.
3. COVID-19 health outcome inequities were observed during the pandemic. In a City where 49% of the population is Black, 42% of cases, 67% of hospitalizations and 56% of deaths were among Black Cleveland residents. Although Black and African Americans are over-represented in COVID-19 cases, they were under-represented as vaccine recipients during the first 18 months of the pandemic. As of July 27, 2021, 26% of Black and African American residents have received their 1st dose, compared to 62% of Asian and 46% of White residents (46%). CDPH community efforts have subsequently decreased this vaccination disparity.
4. Vaccination against COVID-19 was distributed rapidly in Cleveland, in accordance with Ohio Department of Health distribution guidelines. A total of 150,736 Clevelander residents received at least their first dose of the vaccine by July 27, 2021 at over 1,300 different sites within and outside of the city limits.
5. The occurrence and distribution of the SARS-CoV-2 variants within Ohio and more locally in the City of Cleveland will influence public health measures throughout the remainder of 2021. The world continues to struggle to understand how the current Delta variant (and future variants) will respond to immunity established by the existing COVID-19 vaccines and exposure to SARS-CoV-2 through survival of natural infection.

INTRODUCTION:

A pneumonia of unknown origin was first detected in Wuhan, China and was reported to the World Health Organization (WHO) on December 31, 2020.¹ The virus that causes this disease was isolated from an affected patient on January 7, 2020 and described as a communicable infectious disease with human-to-human transmission, spreading rapidly regionally and globally.^{2,3} COVID-19 is an acronym for “Corona Virus Disease - 2019”. COVID-19 is caused by the virus SARS-CoV-2, a positive-sense single stranded RNA virus. SARS-CoV-2 is an acronym for “Severe Acute Respiratory Syndrome - Corona Virus with the number 2 (differentiating it from the prior SARS virus associated with a 2002-2003 epidemic). COVID-19 is a new, emerging viral disease of humans, impacting the health of Ohioans and world as part of an ongoing pandemic. The first confirmed case in the United States of America was detected on January 21, 2020 and in Ohio on March 9, 2020.^{4,5} Due to the public health significance and community transmission of COVID-19, the United States declared a Public Health Emergency January 31, 2020 and Ohio declared a State of Emergency on March 9, 2020 when the first local cases were reported.^{5,6} On March 11, 2020, Mayor Frank Jackson declared a State of Civil Emergency to mitigate the severity and duration of COVID-19 in the City of Cleveland.

On March 22, 2020 the Ohio Department of Health (ODH) declared a stay at home order to mitigate the “imminent threat and high probability of widespread exposure to COVID-19 with a significant risk of substantial harm to a large number of people in the general population, including the elderly and people with weakened immune systems and chronic medical conditions”.^{7,8} Subsequent orders and guidance have sought to further mitigate transmission of the virus in communities and to protect individuals and populations at high risk for severe COVID-19 disease and death. These approaches include social distancing, decreasing droplet and aerosol transmission (i.e., by coughing, talking, and breathing) through community use of fabric or surgical masks, sanitizing surfaces, washing hands,

isolation of sick individuals, and quarantine of exposed individuals.⁸

The current public health approach of reducing the epidemic curve peak (i.e., “Flatten the Curve”) have thus far been effective in mitigating the full public health impact of the COVID-19 pandemic, especially early in the pandemic before vaccines were available and when the distribution of cases and severe disease/deaths were weighted toward elderly and minority populations.⁸⁻¹⁰ During the earliest periods of the pandemic 79% of US deaths involving COVID-19 were among those age 65 years and older.¹¹ Due to COVID-19, the overall age-adjusted US death rate is increasing. COVID-19 is now the third leading cause of death in 2020, after heart disease and cancer.¹² The highly infectious, communicable disease is also causing significant public health impact in Ohio. As of November, 2021, there have been over 46,626,034 cases of COVID-19 detected and 755,201 COVID-19 deaths in the USA.¹³ In Ohio there have been over 1,280,145 confirmed cases, 81,935 hospitalizations and 25,242 deaths due to COVID-19.¹⁴ COVID-19 has been detected in all 88 counties, including Cuyahoga County where 153,372 confirmed cases and 2,541 COVID-19 deaths have been recorded.¹⁴

COVID-19 disparities have been described nationally and observed locally in the City of Cleveland by age, race, socio-economic status, and geography. Public health outcomes that vary across these factors range from access to testing, health care, and vaccination to COVID-19 outcomes including cases, hospitalization, and death.

The Cleveland Department of Public Health maintains a new Commissioner-level position on Health Equity and Social Justice to collaborate within CDPH and across local partnerships to address health equity in our communities. Both the city and county health authorities have declared racism a public health crisis and have linked COVID-19 to this ongoing health emergency.¹⁴⁻¹⁷ The City’s health department continues to address the historical, structural, and ongoing

barriers to health to achieve its mission to improve the quality of life in the City of Cleveland by promoting healthy behavior, protecting the environment, preventing disease, and making the City a healthy place to live, work, and play for all people.

This report addresses the first 18 months of this pandemic. Though the pandemic continues to evolve through new waves of transmission, infection, mitigation, vaccination, and disease organism variants, the Cleveland Department of Public Health has worked daily to ensure accurate, timely data and a scientifically informed public health response to protect residents of the City of Cleveland. The Cleveland Department of Public Health will continue to build upon the scientific data, collaborations, community partnerships, and lessons highlighted in this report of the first 18 months of the COVID-19 pandemic in our community to meet the needs of the residents of the City of Cleveland and throughout the Greater Cleveland community.

TIMELINE OF COVID-19 IN CLEVELAND



CASES

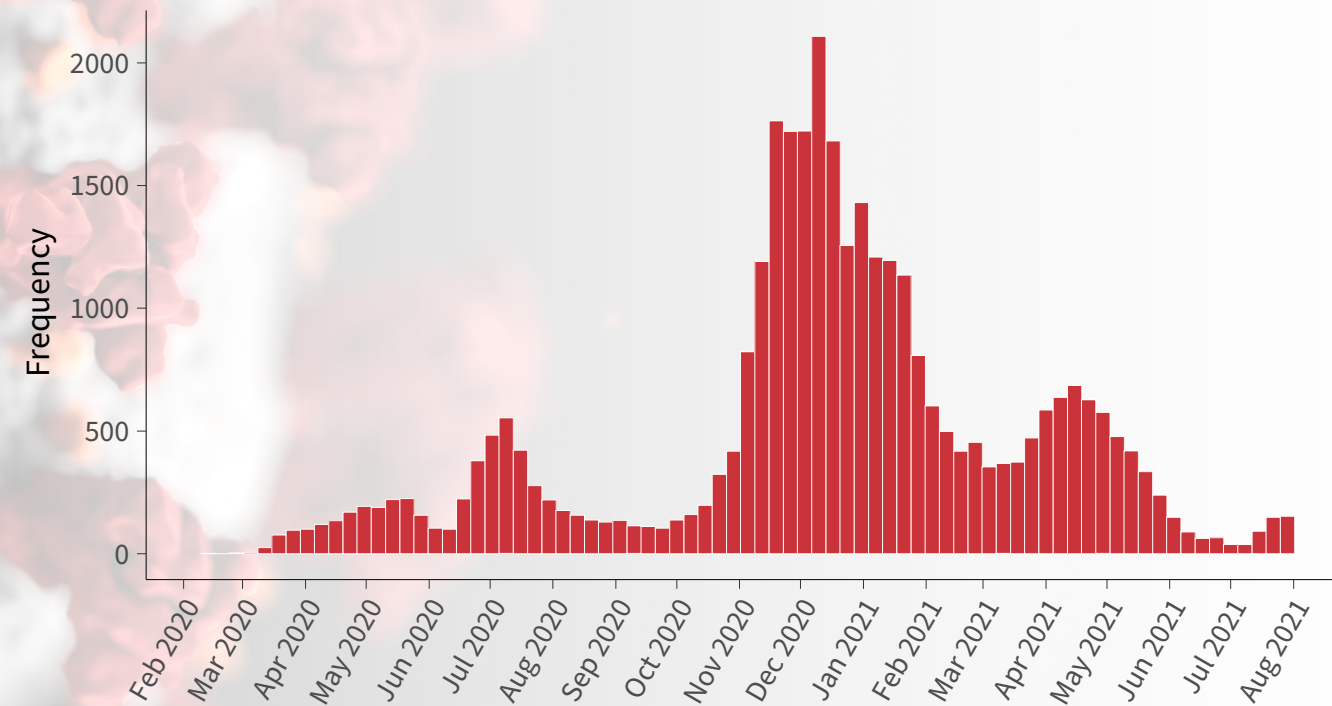


Figure 1. Cases from February 2020–August 2021.

OVERVIEW

During the first eighteen months of the pandemic (March 2020 -July 2021), there were 33,760 cases of COVID-19 in the City of Cleveland (Figure 1). The case incidence rate for Cleveland was lower during this time period (8,611 per 100,000 people) when compared to Cuyahoga County (9,673 cases per 100,000 people), and Ohio (9,701 cases per 100,000 people). In Cleveland, Cuyahoga County and Ohio, residents under the age of 40 had the highest proportion of cases and the highest case incidence rates, compared to the other age groups. In Cleveland, residents 30-39 years of age had the highest incidence rates (13,058 per 100,000) and in Cuyahoga County and Ohio, those 20-29 years had the highest incidence rates. According to the 2019 American Community Survey estimate, the racial composition of Cleveland was 40% white, 49% Black, 0.5% Native American, 2.6% Asian and 4.4% from two or more races. In Cleveland, Black residents made up 42.0% of cases, while White residents comprised 27.4%. In both Cuyahoga County and Ohio, White residents made up a

greater proportion of cases; however, the incidence rate for COVID-19 was higher for Black residents than for White residents. While ethnicity data was missing on a large proportion of cases from all three jurisdictions, the case incidence rates were higher among those who reported as Hispanic or Latino in all three jurisdictions. Those who identify as Female made up 54% of all Cleveland cases, with a rate of 9,221 cases per 100,000. Females similarly made up 54.2% and 53.2% of cases in Cuyahoga County and Ohio, respectively. Finally, the proportion and incidence rate of cases hospitalized in Cleveland was higher (7.7%; 680 per 100,000) when compared with Cuyahoga County (5.7%; 589 per 100,000) and Ohio (5.5%; 534 per 100,000). The City of Cleveland saw 522 deaths (137 per 100,000) among its residents, accounting for 1.5% of all cases. There were 2,170 deaths in Cuyahoga County (176 per 100,000 residents; 1.9% of cases), and 20,693 deaths in Ohio (177 per 100,000 residents; 1.8 % of cases) (see Table 1).

AGE & SEX:

The proportion of cases within the City of Cleveland by self-reported sex have largely remained stable throughout the course of the pandemic as demonstrated in Figure 2. According to the 2019 American Community Survey, females comprise 51.9% of the residents in Cleveland, and they comprise between 50-60% of cases each month.

Unlike the stable sex distribution described above, the age distribution of COVID-19 cases has changed dramatically over the course of the pandemic, and continues to change with the changing age-based eligibility of vaccinations and emergence of variants like Delta. While cases occurred among every age group, the mean age of cases decreased from 50 years in March 2020 to 32 years in July 2021. In the beginning of the pandemic, people over the age of 40 years made up the majority of cases;

however, by May 2020, the majority of cases occurred in individuals younger than 40 years. In fact, the proportion of new cases among those 0-19 years old gradually increased, reaching almost 25% in July 2021 (Figure 3).

One possible explanation for this change in age

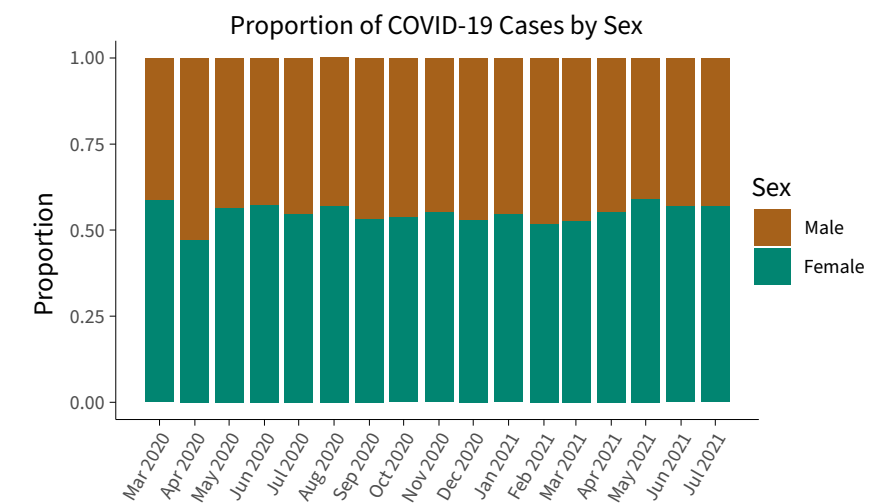


Figure 2. Proportion of COVID-19 Cases in Cleveland by Sex.

distribution may be the phased rollout of vaccines beginning with Ohioans most at-risk of infection and severe illness, including older age groups, in January of 2021, and the emergence of the more virulent Delta variant. Some evidence of this may be observed in the diminishing proportion of cases that were age 60 or more by March 2021 while younger age groups took up a greater share of new cases in Cleveland (see **Figure 3**).

LONG-TERM CARE FACILITIES:

As of July 2021, a total of 72 outbreaks, as defined by the occurrence of two or more COVID-19 positive individuals, were reported to the Ohio Department of Health among 24 long-term care facilities in the City of Cleveland. Long-term care facility outbreaks were most common in October and November 2020; and were very low among residents of long-term care facilities following vaccination roll-out (February/March 2020). During the course of the pandemic up through July 2021, there were 451 cases detected in long term care facility residents and 226 detected in staff. These represent a very small percentage of total cases in Cleveland: 1.34% of all Cleveland cases were among long term care facility residents and 0.67% of all Cleveland cases were among staff.

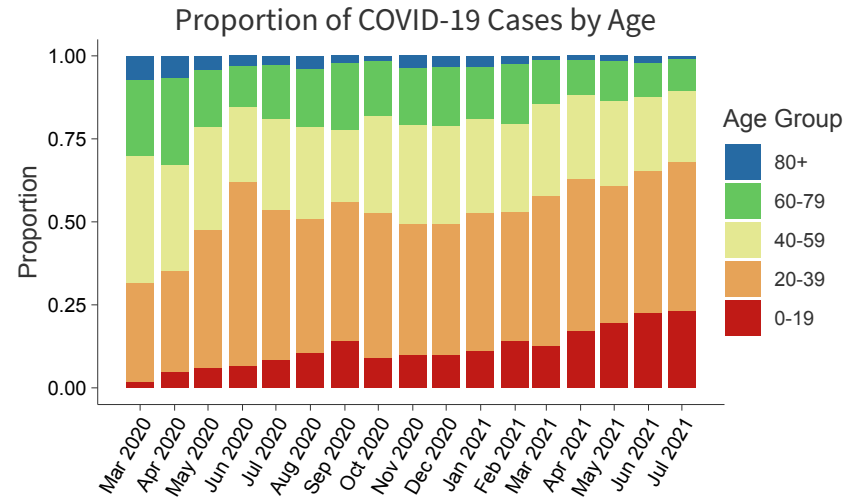


Figure 3. Proportion of COVID-19 Cases in Cleveland by Age.

RACE AND ETHNICITY

During the first 18-months of the pandemic, cases of COVID-19 in the City of Cleveland disproportionately impacted the Black community. Black residents made up 59% of cases (among those reporting a specific race) despite making up 49% of the population of Cleveland.¹⁸ Throughout the pandemic, this over-representation shifted over time. As shown in **Figure 4**, Blacks residents represented 56% of the new COVID-19 cases when stay-at-home orders were initiated in March 2020. By the end of May 2020 when the stay-at-home orders were lifted, they represented 71% of the new cases.

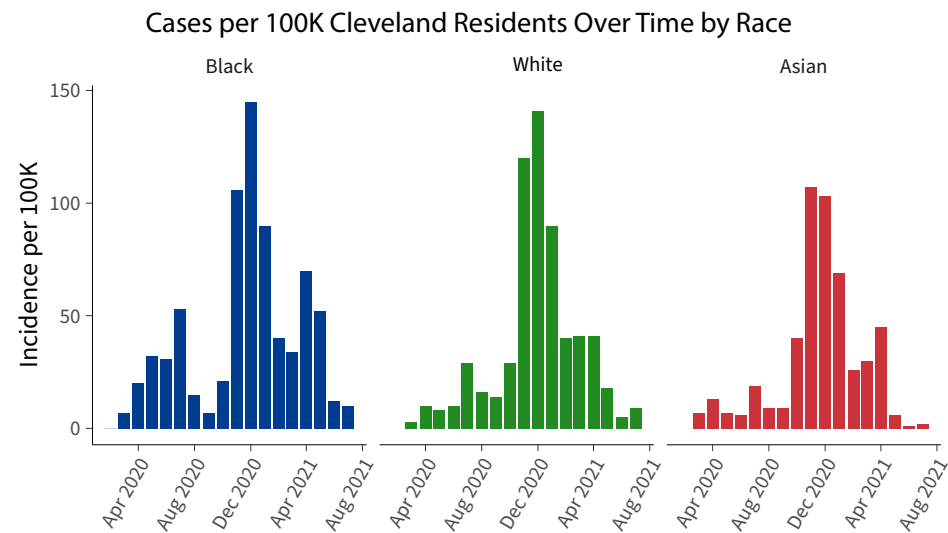


Figure 4. Cases per 100K Cleveland Residents Over Time by Race.

	CLEVELAND, OH		CUYAHOGA COUNTY, OH*		OHIO **	
	Count (%)	Per 100,000†	Count (%)	Per 100,000	Count (%)	Per 100,000
Total Count	33760	8611	116378	9423	1133925	9701
Median Age (in yrs.)	38					
Age categories						
0-19 yrs.	3111 (9.2%)	3363	13071 (11.3%)	4619	157131 (13.9%)	5427
20-29 yrs.	7632 (22.6%)	11380	23318 (20%)	13662	209179 (18.4%)	13597
30-39 yrs.	6568 (19.5%)	13058	19777 (17%)	12616	175265 (15.5%)	11913
40-49 yrs.	4681 (13.9%)	10940	16239 (14%)	11377	164290 (14.5%)	11726
50-59 yrs.	4980 (14.8%)	10578	17363 (14.9%)	10675	169704 (15%)	11116
60-69 yrs.	3866 (11.5%)	8432	13773 (11.8%)	8485	129809 (11.4%)	8786
70-79 yrs.	1815 (5.4%)	8772	7594 (6.5%)	7979	74278 (6.5%)	8326
80+ yrs.	1102 (3.3%)	7471	6055 (5.2%)	9803	54269 (4.8%)	11149
Unknown	0		60			
Race						
Black	14174 (42.0 %)	7465	33176 (28.4%)	9057	128875 (11.4%)	7823
White	9254 (27.4%)	6243	56346 (48.4%)	7354	684190 (60.3%)	7238
Asian	470 (1.4%)	4996	2123 (1.8%)	5199	16031 (1.4%)	5836
Other ‡	4015 (11.9%)	23325	8972 (7.7%)	35963	61420 (5.4%)	40624
Multi-Racial	414 (1.2%)	2545	414		28743 (2.5%)	8372
Unknown	5432 (16.1%)		15346 (13.2%)		214666 (19%)	
Ethnicity						
Hispanic or Latino	3351 (9.9%)	6952	5830 (5%)	7578	38332 (3.4%)	8198
Non-Hispanic or Non-Latino	16274 (48.2%)	4890	78238 (67.2)	6758	752050 (66.3%)	6702
Unknown	14135 (41.9%)		32311 (27.8%)		343543 (30.3%)	
Sex						
Female	18247 (54.0%)	9221	63033 (54.2%)	9757	602901 (53.2%)	10121
Male	15289 (45.3%)	8350	51932 (44.6%)	8816	520430 (46%)	9079
Unknown	224 (0.7%)		1433 (1.2%)		10594 (.9%)	
Total Hospitalized	2592 (7.7%)	680	7269 (6.2%)	589	62391 (5.5%)	534
Total Deceased from COVID-19	522 (1.5%)	137	2170 (1.9%)	176	20693 (1.8%)	177

Table 1. Demographic characteristics and outcomes among COVID-19 cases in Cleveland, Cuyahoga County, and Ohio .

*Cuyahoga county data is EXCLUDING the city of Cleveland

**Ohio data is INCLUDING Cuyahoga County

† The population denominators used to calculate cumulative incidence rate over the 18-month period are from the American Community Survey 2019 1-Year Estimates, U.S. Census Bureau.

‡ The category of Other race, which includes Native Hawaiians/Other Pacific Islanders, American Indians/Alaskan Natives, and those who self-reported their race as "Other", had a high incidence rate. This is likely inflated due to inaccurate population data.

Conversely, Whites residents, who comprise 39% of the population in the city of Cleveland, represented 21% of cases at the beginning of the orders and 14% by the time the orders were lifted.

Following lifting of stay-at-home orders, the proportion of cases who were White increased from 21% in June 2020 to over 40% in September 2020 (Figure 4), surpassing the proportion of cases who were Black and African American (28.1%). This pattern remained through the holiday surge of December 2020 and into the first quarter (Jan-April) of 2021.

Hispanic or Latino residents had higher incidence rates at nearly every timepoint in the pandemic (Figure 5). Among those who identify as Hispanic or Latino, the case incidence rate peaked at 2,247.5/100,000, compared with a peak incidence rate of 1,345.9/100,000 among those who do not identify as Hispanic or Latino. It is important to note that ethnicity information were not reported for 41.9% of cases.

VACCINATION AND CASES: RACIAL AND ETHNIC PERSPECTIVES

Vaccinations were first made available in Ohio in December 2020 and the first Cleveland resident was vaccinated on December 14, 2020. Following this date, vaccinations were offered in according to age and risk-categories as specified by the Ohio Department of Health, as described in detail in the timeline (page 10). During this time, the proportion of cases among Black and White residents was largely the same. Once the vaccines became widely available (March 2021), Black residents were once again over-represented in cases while Whites were under-represented. By May 2021, Black residents represented 72% of new cases, while White residents represented only 14% of cases (Figure 4). Even as cases decreased through June 2021, Black residents comprised the majority of cases. The proportion of cases among Asian, multi-racial and other groups, remained relatively consistent over time.

An examination of the COVID-19 case incidence rates (per 100,000 people) over time, which takes into account the population of each race in the city of Cleveland, shows similar peaks by race. However, it also highlights that at nearly every timepoint in the pandemic, and notably after vaccination began, the incidence rate among Black residents exceeds that of white residents.

SPATIAL DISTRIBUTION OF CASES OVER TIME:

The distribution of cases across the City of Cleveland clustered in different areas at different points from April 2020–July 2021 (see Figure 6, pp. 18-19). From April–June 2020, cases are relatively evenly distributed throughout the city with some clustering occurring near to and in Ward 4. In July 2020, there was a large increase in cases (Figure 1), with cases clustering in the "Cleveland Crescent" (a portion of Cleveland where over 80% of the residents are Black), as well as the near west side. From August–September 2020, there was a decline in cases and generally even distribution across the city. In October 2020, we again see cases rising, especially on the West side of Cleveland. From November 2020–January 2021, we see a dramatic increase in cases and clusters with no regions of Cleveland having less clustering of cases. From February–April 2021, we see a steady amount of clusters on the west side of the city with a decrease in clusters on the east side until April 2021, where a cluster appears again in the Crescent. From May–July, we see a steady decline in cases and case clusters, with the west side seeing more cases when compared to the rest of the city. This is mirrored in the lowest case counts for the city overall (Figure 1).

WHAT MATTERS MOST:

The COVID-19 pandemic has been and continues to be a public health crisis, significantly impacting the health and well-being among residents of The City of Cleveland.

During the first 18 months of the pandemic, COVID-19 caused 343,741 detected cases, 2,592 hospitalizations, and 522 deaths in the City of Cleveland.

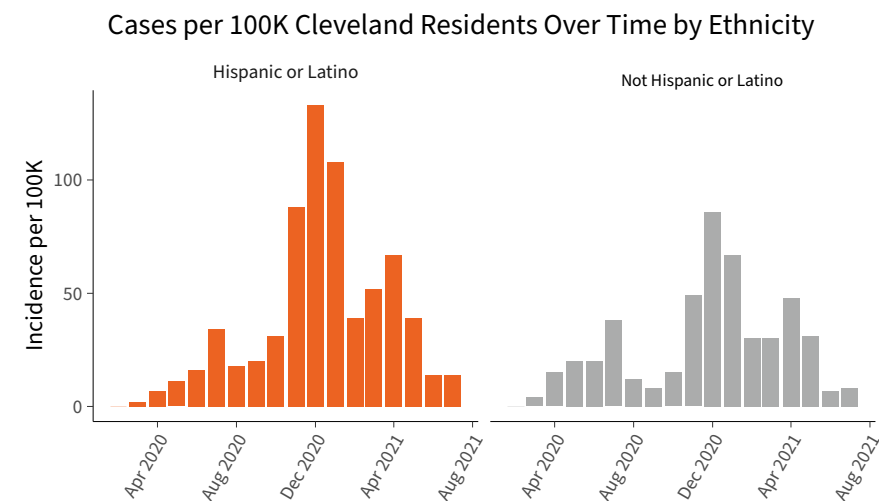
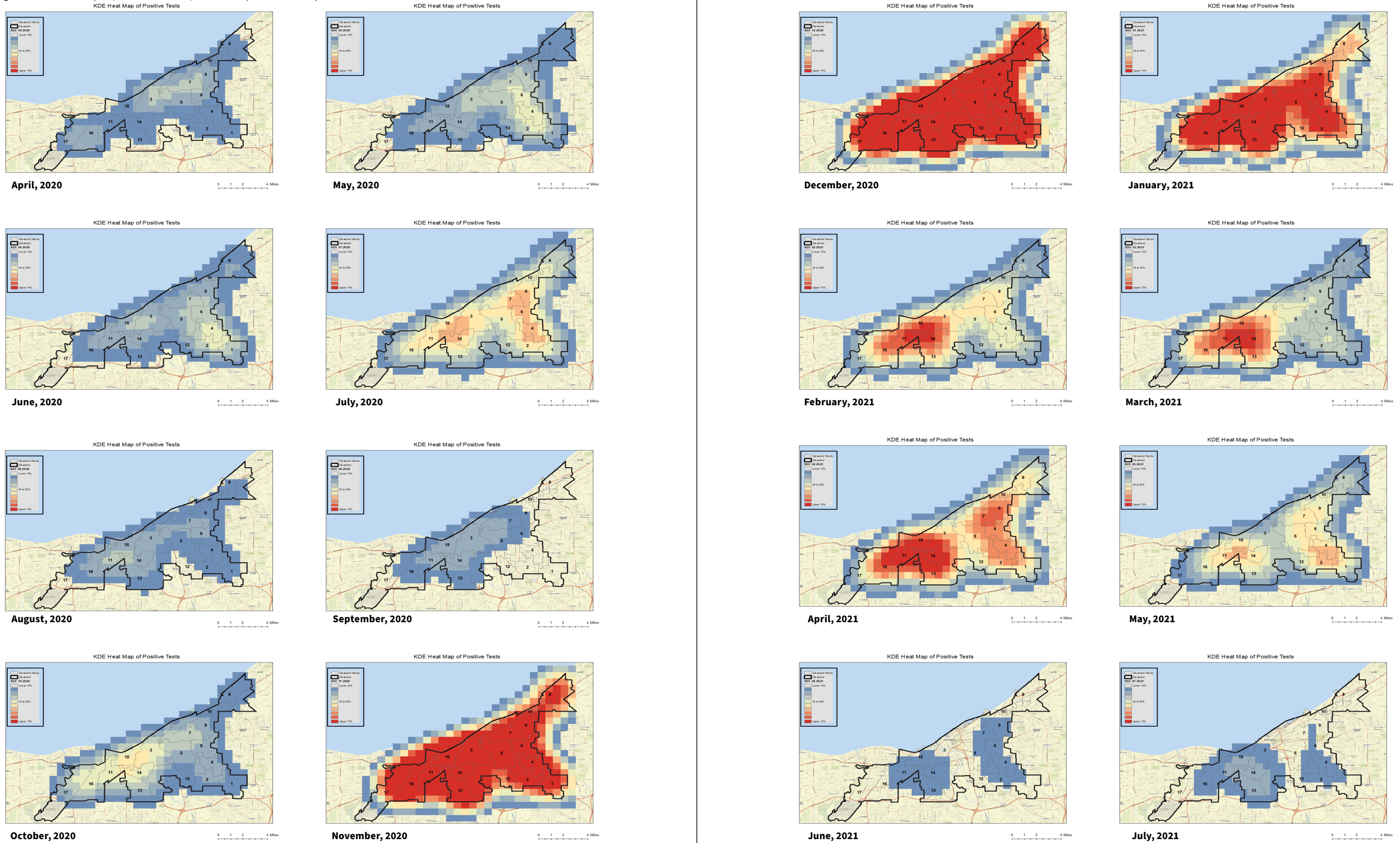


Figure 5. Cases per 100K Cleveland Residents Over time by Ethnicity.

Figure 6. Kernel Density Maps of Cases from April, 2020–July, 2021 in the City of Cleveland and its Wards.



OUTCOMES

COVID-19 HOSPITALIZATIONS

Early national responses to the COVID-19 pandemic were focused on COVID-19 mitigation to decrease the burden of disease on health infrastructure by decreasing hospitalizations and deaths.¹⁹ On January 24, 2020, The State of Ohio declared COVID-19 a reportable disease.²⁰ As a Class A reportable disease, confirmed or suspected cases of SARS-CoV-2 (the virus that causes COVID-19) must be reported immediately to the local health district where the person lives (or the local health district where the person is being evaluated if the person's residence is unknown or not in Ohio). Required reporters include physicians providing care, administrators in charge of hospitals, clinics or other institutions providing care or treatment, laboratory administrators, or any individual having knowledge of a person with the disease. The local health department reports to the Ohio Department of Health (ODH). ODH works with local, state, and federal partners to investigate reports of SARS-CoV-2 in order to identify cases and prevent the spread of infection.

COVID-19 hospitalizations are defined as a hospital admission associated with confirmed or suspected COVID-19 and may also include individuals hospitalized with a positive COVID-19 test. It is not always clear whether pediatric patients are included in this metric.

Table 2 shows the demographic distributions of Cleveland cases by hospitalization status. Hospitalizations were not distributed equally among demographic groups. Nearly half of hospital admission for COVID-19 (49%) occurred among those 60 years or older, while 27.5% were under the age of 40 years. Overall, 18 children between 0 and 9 years old have been hospitalized and another 80 children from ages 10 to 19, making up 3.8% of hospitalizations overall.

Black Cleveland residents constituted 67.7% of hospitalizations, more than 3 times the number of the next most frequent group, White residents who represented 20.3%. This indicates that Black residents were much more likely to experience serious illness related to COVID-19 infection. Asian Clevelanders represent 7.9% of those requiring hospital care. The

	Hospitalized	Not Hospitalized
<i>n</i>	2,592	31,168
Age (Mean (SD))	56.46 (19.39)	39.50 (18.69)
Age Category (%)		
0-9	18 (0.7)	229 (0.7)
10-19	80 (3.1)	2,784 (8.9)
20-29	194 (7.5)	7,438 (23.9)
30-39	222 (8.6)	6,346 (20.4)
40-49	297 (11.5)	4,384 (14.1)
50-59	510 (19.7)	4,470 (14.3)
60-69	594 (22.9)	3,272 (10.5)
70-79	405 (15.6)	1,410 (4.5)
80+	272 (10.5)	830 (2.7)
Race (%)		
Black	1,755 (67.7)	12,419 (39.8)
White	526 (20.3)	8,728 (28.0)
Asian	205 (7.9)	3,810 (12.2)
Other	23 (0.9)	447 (1.4)
Multi-Racial	17 (0.7)	397 (1.3)
Unknown	66 (2.5)	5,367 (17.3)
Gender (%)		
Female	1,314 (50.7)	16,933 (54.3)
Male	1,277 (49.3)	14,012 (45.0)
Unknown	1 (0.0)	223 (0.7)
Ethnicity (%)		
Hispanic or Latino	186 (7.2)	3,165 (10.2)
Non Hispanic/Latino	1,863 (71.9)	14,411 (46.2)
Unknown	543 (20.0)	13,592 (43.6)

Table 2. Demographics of COVID-19 Cases Stratified by Hospitalization Status.

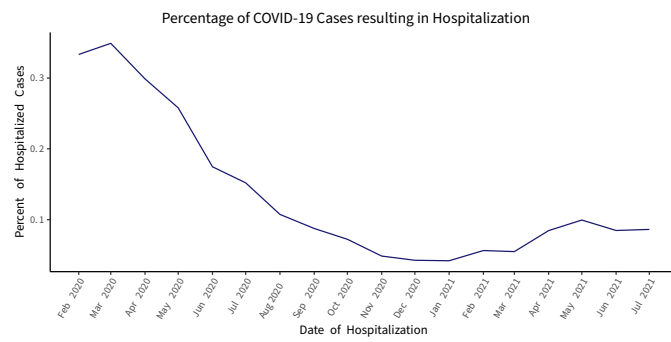


Figure 7. Percentage of COVID-19 Cases Resulting in Hospitalization. To calculate the percent of cases hospitalized, total number of hospitalizations were divided by the total case count for each 1-month reporting period.

great preponderance of hospitalizations occurred among non-Hispanic ethnicity (71.9%), compared to Hispanic or Latino (7.2%). These results are viewed with uncertainty because of the large number of those with unknown ethnicity (20.9%) among those hospitalized.

Hospitalized individuals were evenly distributed by sex (males 49.3% and females 50.7%, **Table 2**). Since women were more likely to be COVID-19 cases, this equivalence demonstrates that males were more likely to experience

serious COVID-19 infections. This is demonstrated by 54.3% of non-hospitalized cases being female, while males represented only 45% of individuals who did not require a hospital stay.

The trend of decreasing percentage of COVID-19 cases resulting in hospitalization (see **Figure 7**) may be related to increased detection of asymptomatic cases through increasing availability of SARS-coV2 testing throughout the progression of the pandemic and improved triaging and treatment of COVID-19 outside of a hospital setting period.

While the trend for hospitalization was higher with increasing age, hospitalization rates fluctuated during the different waves of the pandemic according to age categories (**Figure 8**). In the early stage of the pandemic, hospitalization was most common among age 70+ individuals. However, in the post-vaccination period of April, 2021, the hospitalization rates among 70-79 and 80+ age groups were similar to that of the 30-39, 40-49, and 50-59 age groups. At that time, the 60-69 age group surpassed the older two groups in rate of hospitalizations. Hospitalization rates were relatively low for the youngest age categories but were notably above zero and fluctuated with different time periods and waves of the pandemic transmission.

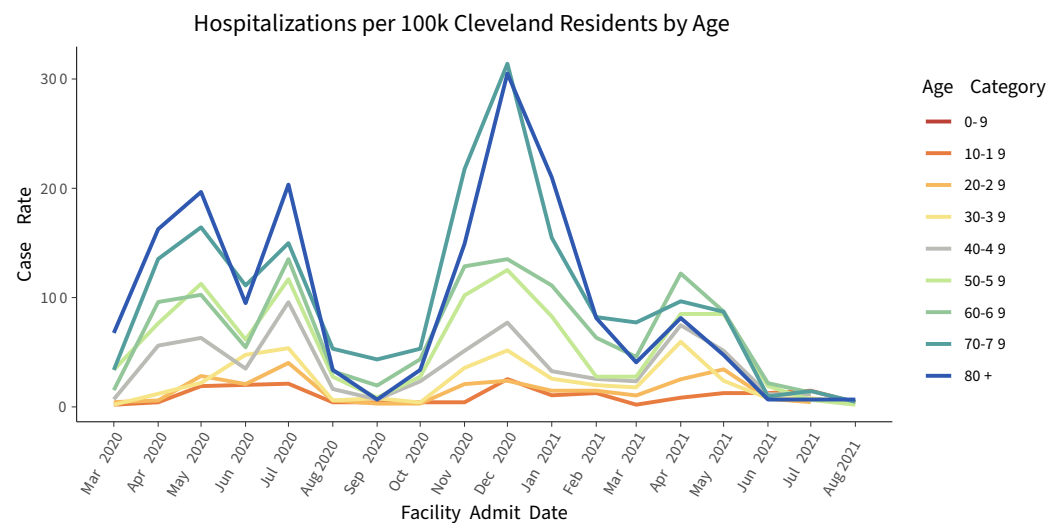


Figure 8. Hospitalizations due to COVID-19 per 100k Cleveland Residents. Incidence rates of hospitalization were calculated by dividing the number of hospitalized cases by the number of Cleveland residents in each age category. Cleveland demographic population sizes are based on estimates from the 2019 American Community Survey (ACS). Each lines represents different ten-year age-groups, reflecting higher hospitalization rates with increasing age categories.

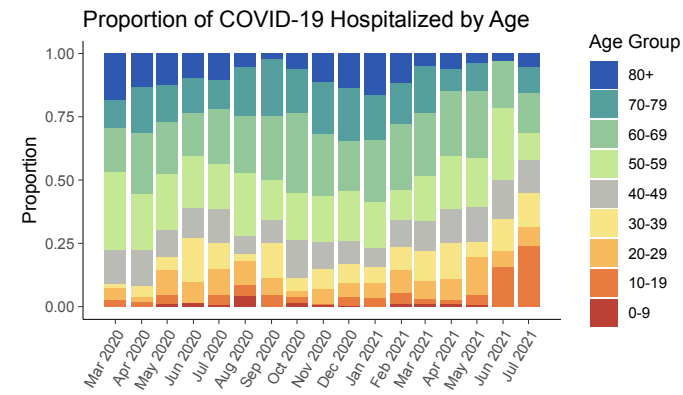


Figure 9. Proportion of COVID-19 Hospitalizations by Age Category. Each bar represents the proportion of all hospitalized cases within each reporting month that fall within that age group.

The age distribution of COVID-19 hospitalizations from **Figure 9** may be alternatively viewed in **Figure 9** as the proportion of each age group among all hospitalizations for each month. A shift occurred from after January 2021 towards an increasing proportion of hospitalizations among younger age groups. This coincided with the roll-out of age-based vaccination where eligibility was initially available to the oldest age categories. During this time, the categories below 50 years of age accounted for increasingly greater proportion of hospitalizations. This may reflect increasing protection from severe disease provided by vaccination among the older populations who were then receiving COVID-19 vaccination.

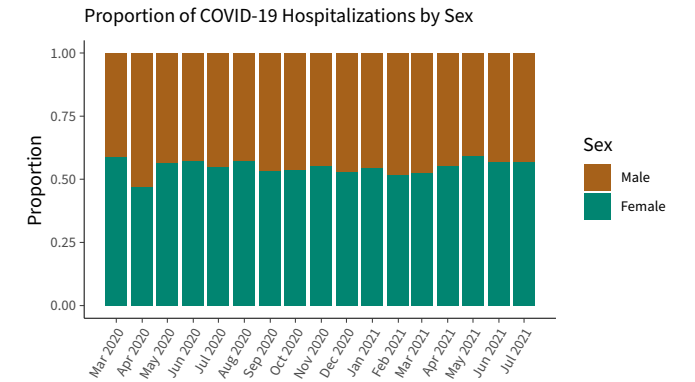


Figure 10. Proportion of COVID-19 Hospitalizations by Sex. Each bar represents the proportion of all hospitalized cases within each reporting month by sex. Note, one hospitalization did not have complete data available

The proportion of male and female hospitalizations remained fairly stable throughout the pandemic with non-significant fluctuations shown in **Figure 10**. The female population would be expected to have slightly higher hospitalization rates based on a larger population size, which could account for the trend of the higher proportion of female cases in 10 out of the 17 months.

Hispanic populations generally had lower rate of COVID-19 hospitalizations than Non-Hispanic or Non-Latino populations as seen in **Figure 11**. This could indicate less severity of COVID-19 infections in this population but may also reflect of a decreased tendency to seek hospital care. Despite the ACA increasing

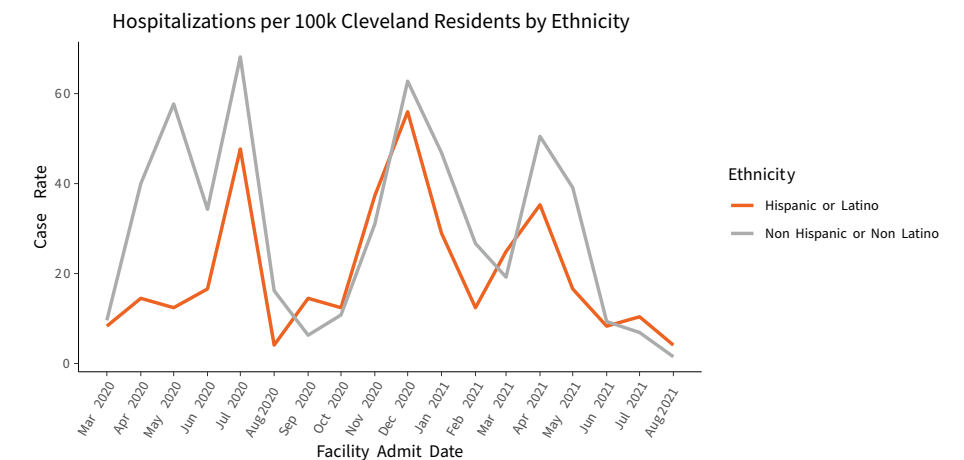


Figure 11. Hospitalizations per 100k Cleveland Residents by Ethnicity. Incidence rates of hospitalization were calculated by dividing the number of hospitalized cases by the number of Cleveland residents in each ethnic category. Cleveland population sizes for ethnicity are based on estimates from the 2019 American Community Survey (ACS).

Hispanic population insured rates, this population has been reported to experience uninsured rates of nearly three times higher than non-Hispanic Whites.²¹ Lack of insurance and under insurance in this population could be a possible explanation for the evidence of fewer hospitalizations from COVID-19 among Hispanics as compared to those who do not identify as Hispanic/Latino.

COVID-19 DEATHS

COVID-19 deaths have been defined as total fatalities with confirmed COVID-19 case diagnosis. In Ohio, mortality data is verified by coded death certificate information. According to CDC guidance, COVID-19 should not be reported on the death certificate if it did not cause or contribute to the death. Cause-of-death information is not perfect, but it is useful. Information is not available daily and may take some time to receive. Once available, deaths are assigned to the date of death. Additional details are available at the CDC website.²²

Table 3 presents the demographic characteristics of cases that resulted in death from COVID-19. During the first 18 months of the pandemic, there were 522 COVID-19 related deaths in the City of Cleveland. Of these COVID-19 related deaths, 58.4%, occurred in 70+ aged residents while 3% of COVID-19 related deaths occurred among residents younger than 40 years old. In comparison, of COVID-19 cases that did not result in death, 7.8% occurred in residents aged 70+ while 32.3% occurred among residents under age 40. This data shows that older populations are more vulnerable to severe health consequences and deaths from COVID-19 than younger populations.

While hospitalizations occurred more often among Black Cleveland residents, there was no statistically significant difference in COVID-19 cases resulting in death or survival between Black and White residents of Cleveland. Case fatality among White residents was 2.2% while the case fatality rate among Black residents was 2.1%. However, the large number of unknown cases in the race category may influence these results. In addition, testing rates (and therefore cases diagnosed) may differ

between demographic groups. While no proportional difference in deaths occurred by race according to the City's demographic distribution, Cleveland lost 291 Black residents, more than half of the 522 Cleveland residents who died.

COVID-19 deaths were not evenly distributed by sex. Among Cleveland residents, 53.4% of COVID-19 related deaths occurred in males. This is similar to national trends reported by the CDC. Another statistic to understand death data is the case fatality ratio which is calculated as the percent of cases that resulted in death. The case fatality ratio in Cleveland was also lower in females (1.3%) versus males (1.8%). Overall, in the city of Cleveland, the case-fatality ratio was 1.4 times higher among men compared to women. These results are consistent with national and global trends showing higher case-fatality ratio among men than among women.

COVID-19 deaths were not evenly distributed by ethnicity. While 12.7% of the Cleveland population identifies as Hispanic or Latino, only 7.7% of COVID deaths were reported in Hispanic or Latino patients. The case fatality rate for Hispanic or Latino residents was only 1.2% while it was 2.9% for non-Hispanic or non-Latino residents. Due to limited self-reported ethnicity data, these results may not represent actual differences in COVID-19 severity between Hispanic or Latino Cleveland residents and non-Hispanic/Latino residents.

Among Long term care facilities, a total of 451 cases were detected in Cleveland including 58 hospitalizations. There were 71 deaths among long term care residents during the first 18 months of the pandemic in Cleveland. These represent 1.3% of all cases in Cleveland, 2.2% of all hospitalizations in Cleveland, and 13.8% of all Cleveland deaths.

WHAT MATTER MOST

COVID-19 health outcome inequities were observed during the pandemic. In a City where 49% of the population is Black, 59% of cases, 67% of hospitalizations and 56% of deaths were among Black Cleveland residents.

	Deceased	Not Deceased
<i>n</i>	522	33238
Age (Mean (SD))	72.57 (14.35)	40.30 (18.92)
Age Category (%)		
0-9	0 (0.0)	247 (0.7)
10-19	6 (1.1)	2858 (8.6)
20-29	4 (0.8)	7628 (23.0)
30-39	6 (1.1)	6562 (19.7)
40-49	16 (3.1)	4665 (14.0)
50-59	65 (12.5)	4915 (14.8)
60-69	120 (23.0)	3746 (11.3)
70-79	137 (26.2)	1678 (5.0)
80+	168 (32.2)	934 (2.8)
Race (%)		
Black	291 (55.7)	13883 (41.8)
White	207 (39.7)	9047 (27.2)
Asian	5 (1.0)	465 (1.4)
Other	15 (2.9)	4000 (12.0)
Multi-Racial	4 (0.8)	410 (1.2)
Unknown	0 (0.0)	5433 (16.3)
Gender (%)		
Female	243 (46.6)	18004 (54.2)
Male	279 (53.4)	15010 (45.2)
Unknown	0 (0.0)	224 (0.7)
Ethnicity (%)		
Hispanic or Latino	40 (7.7)	3311 (10.0)
Non Hispanic or Non Latino	478 (91.6)	15796 (47.5)
Unknown	4 (0.8)	14131 (42.5)

Table 3. Demographics of COVID-19 Cases Stratified by Deceased from Illness Status.

VACCINATION

VACCINE TIMELINE

The Cleveland vaccine rollout took place in accordance to the Ohio Department of Health's COVID-19 vaccination program. The program is a phased distribution strategy, which was designed to deliver the vaccine to the most vulnerable populations first. This was particularly urgent early when vaccine supplies were limited. Phase 1 was based on risk considerations, while Phase 2 was organized by age (Table 4). The first city of Cleveland resident was vaccinated on December 24, 2020 under Phase 1A of the vaccine rollout, which primarily targeted healthcare workers, nursing home residents and staff, and other vulnerable populations. The Wolstein Center mass vaccination clinic opened on Wednesday, March 17, 2021 during Phases 1D and 2B and operated until Monday, June 7, 2021, during which time 260,000 doses of vaccine were administered, of which 23,600 went to Cleveland residents. The Cleveland Department of Health partnered with many institutions, such as local churches, hospitals, businesses and universities to give vaccinations in a number of settings, including delivering shots to

Cleveland's homebound population. A total of 150,736 Clevelanders have received at least their first dose of the vaccine as of July 27, 2021 with March and April being the busiest months (Figure 13). Since the beginning of the vaccination program, Asians have had the highest vaccination rates, while Black and African Americans have the lowest rates. Hispanic residents have had higher vaccination rates than Non-Hispanic residents, although it is important to note that ethnicity

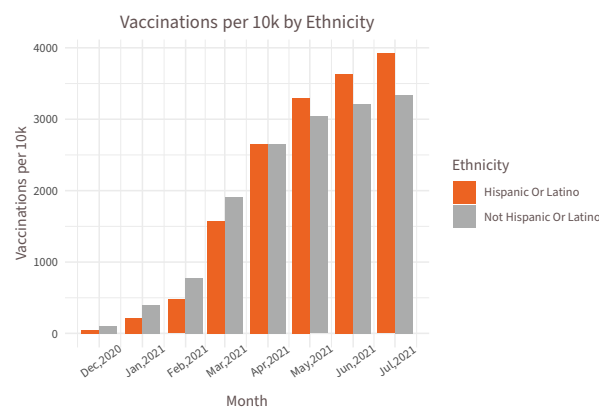


Figure 12. Total Vaccinations Administered by Ethnicity, Standardized to 10,000 Residents.

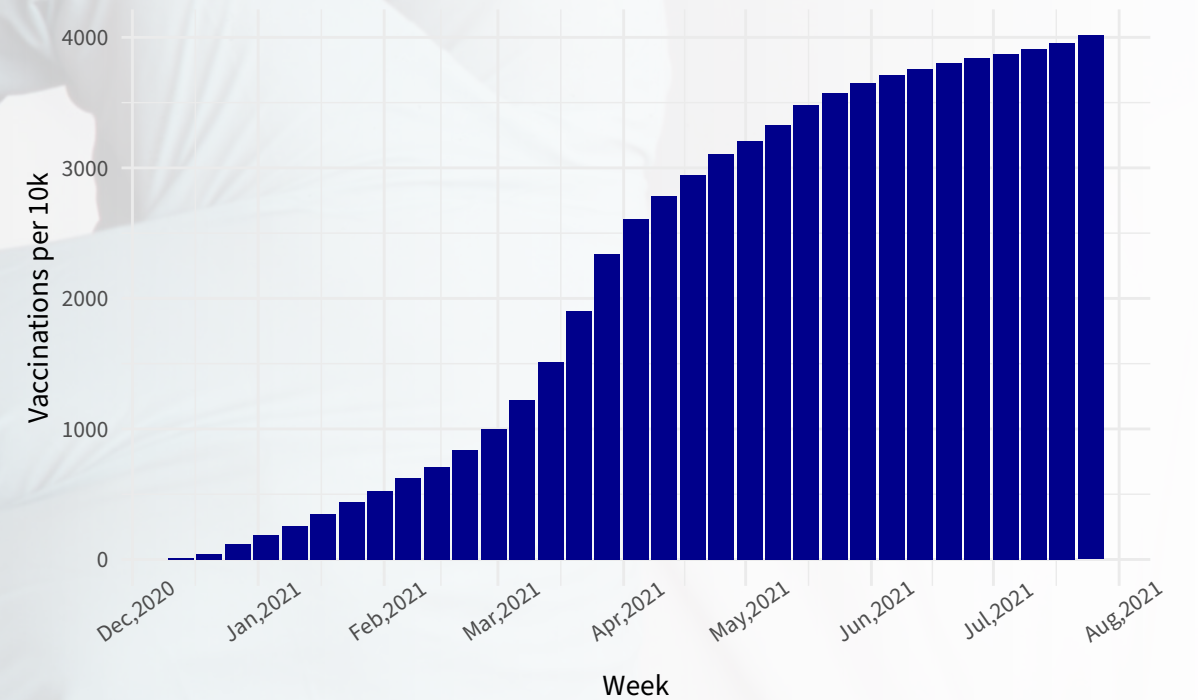


Figure 13. Vaccinations in Cleveland.

information is missing for many vaccinations (Figure 12).

Although Black and African Americans are over-represented in COVID-19 cases, they are under-represented as 1st dose vaccine recipients (Figure 14). As of July 27, 2021, 26% of Black and African American residents have received their 1st dose, as

compared to Asian (62%) and White residents (46%). The proportion of Hispanic or Latino residents that receive their 1st dose has steadily increased since the time that vaccines have become available. 38% of Hispanic and Latinos are vaccinated while 32% of Non-Hispanic residents are .

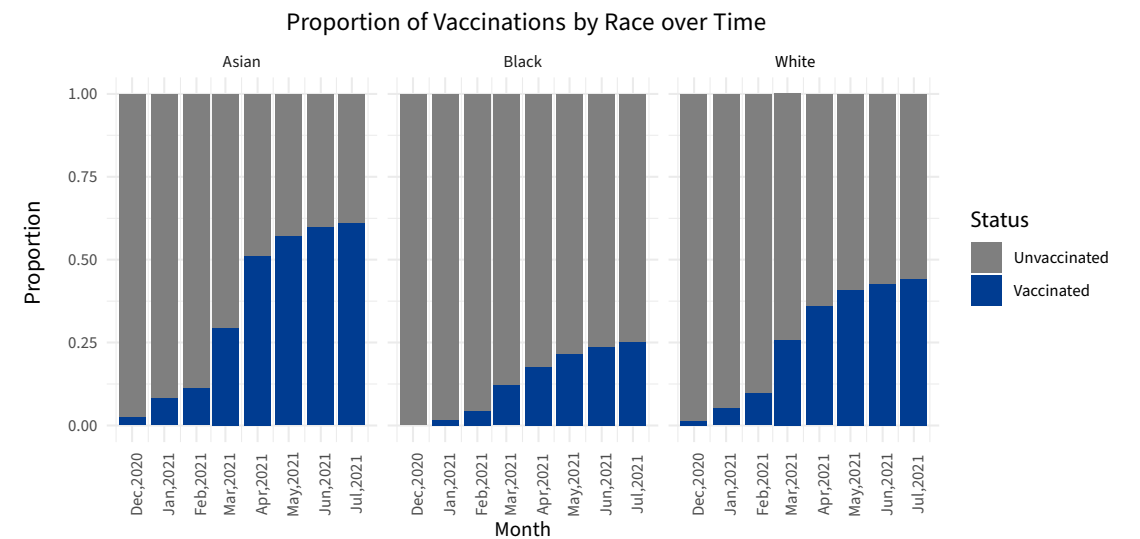


Figure 14. Proportion of Vaccinations by Race Over Time.

	Start Date	Population Eligible for Vaccine
Phase 1A	12/14/2020	<ul style="list-style-type: none"> Healthcare workers and personnel who are routinely involved in the care of COVID-19 patients. Residents and staff in nursing homes. Residents and staff in assisted living facilities. Patients and staff at state psychiatric hospitals. People with developmental disabilities and those with mental health disorders, including substance use disorders, who live in group homes, residential facilities, or centers, and staff at those locations. Residents and staff at our two state-run homes for Ohio veterans. EMS responders.
Phase 1B	1/19/2021	<ul style="list-style-type: none"> Ohioans 65 years of age and older. Ohioans born with or who have early childhood conditions that are carried into adulthood, which put them at a higher risk for adverse outcomes due to COVID-19. Adults/employees in K-12 schools that want to go back, or to remain, educating in person.
Phase 1C	3/4/2021	<ul style="list-style-type: none"> Individuals who have additional medical conditions that may increase their risk of severe illness and death from COVID-19, such as ALS and bone marrow transplant recipients, pregnant women and people with type 1 diabetes. Ohioans who work in certain occupations, including child care services, funeral services, and law enforcement and correction services.
Phase 1D	3/11/2021	<ul style="list-style-type: none"> Individuals who have specified medical conditions that may increase their risk of severe illness and death from COVID-19, such as people with end stage renal disease under the age of 50 and people with type 2 diabetes under the age of 50.
Phase 1E	3/19/2021	<ul style="list-style-type: none"> Individuals who have the specified medical conditions listed below that may increase their risk of severe illness and death from COVID-19, such as cancer, chronic kidney disease, heart disease, obesity or chronic obstructive pulmonary disease
Phase 2A	3/4/2021	<ul style="list-style-type: none"> Individuals age 60 and older
Phase 2B	3/11/2021	<ul style="list-style-type: none"> Individuals age 50 and older
Phase 2C	3/19/2021	<ul style="list-style-type: none"> Individuals age 40 and older
Phase 2D	3/29/2021	<ul style="list-style-type: none"> Individuals age 16 and older

Table 4. Vaccine Roll Out Timeline.

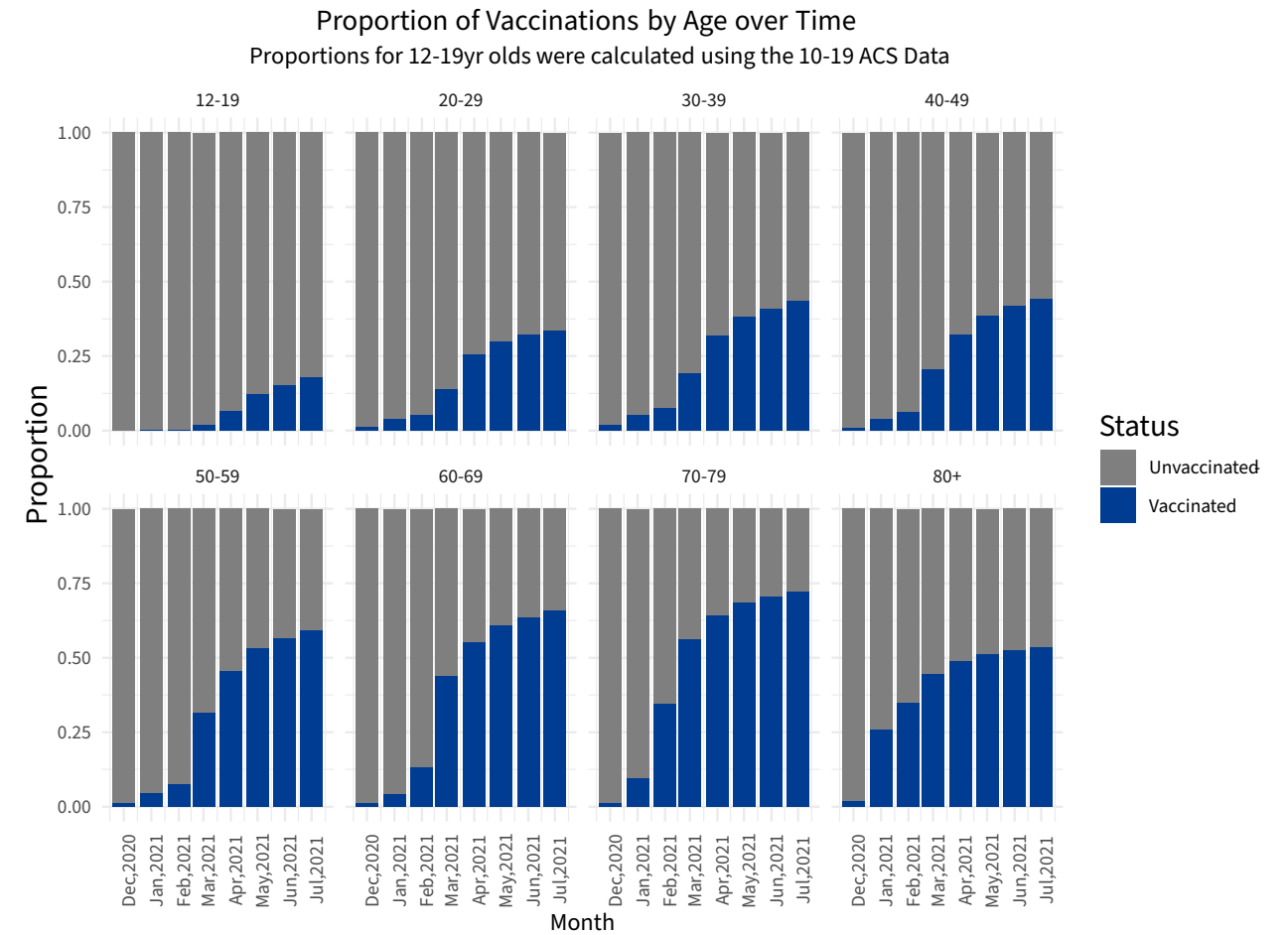


Figure 15. Proportion of Vaccinations Over Time by Age.

VACCINATION SITES

Cleveland residents were vaccinated at over 1,300 different sites within and outside of the city limits. The five sites that provided the most vaccines to residents were pharmacies (CVS, Walgreens, Discount Drugmart, and others combined), the Wolstein Center mass vaccination clinic (the FEMA Megapod), the Cleveland Department of Public Health, MetroHealth, and the Cleveland Clinic.

Pharmacies served an important role in providing vaccination to the City of Cleveland residents. When all pharmacies are combined in aggregate, pharmacies were the most frequent vaccine provider. Cleveland Department of Public Health vaccination sites were also key in providing vaccination to Cleveland residents, especially early in the vaccine rollout. This trend continued through the peak of vaccinations, and then tapered off similarly to other vaccination sites (Figure 16). Cleveland Department of Public Health continues to support vaccine distribution among populations that may not easily access alternative providers by coordinating vaccination sites with community centers, churches, barber shops, schools, businesses, and mobile-vaccine administration to home-bound residents.

The most common vaccination site for Hispanic and Latino residents were pharmacies (Figure 17).

Neighborhood Family Practice Centers (NFPC) also served an over-representative proportion of Hispanic and Latino residents, with half of the vaccines administered at NFPC being given to Hispanic and Latino residents. It is important to note that ethnicity data is not available for many vaccination administrations.

By race, a larger proportion of Black residents were vaccinated at MetroHealth or by Cleveland Department of Public Health, compared with White or Asian residents (Figure 18). Among those vaccinated at the Megapod, 50% were White and over 20% Black (Figure 18).

WHAT MATTERS MOST

Vaccination against COVID-19 was distributed rapidly in Cleveland, in accordance with Ohio Department of Health distribution guidelines. A total of 150,736 Cleveland residents received at least their first dose of the vaccine by July 27, 2021 at over 1,300 different sites within and outside of the city limits.

Although Black and African Americans are over-represented in COVID-19 cases, they were under-represented as vaccine recipients during the first 18 months of the pandemic. As of July 27, 2021, 26% of Black and African American residents have received their 1st dose, compared to 62% of Asian and 46% of White residents. CDPH community efforts have subsequently decreased this vaccination disparity.

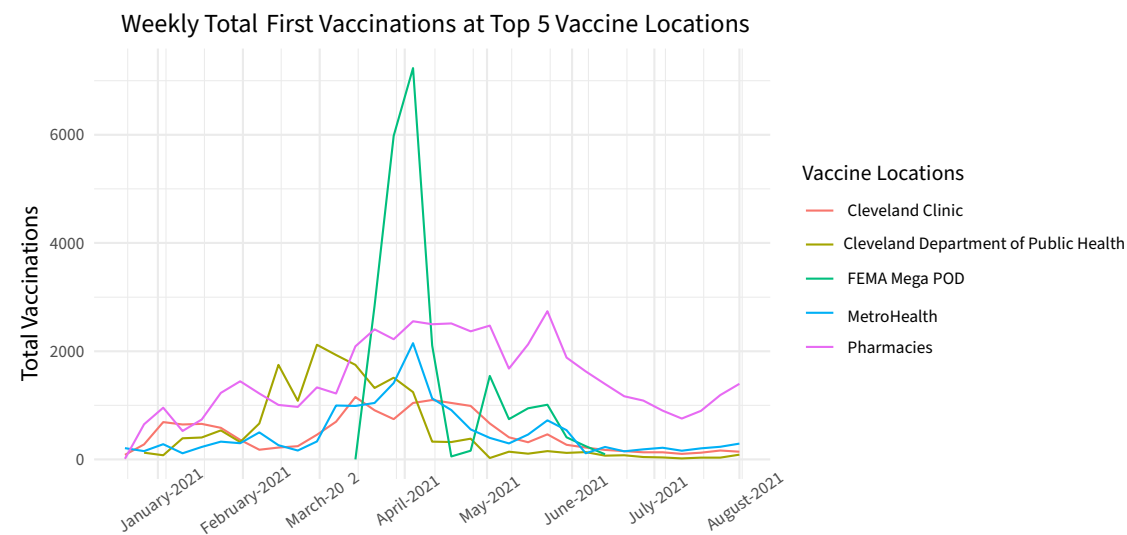


Figure 16. Count of Vaccinations Over Time at the Top 5 Sites.

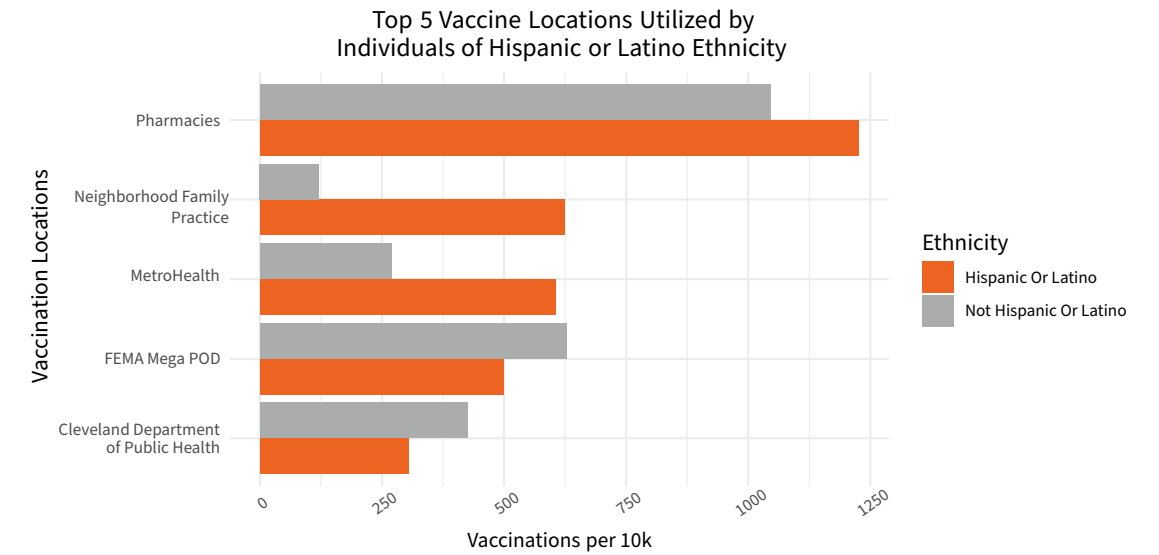


Figure 17. Vaccines Administered per 10K Cleveland Residents by Ethnicity at the Five Most Utilized Sites.

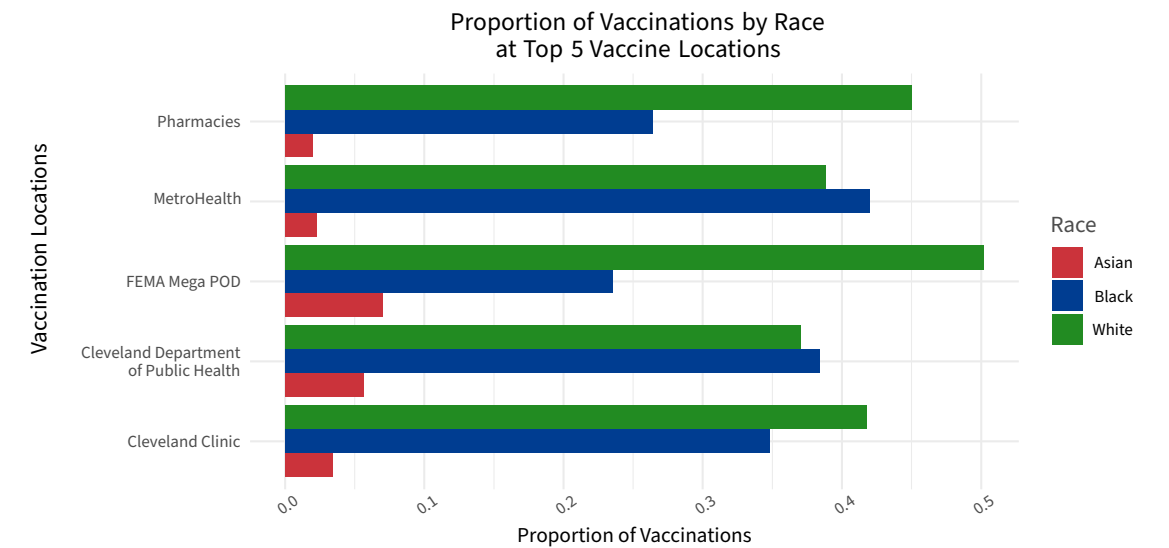


Figure 18. Proportion of Vaccinations Administered by Race at the Five most Utilized Vaccination Sites.

VARIANTS



Transmission electron micrograph of a SARS-CoV-2 virus particle (UK B.1.1.7 variant),w isolated from a patient sample and cultivated in cell culture. Image captured at the NIAID Integrated Research Facility (IRF) in Fort Detrick, Maryland. NIAID/

INTRODUCTION

Early investigation of the COVID-19 outbreak in late December 2019, quickly seized on identifying the genomic sequence associated with the novel pneumonia to confirm that the causative agent was a coronavirus, closely related to the SARS virus.^{23,24} Given that the cases of this novel pneumonia were occurring and emerging from the major metropolitan city of Wuhan (11 million, Hubei Province, China) weeks before the 2020 Chinese New Year Holiday when millions of people travel to visit friends and relatives within and outside of China, the stage was set for wide dispersal of this new infection.

Within weeks of reporting the full genome sequence of a novel coronavirus from a Wuhan patient²⁵ (GenBank NC_045512), the first case of COVID-19 in the United States was reported in a suburb of Seattle, Washington

(January 20th, 2020).⁴ Further sequence analysis of the virus was obtained through a Seattle-based study to monitor emergence of seasonal cases of influenza. Evidence obtained through this investigation showed that many more individuals were infected with SARS-CoV-2 than the original January 20th case suggested, these additional cases had not been in contact with one another (suggesting broad community spread), and there was evidence that the virus was beginning to diversify its genetic sequence. This story was first reported in the New York Times on March 10, 2020²⁶ and later in the New England Journal of Medicine (May 2, 2020).²⁷ These early reports showed that information related to transmission of COVID-19 would emerge from many sources (newspapers and scientific journals) during the ensuing pandemic and complicated outbreak in the United States.

The observation of SARS-CoV-2 sequence variation established at least three areas of concern that could influence public health in the face of COVID-19.

1. Effectiveness of any diagnostic assays could be compromised and reduce the ability to detect the virus and monitor transmission.
2. The sequence of the virus spike protein (virus invasion protein) used to launch vaccine development efforts early in the pandemic (February/March 2020), could change and reduce the effectiveness of the vaccines when deployed.
3. The virus could become more transmissible or more virulent and cause higher levels of illness and death.

It is natural for viruses to mutate and change in the environment constantly. New virus variants have circulated globally and locally during the COVID-19 pandemic and are becoming more common. According to the CDC, “if you think about a virus like a tree growing and branching out; each branch on the tree is slightly different than the others and by comparing the branches, scientists can label them according to the

differences. These small differences, or variants, have been studied and identified since the beginning of the pandemic.”²⁸

VARIANTS OF INTEREST, CONCERN AND HIGH CONSEQUENCE

Acknowledging that SARS-CoV-2 sequence variation was adding complexities for interpreting the success of vaccines, national and international travel, emerging from economic and social restrictions, national and international agencies have recognized the importance of developing classification systems to monitor continuing emergence of SARS-CoV-2 variation as important measures to contain the COVID-19 pandemic.

In the United States, the Centers for Disease Control have established a classification system to communicate levels of risk associated with SARS-CoV-2 variants;²⁸ the World Health Organization issues guidance using a similar system.²⁹ CDC’s guidance on classifying SARS-CoV-2 variants is provided below:

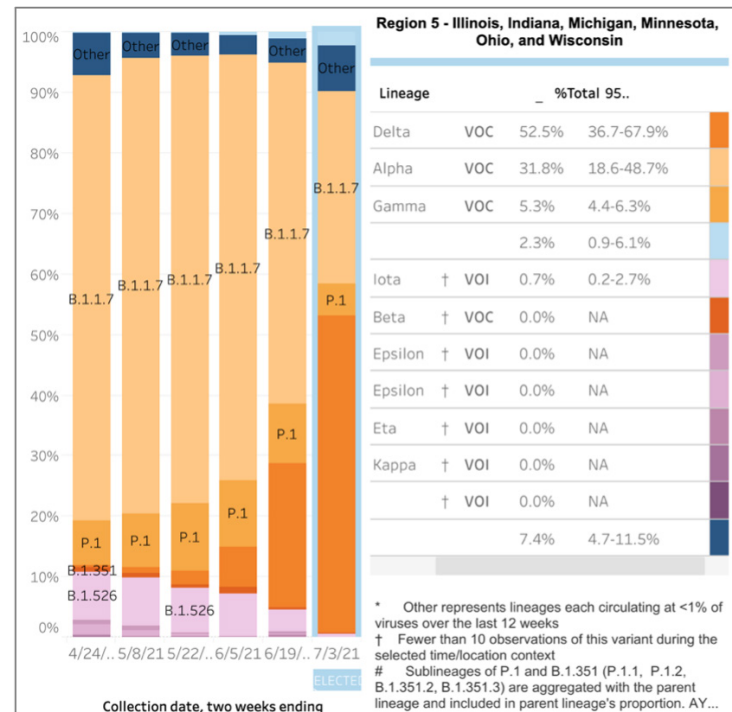


Figure 19. Emergence of the SARS-CoV-2 Delta Variant. The CDC’s predictive model indicates that the Alpha and Delta variants are present in roughly equal proportions at present. This summary indicates that the Delta variant is on its way to becoming the dominant SARS-CoV-2 variant in HHS Region 5, inclusive of Ohio.

Variant of Interest (VOI)—A variant with specific genetic markers that have been associated with changes to receptor binding, reduced neutralization by antibodies generated against previous infection or vaccination, reduced efficacy of treatments, potential diagnostic impact, or predicted increase in transmissibility or disease severity (see **Table 5**).

Variant of Concern (VOC)—Variant with evidence showing an increase in transmissibility, more severe disease (e.g., increased hospitalizations or deaths), significant reduction in antibody neutralization generated during previous infection or vaccination, reduced effectiveness of treatments or vaccines, or diagnostic detection failures (see **Table 5**).

Variant of High Consequence (VOHC)—Variant with clear evidence showing that prevention measures or medical countermeasures (MCMs) have significantly reduced effectiveness relative to previously circulating variants. A VOHC would require notification to W.H.O. under the International Health Regulations, reporting to CDC, an announcement of strategies to prevent or

contain transmission, and recommendations to update treatments and vaccines (The CDC does not currently (July 7, 2021) designate any VOHC).

Global SARS-CoV-2 Genome Sequencing - Since January 2020, sequence data has accumulated in a number of databases. Open data sharing and standardized lineage definitions has been facilitated through the Global Initiative on Sharing All Influenza Data (GISAID). This resource makes it possible to monitor detection of mutations (at least 12,700 of the 29,903 genome bases) and emerging lineages that are relevant for outbreak control and vaccine development around the world.³⁰ As of June 2021, approximately 2,042,000 viral genome sequences had been generated,³² just over 1% of 180 million total cases.^{31,32} To harmonize data analysis and interpretation, user-friendly web-based applications were designed to visualize the dynamic emergence and distribution of lineages on national and international scales (Nextstrain). In the United States, approximately 560,000 SARS-CoV-2 genomes have been sequenced from now over 33 million estimated cases (1.7%).³⁰

WHO Label	Pango Lineage	Date of Designation
Variant of Concern (VOC)		
Alpha	B.1.1.7 and Q lineages	VOC: Dec. 29, 2020
Beta	B.1.351 and descendant lineages	VOC: Dec. 29, 2020
Gamma	P.1 and descendant lineages	VOC: Dec. 29, 2020
Delta	B.1.617.2 and AY lineages	VOC: June 2021
Variant of Interest (VOI)		
Epsilon	B.1.427 B.1.429	VOC: March 19, 2021 VOI: Feb. 26, 2021 VOI: June 29, 2021
Eta	B.1.525	VOI: Feb. 26, 2021
Iota	B.1.526	VOI: Feb. 26, 2021
Kappa	B.1.617.1	VOI: May 7, 2021
N/A	B.1.617.3	VOI: May 7, 2021
Zeta	P.2	VOI: Feb. 26, 2021

Table 5. Variants of Concern and Interest.

SARS-COV-2 GENOME DIVERSITY AND ITS IMPLICATIONS

This sequencing effort has captured appearance of mutations, predominantly in the spike protein that have corresponded to major shifts in strain-specific proportional increases and decreases during the pandemic. **Figure 20** shows how strains carrying an aspartic acid (D) at spike protein amino acid (aa) position 614 were replaced by strains carrying a glycine (G) at this aa position between February and

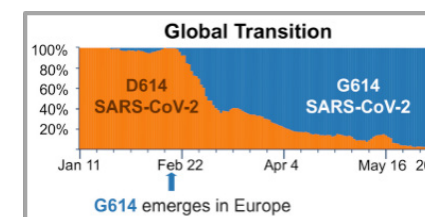


Figure 20. Emergence of the SARS-CoV-2 B Lineage. The D614G amino acid change was the first of the spike protein modifications to be associated with greater affinity to the human ACE2 receptor and increased spread of SARS-CoV-2 in epidemiological studies.

May 2020.³³ Laboratory studies found that SARS-CoV-2 strains carrying the G614 variant displayed growth advantages compared to D614 strains, corresponding to higher upper respiratory tract viral loads, but not with increased disease severity.

Further strain emergence occurred during the significant surge of COVID-19 cases witnessed between October 2020 and January 2021. The “so-called” UK (B.1.1.7; now Alpha), South African (B.1.351; Beta) and South American (P.1; Gamma) strains dominated concern and media discussions throughout the end of 2020 and beginning of 2021 REFS. Continuing emergence of viral diversification now includes California (B.1.427/B.1.429; Epsilon), New York (B.1.526; Iota) and India (B.1.617.2; Delta) strains that have followed significant explosive case surges. Proportional shifts across time and geographic regions provide a perspective of SARS-CoV-2 strain distributions around the world up through early June 2021.³⁴ Of interest in June 2021 was the evidence that the Delta variant was overtaking the Alpha variant in the UK and many other regions of the world.³⁴ In June 2021, the question in the

United States was, would the Delta variant dominate and out-compete all other SARS-CoV-2 variants and set off a new wave of COVID-19 transmission? As of mid-July, it became clear that the Delta variant had made very significant increases in new COVID-19 incidence and was significantly challenging clinical health care and public health systems across the country.

SARS-COV-2 GENOME DIVERSITY WITHIN THE UNITED STATES: NATIONALLY AND LOCALLY

The CDC provides a closer look at the arrival, spread, and current status of the SARS-CoV-2 variants.²⁸ As of mid-July, this resource showed that Delta (B.1.617.2), Alpha (B.1.1.7; UK), Gamma (P.1; South America) and Iota (B.1.526) were the predominant strains being transmitted in the United States. This is consistent with observations in HHS (Health and Human Services) Region 5 inclusive of Ohio, Michigan, Indiana, Illinois, Wisconsin and Minnesota. Finally, new VOIs include Lambda (C.37) from Peru and Mu (B.1.621.1) from Colombia.

REGIONAL DISTRIBUTION OF SARS-COV-2

Data in **Figure 19** from the CDC COVID Data Tracker are summarized for HHS Region 5 (Ohio, Michigan, Indiana, Illinois, Wisconsin and Minnesota) provided strong evidence that the Delta variant was advancing to replace the Alpha variant in HHS Region 5.²⁸ It would be predictable that people who are most susceptible to Delta variant infection and disease are those who have NOT yet received any of the COVID-19 vaccinations.^{35,36}

SARS-COV-2 DISTRIBUTION IN CLEVELAND

Centers for Disease Control and Prevention performs random sampling of the COVID-19 positive identified samples. So, it is important to note that a dataset in which all new infections are sequenced is not available; we only have sequence data of the random positive cases.

The Ohio Department of Health has shared SARS-CoV-2 variant counts with CDPH since April 2021. **Figure 21** provides a summary of the weekly counts through the end of July 2021. It is important to note the limitations inherent in this count data. Specifically,

1. ODH does not indicate what the rationale is for selecting samples that were sequenced;
2. There is no mention of how many sequences did not identify any of the VIO or VOC – thus we do not know what the total number of samples were that were sequenced;
3. Without a total, it is not possible to provide a true proportion of SARS-CoV-2 variant proportions in Cleveland. **Figure 22** provides the cumulative occurrence of the SARS-CoV-2 variants by Zip Codes within the City of Cleveland as of July 31, 2021.

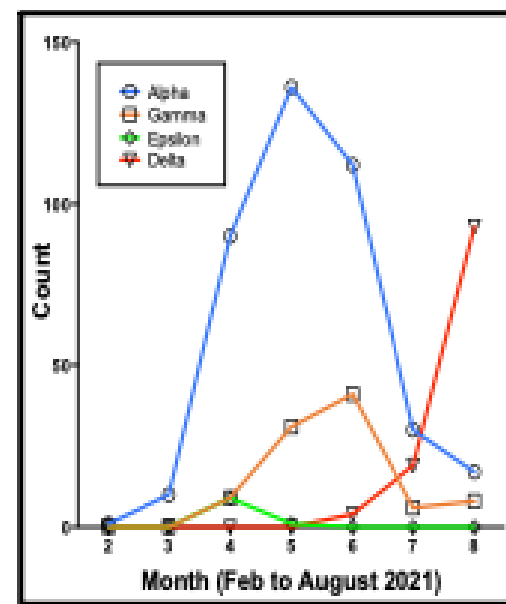


Figure 21. Summary of the Weekly Counts Through the End of July 2021.

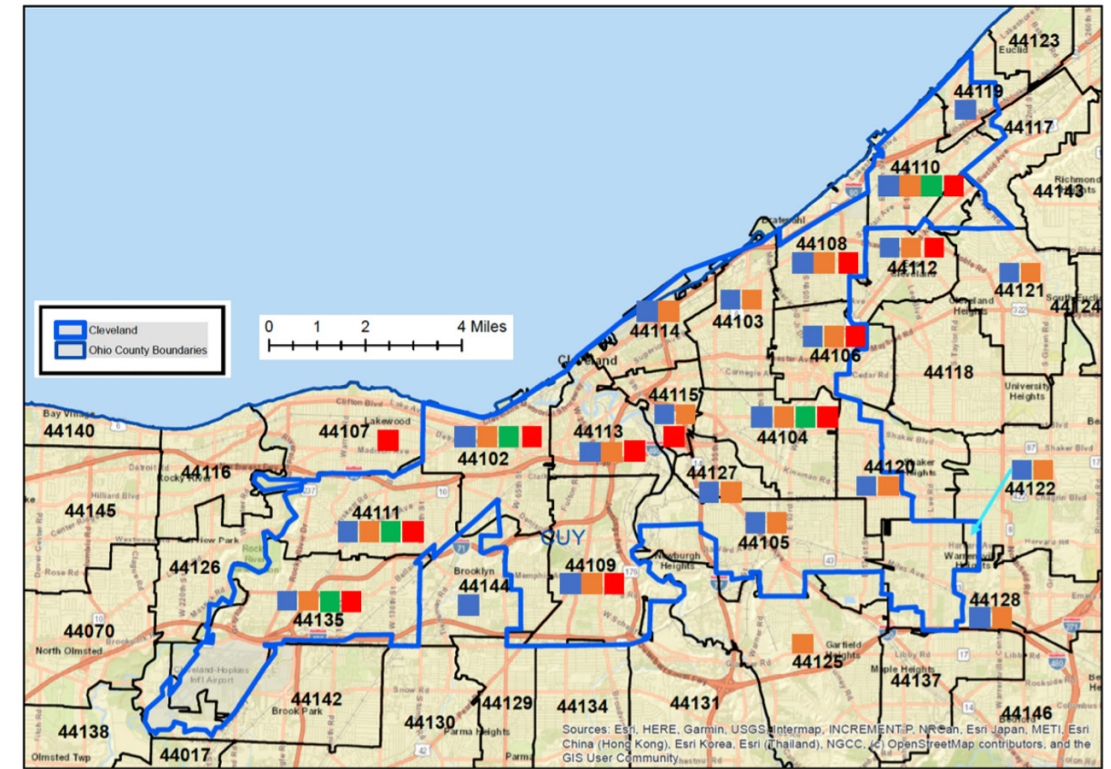


Figure 22. Counts and Regional Distribution of the SARS-CoV-2 Variants by Zip Code as of July 31, 2021. Map prepared by the GIS Health & Hazards Lab, Department of Population & Quantitative Health Sciences, CWRU School of Medicine. Data Sources: University Hospitals, Cleveland Clinic Foundation, Ohio Department of Health; Cleveland Department of Public Health.

WHAT MATTERS MOST

The occurrence and distribution of the SARS-CoV-2 variants within Ohio and more locally in the City of Cleveland has potential to influence public health measures throughout the remainder of 2021. The

primary concern in June/July 2021 is concentrated on predicting how the Delta variant will respond to immunity established by the existing (1) COVID-19 vaccines and (2) exposure to SARS-CoV-2 through survival of natural infection.

Consider COVID Vaccination

for yourself, your family
and your community

OUTREACH



COVID-19 OUTREACH OVERVIEW

The State of Ohio declared a State of Emergency on March 9, 2020 when the first cases were reported in Ohio. On March 11, 2020, Mayor Frank Jackson declared a State of Civil Emergency to mitigate the severity and duration of COVID-19 in the City of Cleveland. The first case of COVID-19 was confirmed in Cleveland on March 14, 2020. Since these earliest days of the pandemic, the Cleveland Department of Health has developed and implemented outreach initiatives to educate the community about the risks of COVID-19, science-based prevention/mitigation practices, where to get tested, how to protect ourselves and our neighbors, and how to get vaccinated.

PRE-VACCINE

In the early stages of the pandemic, informing the community about best practices to stay safe was the primary focus of outreach. As stay-at-home orders kept many residents indoors, CDPH utilized press releases,

Facebook Live sessions, robo-calls, partnerships with faith-based institutions and regular updates from the Mayor to push messaging around basic COVID information and to push the importance of testing to prevent community spread.

When stay-at-home-orders were lifted and residents began to interact with each other more in public, cases began to rise. In response, CDPH used additional strategies to drive the importance of good public health practices. Redeployed community canvassing staff who were trained on cultural competency listened to the concerns and challenges of residents at their doorsteps and in other public settings, learning that the highest needs for most residents were for more PPE and for food, utility, and rental assistance.

In response to the needs of the community, CDPH partnered with University Hospitals to obtain more PPE and to co-develop COVID-19 education materials and

messages for residents. The department received a grant from the Office of Minority Affairs which supported the purchase of PPE for outreach and the hiring of additional community health workers. This increased workforce was better able to target some of the most affected communities such as Glenville, Collinwood, and Buckeye, by distributing PPE and community-tailored educational information. Additionally, CDPH increased their media messaging, using a targeted traditional media campaign entitled “COVID-19- Make A Difference.” Messaging went out over radio airwaves, billboards, and commuter ad spots on RTA busses and rapid trains reinforcing how residents could keep themselves safe and reduce the spread of COVID-19.

POST VACCINATION

When the vaccine became available in December 2020, COVID-19 case counts were at the highest levels of the pandemic. CDPH was the lead planning agency for vaccination distribution in Cleveland, with support from Public Works, the Fire Department and EMS. As a result of the partnership, a successful clinic operated

out of the Public Auditorium, vaccinating 600 first responders in the first 6 days of operation. The lessons learned from the Public Auditorium site were applied to the two City health clinics, Community Centers, and mobile clinics which delivered and administered vaccines to the staff and residents of congregate care facilities. As the number of vaccination sites grew, CDPH also partnered with Cuyahoga Community College and Case Western Reserve University to administer more vaccinations to the community. The number of weekly doses administered rose to a peak of 5000 per week in mid-April, but sharply fell off by the end of the month to 300-400 doses per week, with the downward trend continuing.

COMMUNITY VACCINATION SITES

CDPH’s vaccination strategy fundamentally changed after the surge in vaccination demand in April 2021. The number of mass vaccination sites was reduced in favor of smaller, community-based vaccination sites, like churches and barbershops. This was done in response to concerns that residents had not been

able to reach the central vaccination sites and in effort to reduce the growing disparity of vaccination rates between Black and African American residents and White and Asian residents. Additionally, CDPH shifted their outreach efforts to target residents who are distrustful of the vaccine, hosting webinars with the Cuyahoga Metropolitan Housing Authority, re-engaging community health workers, and utilizing vaccination ambassadors.

Community vaccination sites have been a key driver in reaching Cleveland residents. The Department has collaborated with sites like Daisy's Ice Cream, Bethany Christian Church and Diamond Cut Barbershop among many others to offer vaccines to residents in a comfortable and conveniently located environment. In some cases, additional incentives, such as free food, entertainment or celebrity appearances are used to drive interest and attendance in the vaccination clinics.

Successful community site clinics often vaccinated 10-50 residents who may not have otherwise received the vaccine. The approach of CDPH always focused on meeting the community where they are. Vaccine distribution through community centers, community partners, and mobile clinics were intentionally designed to overcome health barriers and inequities in Cleveland.

WHAT MATTERS MOST

Community outreach has been central to Cleveland Department of Health's approach to communicate, educate, and inform in order to mitigate the impact of the pandemic in our community. These efforts have resulted in increased vaccine coverage in people and areas identified as at high-risk for COVID-19 and to address disparities in COVID-19 outcomes and vaccination.



SAT JUNE 12TH 11:30 AM - 5:30 PM
PLEASE JOIN DIAMOND CUT BARBERSHOP
FOR COMMUNITY COME-UP '21
 5139 SUPERIOR AVE

WITH A SPECIAL APPEARANCE BY: OMARI SPELLMAN, LONDON FLETCHER, ANTONIO LANG & OTHERS
MUSIC BY: DJ ELLERY

COVID-19 VACCINES PROVIDED BY:
 1-DOSE JOHNSON & JOHNSON FOR ADULTS 18 & UP
 2-DOSE PFIZER FOR INDIVIDUALS 12 & UP

* Walk-in or pre-register at gettheshot.coronavirus.ohio.gov or call 216-664-2222 for assistance. Those under 18 must be accompanied by a parent or guardian.

HAIRCUT VOUCHERS! FREE REFRESHMENTS!

ICE CREAM AND vaccines
THIS SATURDAY!
August 7 • 2-4 pm
Daisy's Ice Cream/The Garden of Life
 (5614 Fleet Avenue)

FREEBIES:
 • Month of Sundaes for anyone getting vaccinated
 • Entry into drawing for "Free Ice Cream for a Year" for anyone who gets vaccinated
 • Free ice cream cone for anyone already vaccinated (available to the first 50 who present their vaccination card)

Walk-up or pre-register by calling 216-664-2222 (hours of operation: Monday to Friday 9a to 5p) or visit gettheshot.coronavirus.ohio.gov/
AGES 12 AND OLDER - *Those under 18 must be accompanied by a parent or legal guardian to receive the vaccine.

CEPH COUNCIL MEMBER **Tony Brancatelli** WARD 12 RTA SLAVIC VILLAGE NEIGHBORHOOD TABLES BLOCK CLUB



VACUNAS COVID-19
 para individuos de 16 años o más interesados en recibir la vacuna Pfizer COVID-19

Bethany Christian Church
 3940 Martin Luther King Jr Dr
Sábado, 15 de Mayo
 10 a.m. to 4 p.m.

Sin cita previa o llame al centro de llamadas de vacunas del CDPH, 216-664-2222, para inscribirse.
 Horario de atención: de Lunes a Viernes de 9am to 5pm
 Visitando <https://clecovidvaccine.timetap.com/#/>
 *Los menores de 18 años deben estar acompañados por un padre o tutor

CEPH CITY OF CLEVELAND Mayor Frank G. Jackson

Consider COVID Vaccination
 for yourself, your family and your community

Schedule your appointment TODAY! 216-664-2222

CEPH Paid for by the Ohio Commission on Minority Health

COVID-19 FACT SHEET

WHEN SHOULD I SEEK MEDICAL ATTENTION?

If you have symptoms like cough, fever, or other respiratory problems, contact your regular doctor or local clinic for advice. If you develop these emergency warning signs for COVID-19, call 911 immediately.

- Trouble breathing
- Persistent pain or pressure in the chest
- New confusion or not being able to wake up easily
- Bluish lips or face

If you're over 60 and you have underlying conditions like diabetes, heart disease, and lung disease, come up with a plan with your doctor to identify your health risks for coronavirus and how to manage symptoms. Contact your doctor right away if you do have symptoms.

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COVID-19 FACT SHEET

HOW CAN I PREVENT FROM GETTING COVID-19?

There are steps you can take to help prevent the spread of COVID-19:

- Stay home unless you must leave, for essential reasons, especially if you are sick
- Frequently wash your hands with soap and water. If that is not available, use hand sanitizer with at least 60% alcohol
- Cover your mouth/nose with a tissue or sleeve when coughing or sneezing
- Avoid being within 6 feet of those outside of your household
- Clean and disinfect frequently touched surfaces and objects
- Wearing face-coverings (home sewn masks, handkerchiefs, bandanas) is recommended by the CDC and the Ohio Department of Health

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DURING COVID-19 MAKE A DIFFERENCE FOR THOSE YOU LOVE

- Stay Home
- Cover Your Face
- Wash Hands
- Keep a Distance

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SARS-COV-2 VARIANT ADDENDUM

Our framework for developing the 18-month report on the COVID-19 pandemic's impact on the City of Cleveland completed data collection as of July 10, 2021. This addendum is meant to highlight the significant continuing global health threat posed by COVID-19 associated with the emergence of the SARS-CoV-2 Delta variant (B.1.617.2).

Briefly, the dramatic surge of cases experienced in India in the second quarter of 2021 included daily case counts over 300,000 between April 21 and May 15, 2021. During this highest population-specific surge of the COVID-19 pandemic to-date, unique transmission characteristics and genetic variation evolved. The original Wuhan strain was characterized with a basic reproductive number (R0) of approximately 3.0 (mean and median value of R0 for COVID-19 of 3.28 and 2.79, respectively),³⁷ suggesting that a single infected individual was transmitting their infection to 3 additional people. The SARS-CoV-2 Alpha variant (B.1.1.7; emergent from Q3-2020) was observed to be

50% more transmissible than the Wuhan strain (R0 ~ 4.5). Delta has been estimated to be 50% more transmissible than Alpha (R0 ~7.0; emergent in the United States from Q2-2021 onward). Preliminary studies have suggested that increased transmissibility of Delta results from viral loads may be 1,000 times higher than those infected with previous coronavirus strains;³⁸ further evidence is provided by others.³⁹

Our 18-month report indicated that as of mid-July, Delta (B.1.617.2), Alpha (B.1.1.7; UK), Gamma (P.1; South America) and Iota (B.1.526) were the predominant SARS-CoV-2 strains being transmitted in the United States. At that time, Delta had overtaken the Alpha variant in the UK and many other regions of the world.³⁴ It was also becoming clear that Delta was contributing to very significant increases in new COVID-19 incidence and was significantly challenging clinical health care and public health systems across the United States. Progression of Delta in the United States is summarized in **Figure 23**, as expansion of the Delta (dark orange) segment of

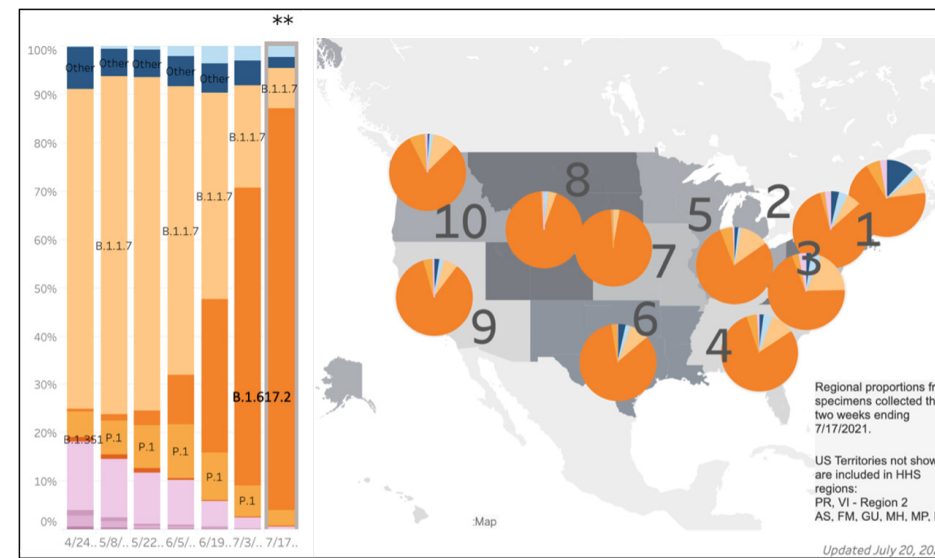


Figure 23. Emergence of the SARS-CoV-2 Delta Variant. The CDC's predictive model indicates that the Delta variant has overtaken Alpha as the dominant SARS-CoV-2 Variant of Concern (VOC) in the United States, in Health and Human Services Region 5 (inclusive of Ohio), roughly equal proportions at present. This summary indicates that the Delta variant is on its way to becoming the dominant SARS-CoV-2 variant in HHS Region 5, inclusive of Ohio.

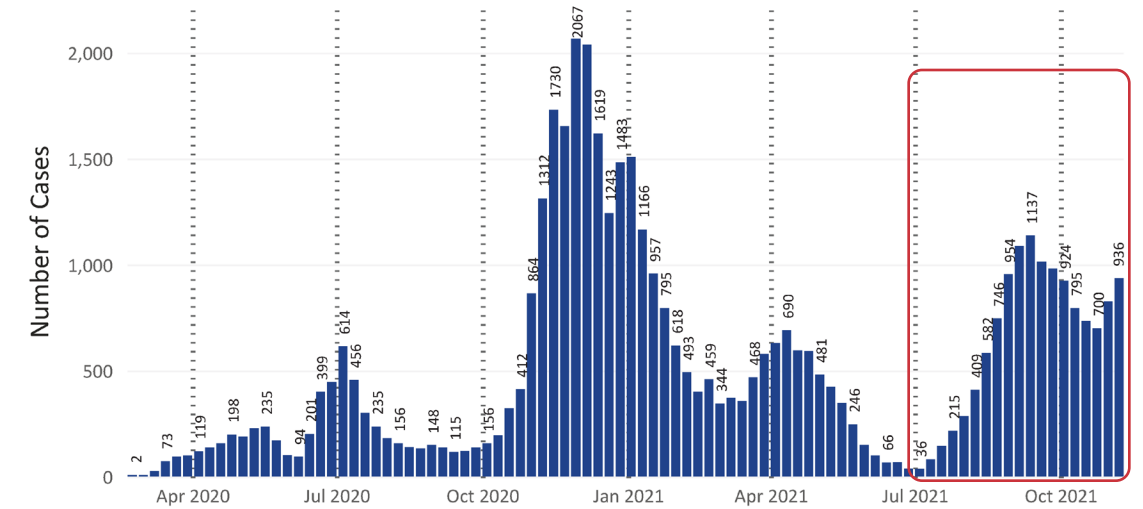


Figure 24. Emergence of the SARS-CoV-2 Delta Variant in Cleveland, Ohio. The graph shows weekly incidence of COVID-19 cases in the City of Cleveland since the beginning of the pandemic in February 2020. The time frame of the Delta variant surge is shown in the Red box from July 4th to the present mid-November conclusion of this addendum.

the proportional histogram suggests near replacement of Alpha (light orange) from mid-June to mid-July, 2021.⁴⁰ After mid-August, Delta has been reported as the predominant SARS-CoV-2 variant, present in over 97% of cases evaluated by viral genome sequence analysis throughout the United States. In the US, from July 23 through September 7, 2021, daily new cases were between 100,000 to 275,000; from August 26 to November 12, 2021 daily new deaths ranged between 1,000 to 3,500; thus highlighting the impact of the Delta surge.

In the City of Cleveland, the Delta surge has been responsible for the very significant increase in COVID-19 cases starting after July 4, peaking on or around September 15 and persisting now through mid-November, 2021 (**Figure 24**, Red box).⁴¹ Verification of the predominance of the Delta variant has been confirmed by viral genome sequence analysis of wastewater samples from multiple neighborhoods within the City.

WHAT MATTERS MOST

The occurrence and distribution of the SARS-CoV-2 Delta variant within Ohio and more locally in the City of Cleveland has and continues to significantly influence

public health measures in 2021. The most significant impacts of the Delta variant surge in the City of Cleveland include the following.

Over the course of the entire pandemic (now covering 90 weeks), 45,372 cases have been reported to the Cleveland Department of Public Health (CDPH). The 11,466 COVID-19 cases reported to CDPH since mid-July (4 months), suggests that 25% of all COVID-19 cases in the City of Cleveland can be attributed to the Delta variant surge.

- Though the percent of Cleveland Residents fully vaccinated continues to increase, vaccination rates in many neighborhoods in the City of Cleveland remain low.
- Vaccination in young children and booster vaccinations in adults have been approved subsequent to the reporting period for this report.
- Studies conducted in numerous countries around the world have shown that the vaccines against COVID-19 are effective against all variants of SARS-CoV-2, including Delta.
- Consistent with observations around the world, the Delta variant surge has had its greatest impact among people who have not received any of the COVID-19 vaccines.

LESSONS LEARNED:

REFLECTIONS FROM THE COVID RESPONSE TEAM

- **A strong Office of Epidemiology and Population Health is essential to understanding and responding to a novel virus pandemic.** Accurate data management, stewardship, and analysis allows strategic approaches to mitigate the consequences of the pandemic.
- **The Office of Epidemiology and Population Health requires access to and support from City and CDPH leadership.** While Epidemiology provides data analysis and translation to leadership, dissemination of this vital information is successful because of strong leadership from the Chief of Prevention, Intervention, and Opportunity for Youth and Young Adults; the Health Director; the Medical Director; the Health Commissioner; the Nursing Director; Public Information Officer; Emergency Preparedness Coordinator, and all divisional CDPH leadership.
- **Effective communication is key to a successful response.** This communication begins with a unified message framed by Public Health experts on a national, state, and local basis. While inconsistencies in messaging existed on a national level, it was incumbent upon CDPH to carefully craft and effectively communicate scientific and data-informed public health information to our community. Dissemination of the message included effective communication within CDPH, with the Mayor's Office, and with other City of Cleveland Departments that contributed to the emergency response. Beyond communication to manage the emergency response within the City, transparent communication with the people of Cleveland was provided to convey the nature and course of the pandemic and public health guidance for pandemic response. Examples of this response included the public-facing weekly report published online.
- **The overwhelming nature of responding to a novel virus requires a willingness to collaborate.** Assistance was requested and provided from virtually all City departments. Leadership and personnel shifts within the pandemic crisis further stressed the public health workforce on CDPH. This dilemma led to development of a formal, strategic partnership between CDPH and the Master of Public Health Program at the Case Western Reserve University School of Medicine. Experienced Public Health and Epidemiology experts joined the daily function of CDPH, with an emphasis on the Office of Epidemiology and Population Health. This included 6 faculty in primary roles, 3 staff, and a cohort of 6-8 CWRU interns who helped share the data management and analysis burden. This partnership touched virtually all aspects of the CDPH response to the pandemic in positive and meaningful ways. Collaboration with Health Department leadership and the frontline responders increased the effectiveness and efficiency of the pandemic response and built relationship that will have ongoing benefits to both CDPH and CWRU.
- **Mounting a coordinated response is essential. Coordination with the Cuyahoga County Board of Health, the Ohio Department of Health, Cleveland Healthcare Systems, and a broad range of community organizations was a necessary process.** Within CDPH, while initially somewhat siloed, active effort was expended to assure coordination between leadership, epidemiology, case investigation, community outreach, emergency preparedness, vaccine dissemination and vaccine data management.
- **Utilization of advanced science and technology has been vital to the quality of the Cleveland COVID-19 response.** State of the art geospatial mapping was made available through the CDPH-CWRU partnership to track COVID-19 outbreaks and clusters. These maps were vital to the development of strategic approaches to reaching high-risk populations in Cleveland. In addition, verification of COVID-19 and the predominance of the Delta variant was confirmed by viral genome sequence analysis of wastewater samples in multiple Cleveland neighborhoods. Because limited testing was occurring in a number of locations, this verification also informed communication strategy to reach under-resourced neighborhoods and the COVID-19 dashboard with daily updates
- **Reaching the people who most need the support and resources provided by CDPH requires deepening and optimizing ties to the people in the community, to the neighborhoods, to trusted community partners.** It requires trust building through repeated efforts despite frustration in order to reach people who carry a hard-earned distrust of healthcare and government.
- **In order to be prepared to see this pandemic through and to be ready for future inevitable challenges, Workforce and professional development is necessary in order to enhance capacity and workforce retention.** This must be coupled with a positive workplace culture that supports the hard, often thankless work of responding to public health problems.

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