Population Health Vital Statistics Brief:
COVID-19 Pandemic Summary, 2022

The *Population Health Vital Statistics Data Brief* series was created to provide regular updates to the 2016 Community Health Assessment and to provide the community with additional important information about population health. For more information on the Community Health Assessment and to access other reports in the *Vital Statistics Data Brief* series, please visit scph.org/assessments-reports

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The Arrival and Spread of COVID-19 in Summit County

The first known case of COVID-19 in Summit County was reported in early March, 2020. By the end of that first month, the county had 130 known cases. By the end of April, that rate had grown nearly 500%, to nearly 650 cases. Through a combination of the state's stay-at-home order, school and business closures, and the public's willingness to adopt mask wearing, hand washing, and social distancing, the rate of growth slowed down sharply until the surge in cases in November and December 2020 (Figure 1).

Even with the precautionary measures the community put in place, several waves of cases drove the case counts from just 130 in March 2020 to about 140,000 by the end of 2022. The number of deaths surpassed 2,000 during that same period (Figure 1). Those 140,000 reported cases represented more than 26% of Summit County's total 2019 population of 541,013. As will be discussed in more detail later, the number of cases we know about is probably far lower than the actual number of cases.

The number of deaths spiked initially as the virus first hit long-term care facilities. However, as protective measures took effect, the number of deaths per 1,000 cases dropped sharply between April and November of 2020, and remained relatively steady since then (Figure 2).

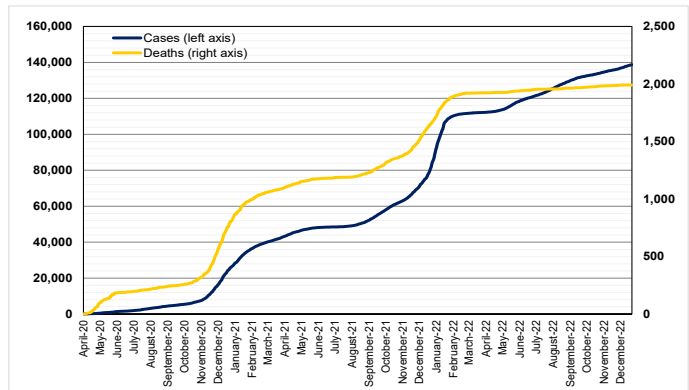Link to SCPH
data dashboards

INSIDE THIS BRIEF

Figure 1: Growth in COVID-19 Positive Cases and Deaths in Summit County, March, 2020 - December, 2022 Source: Ohio Disease Reporting System (ODRS), Summit County Public Health (SCPH)
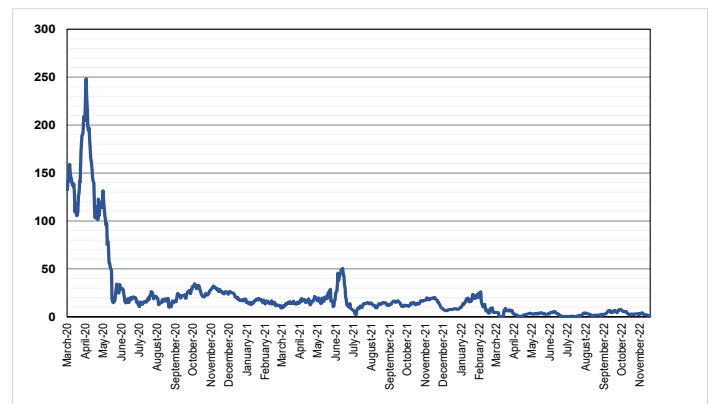

Figure 2: Change in COVID-19 Deaths Per 1,000 Positive Cases in Summit County, March, 2020 - November, 2022 Source: Ohio Disease Reporting System (ODRS), Summit County Public Health (SCPH)

Mapping The Spread of COVID-19 In Summit County

March - October 2020: In the earliest days of the pandemic, the highest concentrations of COVID-19 cases were in long-term care facilities, though community and workplace spread was occurring throughout the county as seen in Map 1. It was during this time that the governor's stay-at-home order was issued. By the end of the period Summit County was experiencing about 86 new cases per day.

November - December 2020: By November, it was clear that the growth in cases was accelerating as the annual respiratory illness season began. Case counts began to skyrocket, with expansion occurring throughout most of the county. At the end of this period, the county was seeing about 452 new cases per day (see Map 2).

January - June 2021: The severe surge of cases seen in the prior two months began to fade in early 2021. With the exception of the Alpha variant in early spring, the decline in cases continued as June approached. Administration of the COVID-19 vaccine, which became available in December 2020, peaked in early April then dropped off sharply after the temporary pause on using the J and J vaccine was announced. By the end of June, cases were down to just 9 per day (see Map 3).
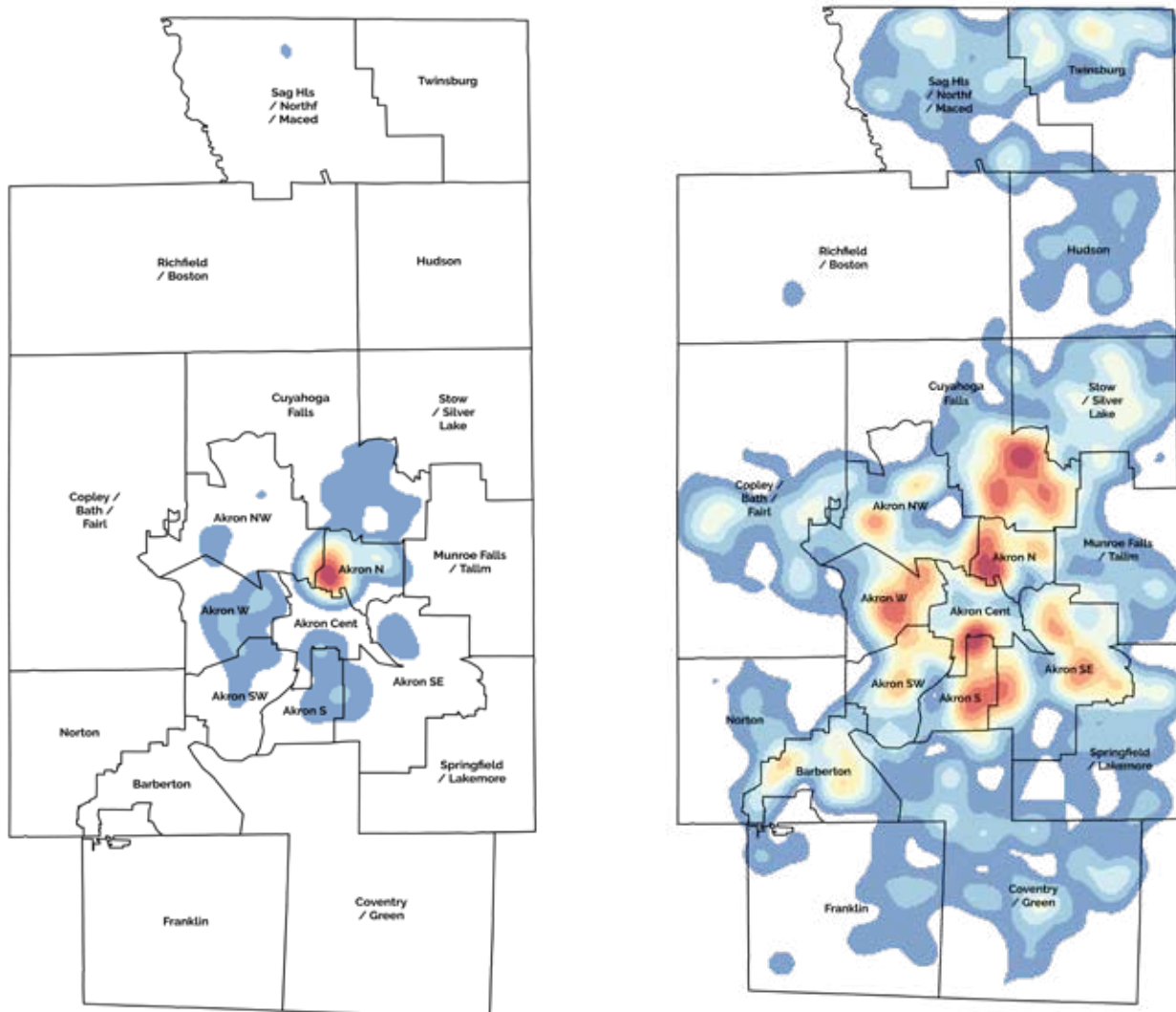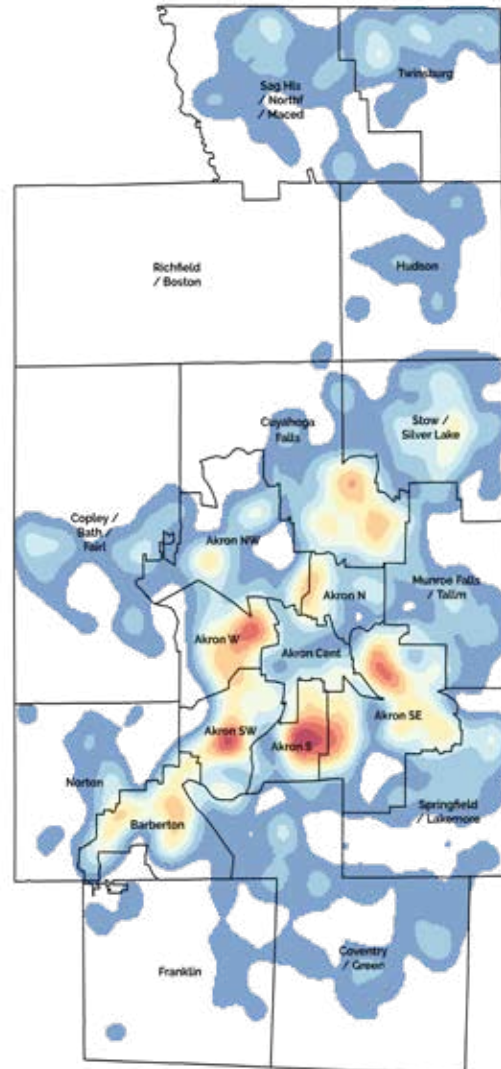

Map 1: *COVID-19 Phase 1: Mar - Oct 2020; **5,279** cases over 8 months (**660 per month**). Predominant variant: **COVID-19 original virus***

Map 2: *COVID-19 Phase 2: Nov - Dec 2020; **18,550** cases over 2 months (**9,275 per month**). Predominant variant: **Alpha***
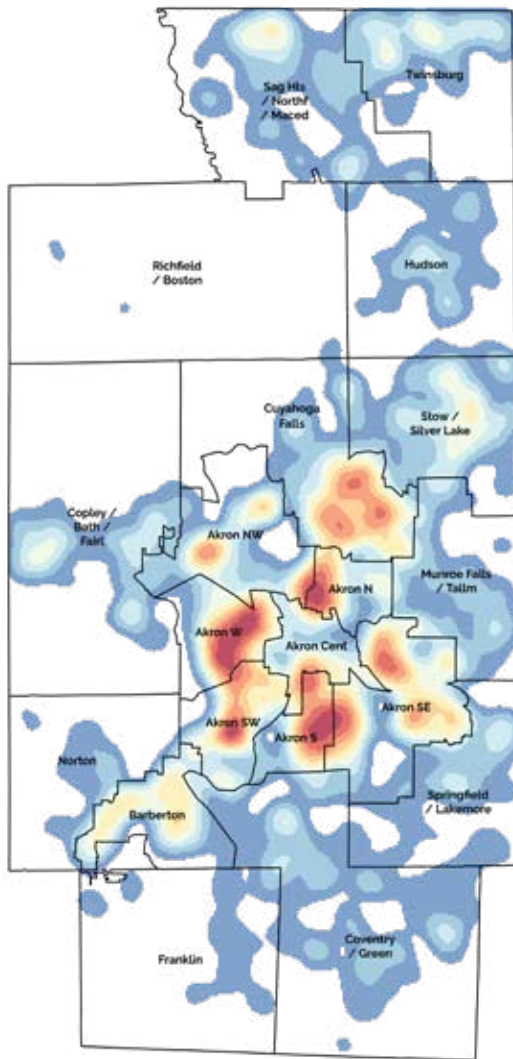
Map 3: *COVID-19 Phase 3: Jan - Jun 2021;* ***24,227*** *cases over 6 months (**4,037 per month**). Predominant variant:* ***Alpha***

Map 4: *COVID-19 Phase 4: Jul - Nov 2021;* ***24,743*** *cases over 5 months (**4,954 per month**). Predominant variant:* ***Delta***

July - October 2021: COVID-19 roared back in early July with the arrival of the Delta variant, sending case counts to the highest levels seen since November and December of 2020. At the end of October 2021 the county was averaging about 142 new cases per day (Map 4).
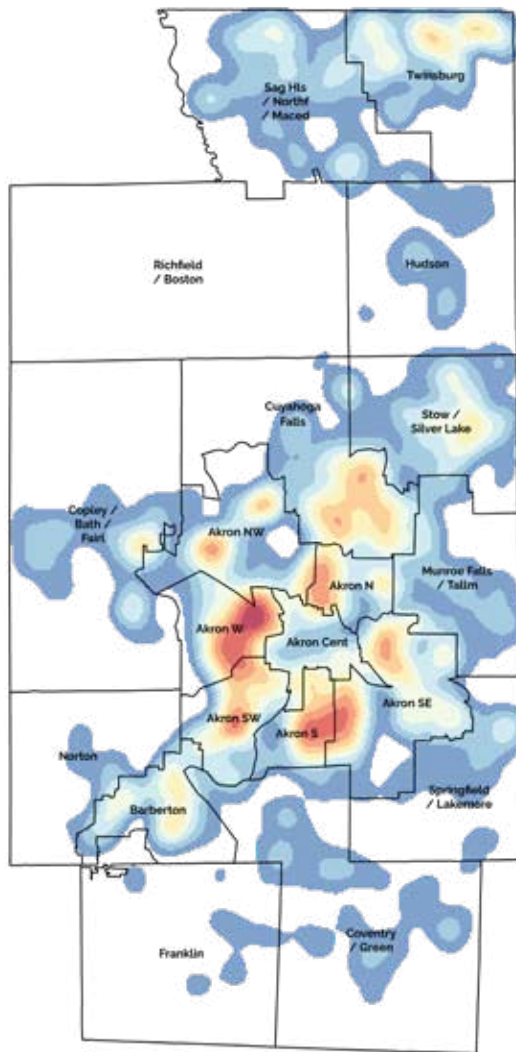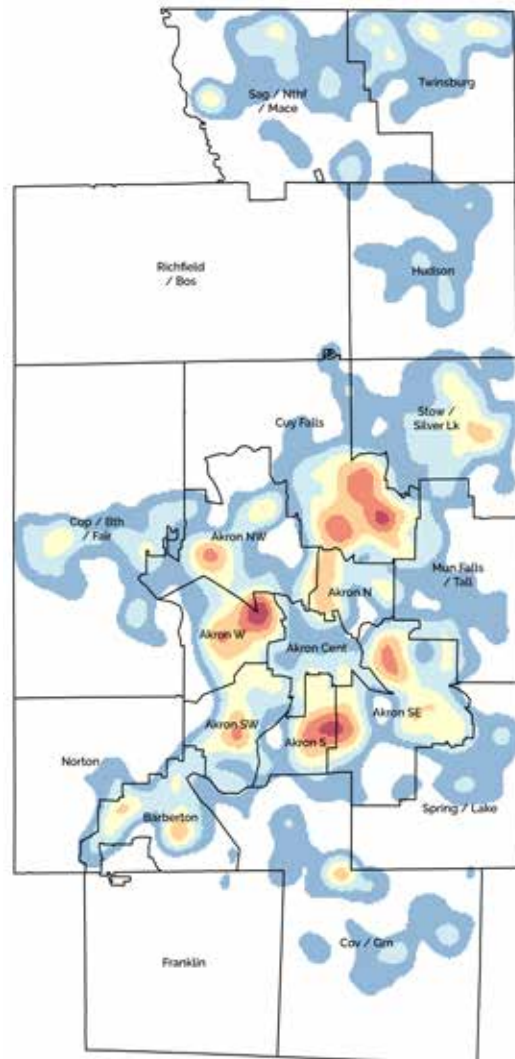
Map 5: *COVID-19 Phase 5: Dec 2021; **20,299** cases over 1 month. Predominant variant: **Omicron / Delta***

Map 6: *COVID-19 Phase 5: Jan 2022 - Mar 2022; **16,387** cases over 2 months.. Predominant variant: **Omicron***

November - December 2021: The continuing impact of the Delta variant and the sudden arrival of the Omicron variant fueled an even greater increase in case counts starting in early November. The number of new cases per day shot up from 142 at the end of October to a high of 988 per day by the end of the year. The all-time high was hit just four days into the new year, with 1,093 new cases per day by January 4th (see Map 5).

January - March 2022: Just as suddenly as the one-two punch of the Delta and Omicron variants hit in December of 2021, it disappeared rapidly over the next three months. Cases dropped to their lowest levels since the previous summer in late March - early April 2022.

March - December 2022: The bottoming out of cases in March didn't last long. Only a couple of weeks later cases began to heat up again. This time cases remained relatively steady, hovering around the 100 cases per day mark after a mild peak in early July 2022. Though cases rose again as school started and the holidays began, case counts have been nowhere near as high as in the previous two Decembers.

It is important to note that due to the decreasing severity of COVID-19, it is likely that case counts are being significantly underreported. The vast majority of testing for COVID-19 now occurs at home via self-administered antigen tests, which are rarely, if ever, reported.
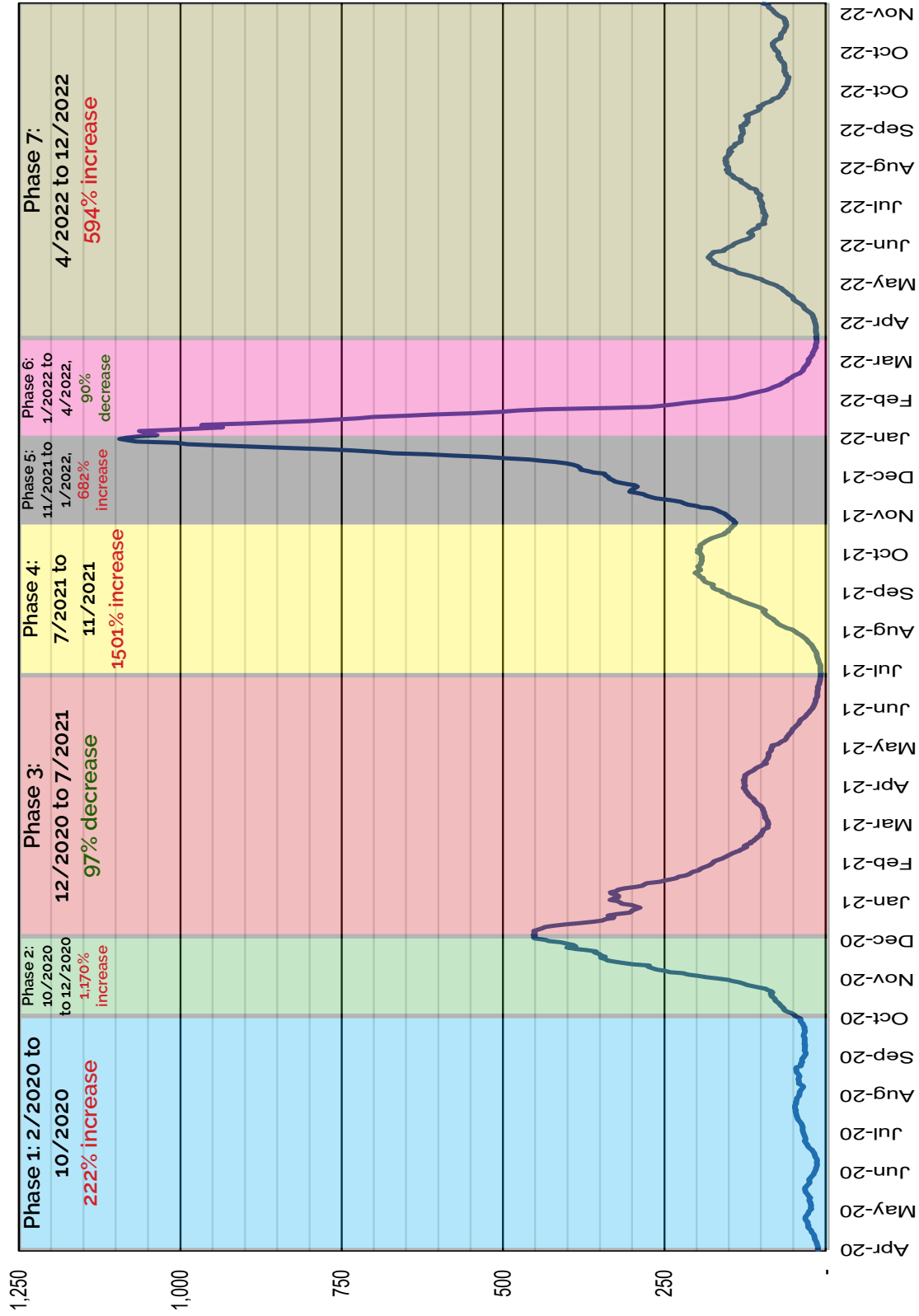
Figure 3: Phases of the COVID-19 Pandemic in Summit County, March 2020 to December 2022 -- The seven phases of the pandemic discussed in the maps above can be seen here in its entirety. The blue line above shows county's 7-day average number of confirmed and probably COVID-19 cases. Cases spiked in December 2020, again in September 2021, and a third time in early January 2022.

A Word About COVID-19 Data: Counting COVID-19 cases sounds like it should be easy; just add up everyone who tests positive and report that number. In reality, trying to put hard numbers on COVID-19 is much more complicated than it sounds. The fact is, nobody knows the true number of people who have had COVID-19. The CDC estimates that only about 1 in 4 COVID-19 positive cases, 1 in 3 cases with symptoms, and 1 in 2 hospitalizations actually get reported. The CDC estimates that by as of October 2021 a total of about 146 million people have been actually been infected, 124 million of whom had symptoms. Of those, about 7.5 million have likely been hospitalized.[1].

There are many challenges to accurate COVID-19 reporting. People who are sick don't always see a doctor, and doctors can sometimes mistake a COVID-19 infection for something else. Overworked staff at all levels sometimes don't report results when or how they should. Most people without symptoms are unlikely to be tested, while others who need to be tested will decline the opportunity. With so many home antigen tests being self-administered now, many positive results will likely not be reported. Tests can also return false results.

There are also technological challenges; hospital computer systems can be incompatible with state systems, smaller medical practices often rely on paper and fax machines; state and local health departments may not have the resources to field modern reporting systems. Sometimes, automatic computer updates either don't run when scheduled or don't run at all. These and other such problems lead to delays in reporting at all levels, incorrect reporting, and revised totals when errors and omissions are corrected, and missing data is added.

The result of all these challenges is that the numbers being reported at the federal, state, and local levels will never be as firm, as current, or as final as we all want them to be. Those of us who analyze these numbers try to be as accurate as possible, but members of the public who rely on COVID-19 data should be aware of both the strengths and the limitations of the numbers they're seeing and what they actually show.

[1] https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/burden.html

COVID-19 Demographics through Dec. 2022

Age of COVID-19 Cases: The median age of all COVID-19 cases is currently 41 years of age. Seniors account for 16% of the cases but 83% of the deaths, while adults account for 71% of the cases but only 17% of the deaths. Children make up 14% of cases but fortunately no deaths to date.
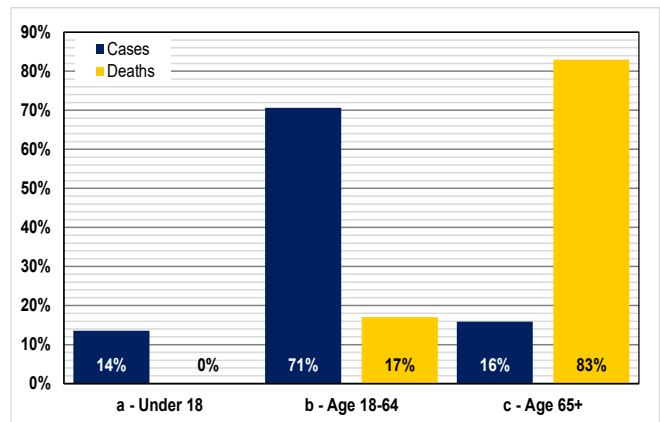

Figure 5: Percent of COVID-19 Cases by Age Source: ODRS, SCPH

Sex of COVID-19 Cases: There are more females than males among all cases (55% to 45%), Deaths due to COVID-19 are slightly more evenly split.
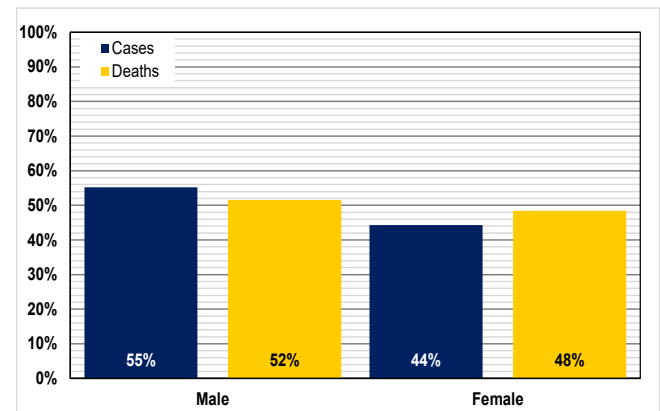

Figure 6 Percent of Cases and Deaths by Sex Source: ODRS, SCPH

Race of COVID-19 Cases: White cases make up 74% of total cases and 81% of the deaths where race is known.* Black cases and deaths are about evenly split, while Asians account for 4% of the cases but 1% of the deaths. While race will be discussed in more detail later on, it is important to note here that the percentages of deaths by race isn't the whole story. The disproportionate death-to-case ratio for white cases is due at least in part to the fact that White COVID-19 deaths tend to be older (median age at death of 77), than Black and Asian COVID-19 deaths (median age at death of 71 and 70, respectively). For reasons that will be discussed later, Black individuals suffer disproportionately from COVID-19.
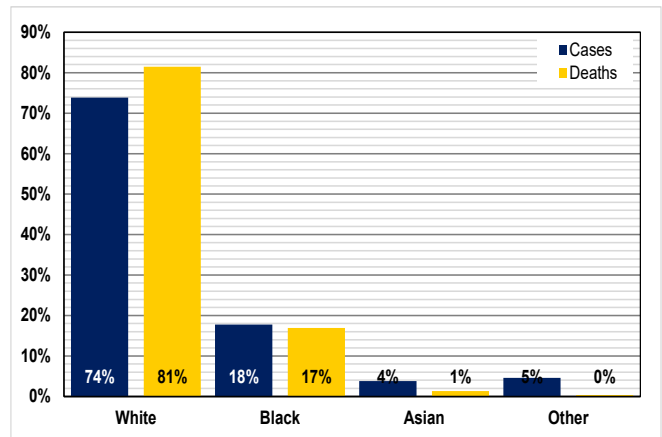

Figure 7: Percent of COVID-19 Cases and Deaths by Race Source: ODRS, SCPH

* Race data in ODRS was missing for 15% of cases. The percentages for each race were based only on cases where race is known.

Ethnicity of COVID-19 Cases: Hispanic individuals make up about 2% of total COVID-19 cases and 1% of the deaths.
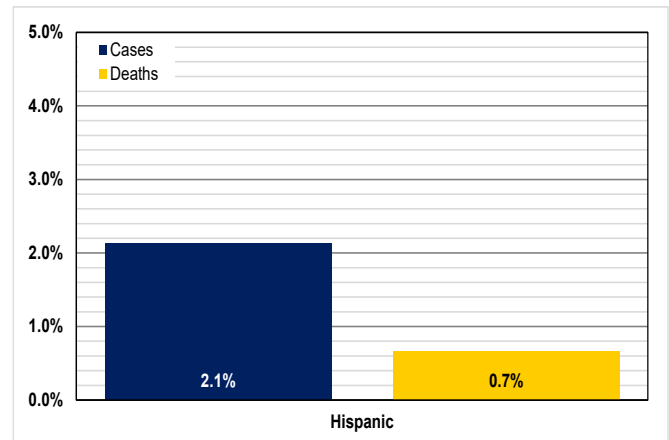
Figure 8: Percent of COVID-19 Cases and Deaths by Ethnicity (percent of those with ethnicity known) Source: ODRS, SCPH

Long-Term Care (LTC): Owing to the generally advanced age and fragile health status of those living in LTC facilities such as assisted living or nursing homes, known LTC residents make up only 9% of cases but 53% of the total deaths due to COVID-19.

Note: LTC status in ODRS was missing for a large proportion of cases (66%). Data for Figure 9 includes only confirmed LTC cases, with confirmed non-LTC and unknown cases combined to calculate the percentage living in an LTC. The percentages for LTC residence based only on cases where that status is known is Lives in LTC (23%) / Does not live in LTC (77%).

Figure 9: Percent of COVID-19 Cases and Deaths by Long-Term Care Status (LTC) Source: ODRS, SCPH

COVID-19 Hospitalizations: About 17% of COVID-19 positive cases were known to be hospitalized; nearly 9,000 in total.
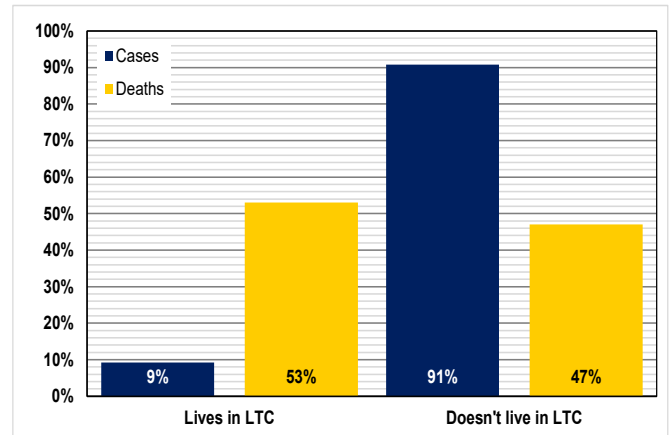
Note: Hospitalizations in ODRS were missing in 61% of cases. Figure 10 includes only confirmed hospitalizations, with confirmed non-hospitalizations and unknowns combined to calculate the percentage hospitalized. The hospitalized percentage based on all cases (including blank entries) <u>whether hospitalization status is known or not</u> is 7%.
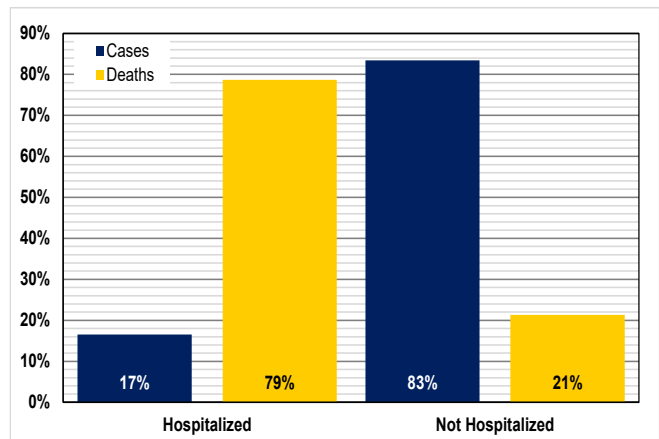
Figure 10: Percent of COVID-19 Cases by Hospitalization Status
Source: ODRS, SCPH

Intensive Care Status: About 22% of hospitalized cases wound up in the intensive care unit (ICU). Three-quarters of those who were hospitalized and in ICU (74%) eventually died.

Figure 12 Percent of COVID-19 Cases and Deaths by Intensive Care Unit Status Source: ODRS, SCPH

COVID-19 Symptoms: About 10% of those testing positive were found to be asymptomatic (see Figure 13).

Figure 13: Percent of COVID-19 Cases With Symptoms Source: ODRS, SCPH

The Impact of COVID-19 on Population Health

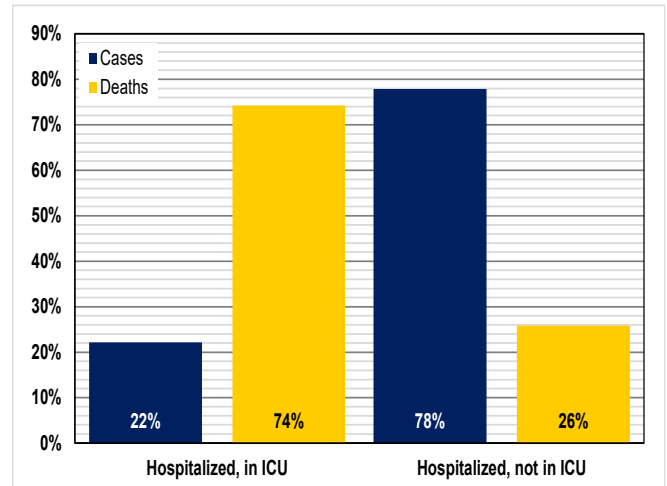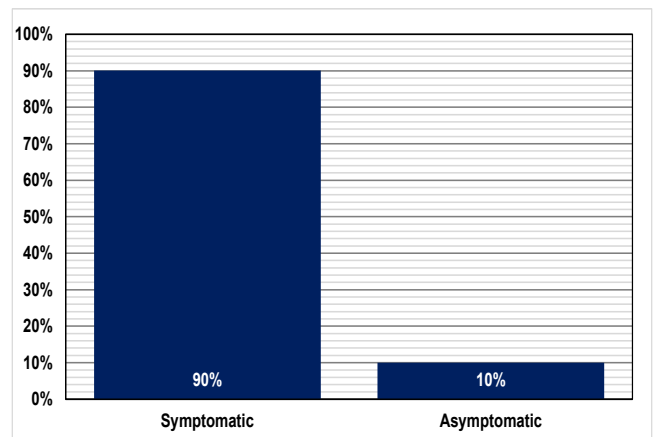| Rank	Under 5	5 - 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65 - 74	75 - 84	85 & over
1	Accidents	Accidents	Accidents	Accidents	Accidents	COVID-19	Cancer	Cancer	Heart disease	COVID-19
2	Perinatal condit.	Cancer	Assault (homicide)	Assault (homicide)	COVID-19	Cancer	Heart disease	Heart disease	Cancer	Heart disease
3	Congen / chromo abnorm	Assault (homicide)	Suicide	Suicide	Cancer	Heart disease	COVID-19	COVID-19	COVID-19	Alzheimer's disease
4	Heart disease	COVID-19	COVID-19	COVID-19	Heart disease	Accidents	Accidents	Chronic lower respiratory	Alzheimer's disease	Cancer
5	Cancer	Chronic liver disease	Diabetes	Heart disease	Suicide	Chronic liver disease	Chronic lower respiratory	Diabetes	Chronic lower respiratory	Stroke
6	Stroke	Suicide	Cancer	Cancer	Assault (homicide)	Stroke	Stroke	Stroke	Stroke	Chronic lower respiratory
7	Assault (homicide)	Other cancers	Congen / chromo abnorm	Septicemia	Diabetes	Suicide	Diabetes	Accidents	Diabetes	Accidents
8	--	--	Heart disease	Congen / chromo abnorm	Chronic liver disease	Diabetes	Chronic liver disease	Chronic liver disease	Accidents	Essential hypertension
9	--	--	Chronic lower respiratory	Chronic lower respiratory	Stroke	Chronic lower respiratory	Septicemia	Kidney disease	Parkinson's disease	Diabetes
10	--	--	Septicemia	Influenza and pneumonia	Kidney disease	Septicemia	Suicide	Septicemia	Kidney disease	Kidney disease
COVID-19 Rank	4	4	4	4	2	1	3	3	3	1

Note 1: "Other Cancers" include cells that look like cancer (possibly pre-cancerous), benign growths, and groups of cells that may or not be malignant.

Note 2: Top five causes of death overall are color coded to more easily follow them across the age groups.

Figure 16: Ten Leading Causes of Death Ranked For Those Age 15 and Older, 2021   Source: ODH Death Certificate Data, Centers for Disease Control and Prevention.

In less than two years, COVID-19 became a top 5 cause of death for those under age 35, and a top 3 cause of death for those 35 and older. For those 85 and older, it ranks first.

The Impact of COVID-19 on the Labor Market in Summit County

| Type of Industry	1st Quarter 2020	1st Quarter 2021	1st Quarter 2022	1q-20 to 1q-21	1q-21 to 1q-22	Avg. Annual Earnings 2020	Avg. Annual Earnings 2021	2020-2021
Total employment	262,673	247,389	248,553	-6%	0%	$53,799	$56,661	$2,862
Private Sector	236,327	222,654	224,301	-6%	1%	$53,485	$56,541	3,056
Agriculture, forestry, fishing and hunting	112	190	260	70%	37%	$34,304	$36,037	1,733
Mining	110	92	111	-16%	21%	$66,739	$69,170	2,431
Utilities	1,069	1,028	1,021	-4%	-1%	$109,416	$131,878	22,462
Construction	10,776	10,188	10,781	-5%	6%	$65,655	$69,073	3,418
Manufacturing	28,296	26,647	27,042	-6%	1%	$59,559	$61,792	2,233
Wholesale trade	12,974	12,225	12,585	-6%	3%	$70,359	$74,436	4,077
Retail trade	28,881	28,252	26,903	-2%	-5%	$34,701	$38,170	3,469
Transportation and warehousing	11,162	11,894	13,082	7%	10%	$42,731	$46,451	3,720
Information	4,117	4,192	2,717	2%	-35%	$76,631	$80,764	4,133
Finance and insurance	10,018	9,103	9,477	-9%	4%	$84,905	$91,528	6,623
Real estate and rental and leasing	2,890	2,721	2,844	-6%	5%	$48,402	$49,744	1,342
Professional and technical services	13,500	13,164	13,856	-2%	5%	$73,485	$78,344	4,859
Mgt. of companies and enterprises	13,619	13,002	12,585	-5%	-3%	$109,138	$115,162	6,024
Administrative and waste services	15,084	13,936	14,014	-8%	1%	$34,593	$37,544	2,951
Educational services *	3,678	3,490	3,716	-5%	6%	$33,200	$34,755	1,555
Health care and social assistance	45,340	43,470	42,773	-4%	-2%	$53,078	$55,459	2,381
Arts, entertainment, and recreation *	4,303	3,224	3,000	-25%	-7%	$23,743	$24,903	1,160
Accommodation and food services *	22,348	18,545	20,105	-17%	8%	$17,334	$19,611	2,277
Other services, except public admin. *	8,052	7,290	7,431	-9%	2%	$34,741	$37,547	2,806
State & Local Government	26,346	24,735	24,252	-6%	-2%	$56,643	$57,762	1,119
State Government	4,028	3,820	3,668	-5%	-4%	$68,141	$66,356	(1,785)
Local Government	22,318	20,915	20,584	-6%	-2%	$54,565	$56,277	1,712
Federal Government	1,931	1,866	1,905	-3%	2%	$67,746	$74,076	6,330
Four hardest-hit sectors *	38,381	32,549	34,252	-15%	5%	--	--	--
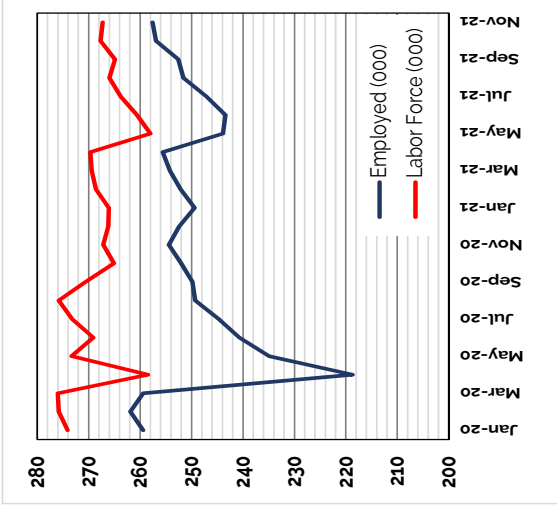
Figure 17: Employment and Job Losses, 2019-2021 by Quarter Source: *Ohio Bureau of Labor Market Information, U.S. Bureau of Labor Statistics Quarterly Census of Employment & Wages*

Figure 17 shows the change in jobs by sector in Summit County by quarter from 2020 to 2022. In the 1st quarter of 2020, the total number of jobs grew by about 1,300 (relative to the 1st quarter of 2019). By the 2nd quarter of 2020 the impact of COVID-19 was clear. Nearly 33,000 jobs were lost in Summit County between the 2nd quarter of 2019 and the 2nd quarter of 2020. Data for the 3rd quarter of 2020 shows that job losses continued, but at a slower pace, with year-over-year losses dropping from 33,000 to 18,000. By the end of the 1st quarter of 2022, overall job losses stabilized in most sectors.

While nearly all sectors suffered, job losses hit four major sectors harder than the rest of the labor market. *Arts, Entertainment, and Recreation* along with *Accommodation and Food Service*, *Educational services* and *Other Services* lost a total of more than 13,000 jobs in the 2nd quarter of 2020; about 40% of all the jobs lost. Making matters worse, these were among the lowest-paying jobs available, with 11,000 of the lost jobs paying just $25,000 or less. Jobs in these four sectors combined declined by 15% between the 1st quarter of 2020 and the 1st quarter of 2021. From that point until the 1st quarter of 2022, jobs in these four sectors rose by a combined 5%, led by *Accommodation and Food Service* (+8%) and *Educational Services* (+6%).

COVID-19 Racial Disparities

While COVID-19 is affecting every part of our communty, it has a greater impact on racial minorities than Whites. This highlights the ongoing inequities in resources, opportunities, and the quality of and access to health care in minority communities.

**Testing Positive for COVID-19:**

Figure 18a shows COVID-19 incidence and death rates by race. White individuals had a lower rate of COVID-19 infections (7,714 cases per 100,000) than both Black individuals (10,379 per 100,000) and Asian individuals (9,296 per 100,000).

Several factors contribute to higher infection rates among some racial groups, including the physical health of different populations, the environmental conditions in which they live and work, and economic factors such as education, employment, income, and access to health care.

Dying from COVID-19:

Unfortunately, the racial disparities seen in both infections and hospitalizations continue for fatality rates. While Black individuals ranked second of the three broad racial groups for both infections and hospitalizations, they ranked highest when it comes to age-adjusted death rates. White individuals as a group have the lowest age-adjusted death rates.

Why the higher rates for Black individuals? Different employment types between White and Black workers can contribute to higher rates. According to the 2019 American Community Survey, Black workers are 2.6 times more likely to be employed in healthcare support occupations, 1.5 times more likely to be in food preparation or serving occupations, and 1.6 times more likely to be in production, transportation, or material moving occupations than White workers.[1] These
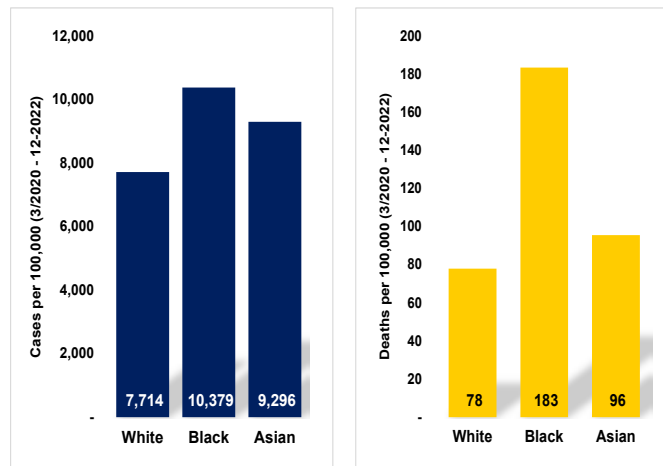
Figures 18a and b: Age-Adjusted COVID-19 Incidence (blue) and Death Rates (gold) per 100,000 Population, by Race, March 2020 to December 2022 Source: ODH, SCPH

occupations generally involve more person-to-person contact and close quarters work than many other professions, and fewer, if any, opportunities to work at home. This exposes employees in these sectors to greater chances for infection. Recent research has highlighted the likely impact of working in these professions for racial and ethnic minorities especially.[2]

The role of race in population health nationwide has become clearer in recent years. Stark differences can be seen in Summit County and across the nation in health outcomes by race that are strongly influenced by social, economic and environmental factors, as well as broader societal issues such as institutionalized racism. Such factors help create the health disparities by race that we see.

Race and Social Vulnerability: There is also a well-known link between race and place. Racial and ethnic minorities who live in vulnerable neighborhoods tend to have worse health than those who live in neighborhoods with better socioeconomic conditions.

In order to better understand the conditions that contribute to health disparities, the CDC

[1] Source: 2019 American Community Survey (ACS). The size of the Asian population in Summit County wasn't large enough for the ACS to generate Asian estimates for these detailed occupations.

developed a Social Vulnerability Index. As the CDC explains, "...the degree to which a community exhibits certain social conditions, including high poverty, low percentage of vehicle access, or crowded households, may affect that community's ability to prevent human suffering and financial loss in the event of disaster. These factors describe a community's social vulnerability."

The Index tracks four measures of vulnerability for each census tract in the nation using 15 indicators of health and social conditions. These measures and indicators are shown in Figure 19, and mapped for Summit County in Map 8.

Maps 9, 10, 11 and 12 show where COVID-19 cases are concentrated in Summit County. More than 11,000 Summit County residents with COVID-19 live in areas of high social vulnerability. These figures differ sharply by race. For Black and Asian individuals, half or more COVID-19 cases are located in those dark blue areas of Maps 9-11 which have the highest social vulnerability, In the case of white individuals, several areas of higher density COVID-19 concentrations are also located in those highest social vulnerability areas. However, there are many other areas of high-density COVID-19 concentration for white individuals that are in much less socially vulnerability areas of the county.

What does this mean? Overall, one-in-five Summit County residents live in an area of high social vulnerability.

Examining the issue by race, most White individuals with COVID-19 (85%) live in areas of the county that face fewer socioeconomic challenges, with higher levels of income, education, and employment; homes that are in better condition, with easier access to transportation and many other advantages. These neighborhoods have very few problems like run down housing (that can cause lead poisoning and asthma), or air and water pollution that can contribute to cancer, asthma and other respiratory illnesses. These and other poor environmental conditions weaken people's health and make them more vulnerable to infectious diseases such as COVID-19, especially when combined with socioeconomic disadvantage and jobs with greater potential for exposure to the virus. In other words, most White individuals have access to resources in the places they live that make it easier for them to cope with the hardships that a crisis like COVID-19 creates.

The remaining 15% of White COVID-19 cases live in one of the areas of high social vulnerability that do not have the same access to resources and good environmental conditions. The same can be said about the 45% of Black and the 27% of Asian individuals with COVID-19. They, too, live in areas with high social vulnerability; areas that can make coping with COVID-19 and other health crises even harder than it already is.
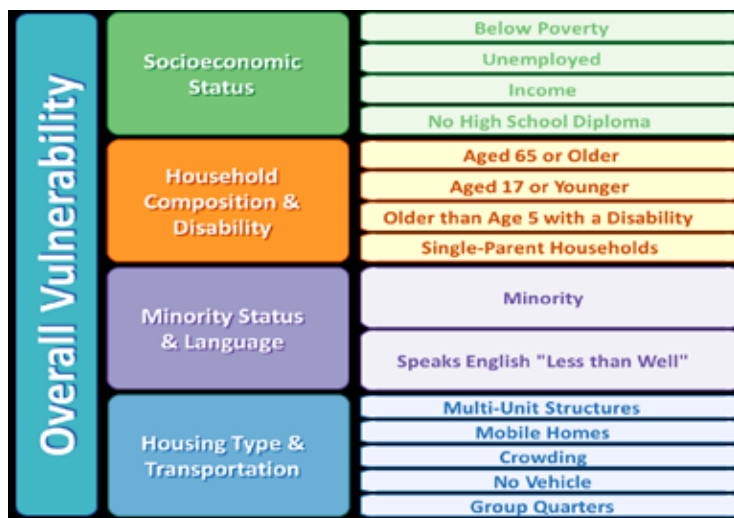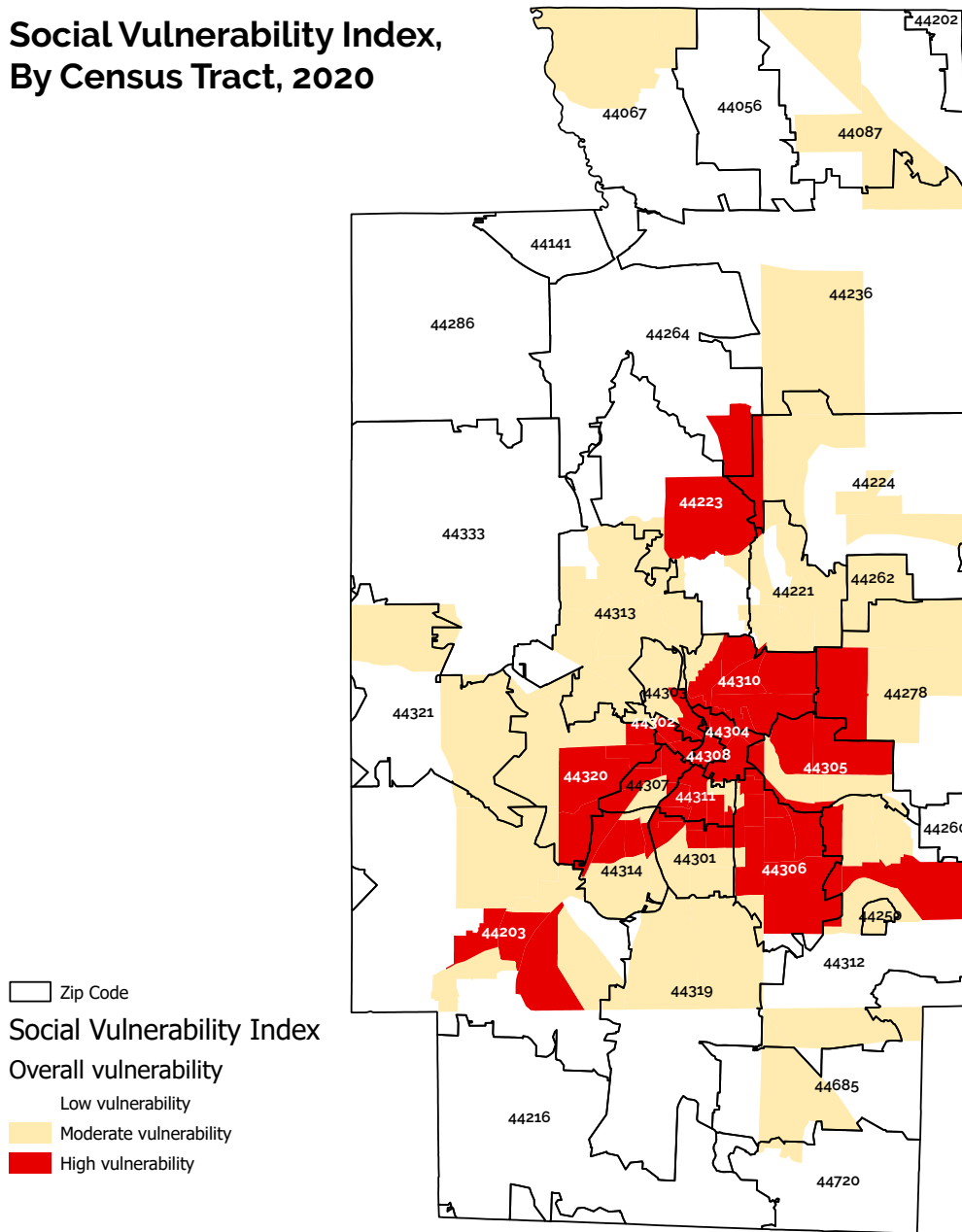

Figure 19: The Social Vulnerability Index *Source: CDC*

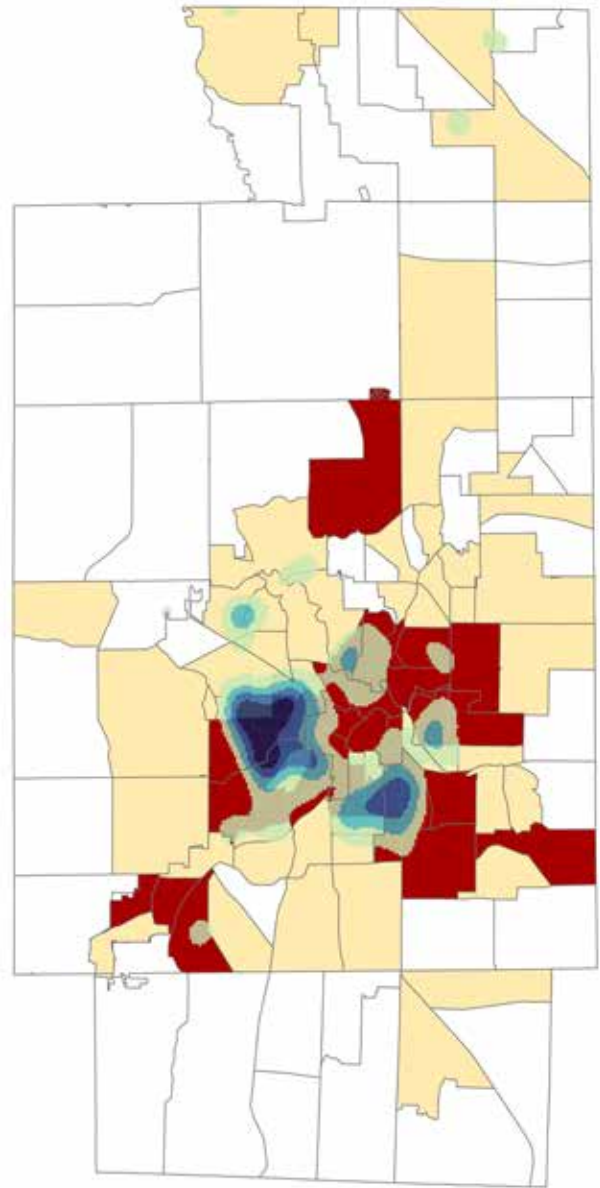[2] Hawkins D. Differential occupational risk for COVID-19 and other infection exposure according to race and ethnicity. Am J Ind Med. 2020;1–4. https://doi.org/10.1002/ajim.23145

**Social Vulnerability Index,
By Census Tract, 2020**

44202

44067   44056   44087

44141

44236

44286   44264

44223

44224

44333   44221   44262

44313

44310   44278

44307
44321   44302 44304
44308   44305
44320   44307 44311

44260
44314   44301   44306

44203   44259

44312

44319

Zip Code

Social Vulnerability Index

Overall vulnerability

Low vulnerability

Moderate vulnerability   44685
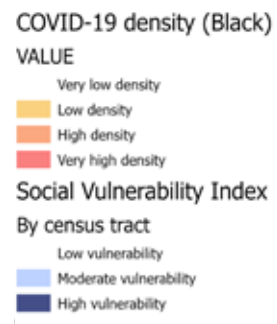
High vulnerability   44216

44720

Map 8: *Social Vulnerability Index by Census Tract in Summit County, 2020*
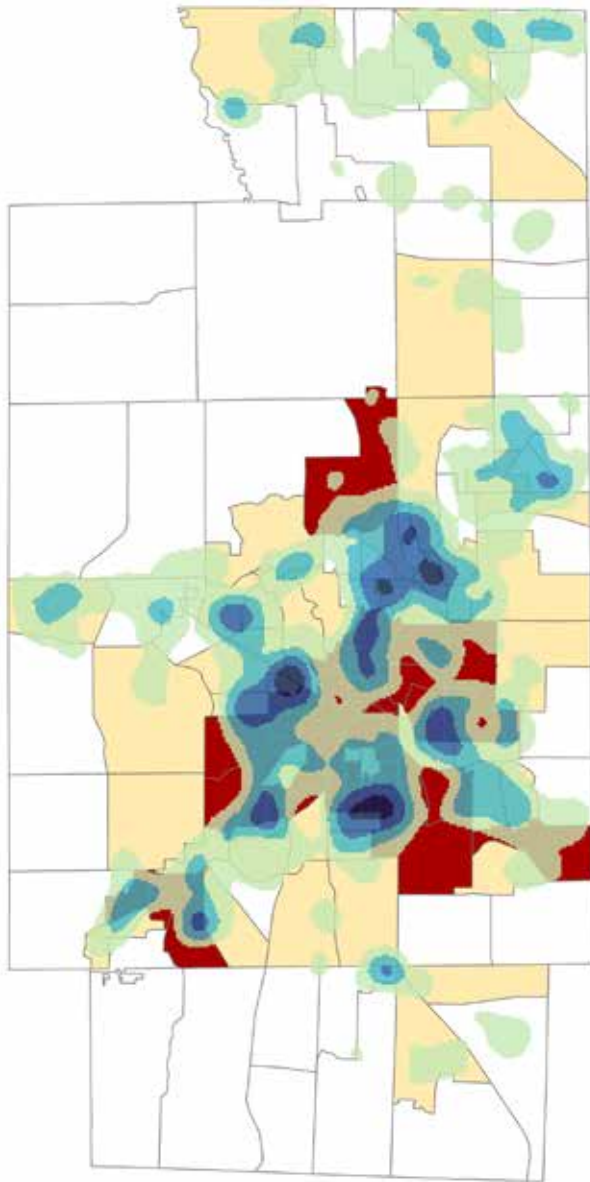
Map 9 (left): *Density Map of All COVID-19 Cases and Social Vulnerability Index by Census Tract*
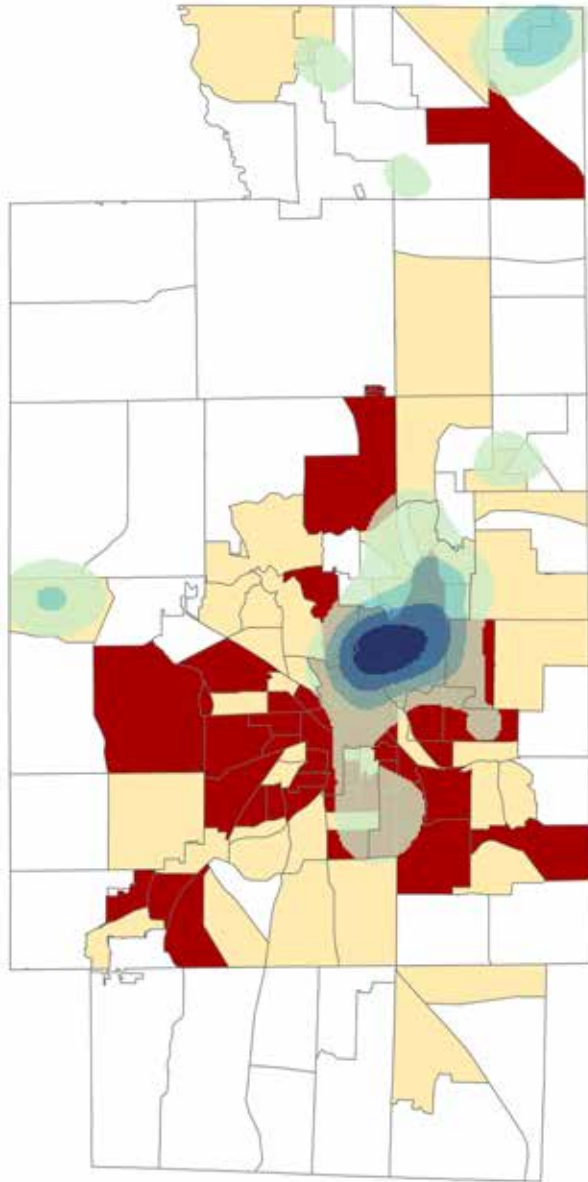

Map 10 (left): *Density Map of Black COVID-19 Cases and Social Vulnerability Index by Census Tract*

COVID-19 density
VALUE
 Very low density
 Low density
 High density
 Very high density
Social Vulnerability Index
By census tract
 Low vulnerability
 Moderate vulnerability
 High vulnerability

COVID-19 density (Black)
VALUE
 Very low density
 Low density
 High density
 Very high density
Social Vulnerability Index
By census tract
 Low vulnerability
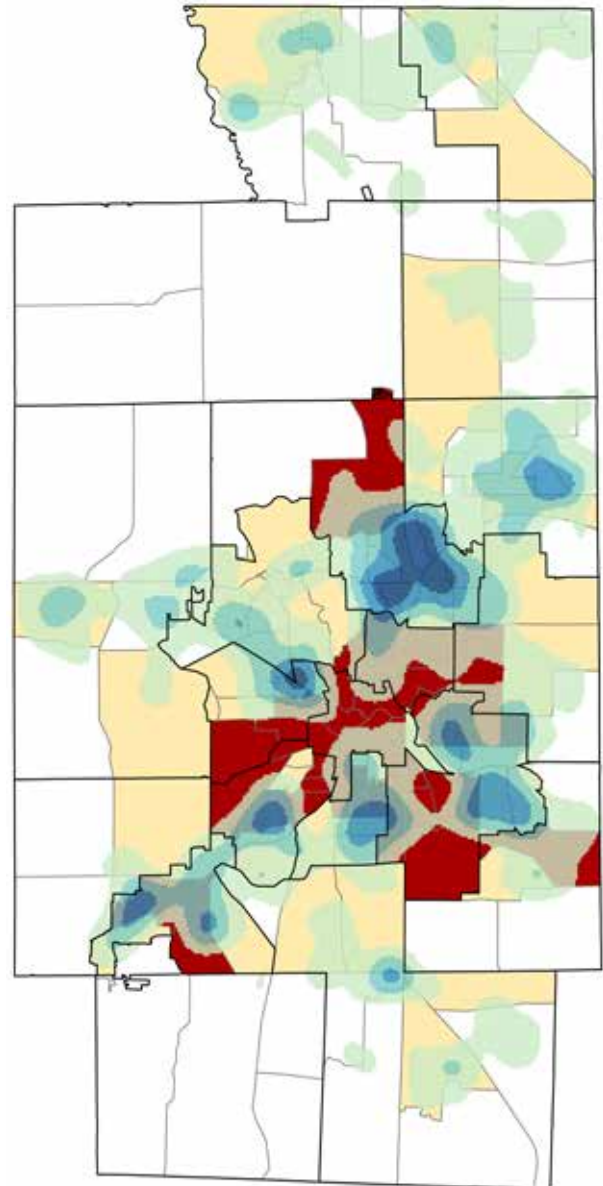 Moderate vulnerability
 High vulnerability

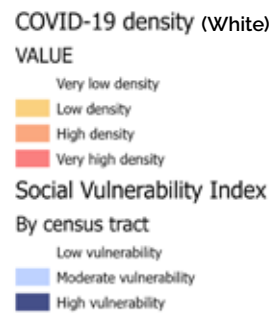Percent of all COVID-19 cases living in high vulnerability census tracts: **20%**

Percent of Black COVID-19 cases living in high vulnerability census tracts: **45%**

Map 11 (right): *Density Map of Asian COVID-19 Cases and Social Vulnerability Index by Census Tract*

Map 12 (left): *Density Map of White COVID-19 Cases and Social Vulnerability Index by Census Tract*

COVID-19 density (Asian)

VALUE

Very low density
Low density
High density
Very high density

Social Vulnerability Index

By census tract

Low vulnerability
Moderate vulnerability
High vulnerability

COVID-19 density (White)

VALUE

Very low density
Low density
High density
Very high density

Social Vulnerability Index

By census tract

Low vulnerability
Moderate vulnerability
High vulnerability

Percent of Asian COVID-19 cases living in high vulnerability census tracts: **27%**

Percent of White COVID-19 cases living in high vulnerability census tracts: **15%**

COVID-19 Vaccinations

According to the Ohio Department of Health, nearly two-thirds of Summit County's 12-and-older population has been fully vaccinated; a total of 349,236 people . So far, more than 95,000 Summit County residents have received both COVID-19 boosters, while 93,000 have received the updated bivalent booster as of January 2023.

Vaccine Demographics:

Gender - More females than males have been fully vaccinated so far (54% vs. 46%).

Race - Among the largest racial categories, Asian individuals have the highest rates of being fully vaccinated (72%), followed by White (59%) and Black individuals (43%).

Ethnicity - Nearly two-thirds of Hispanics (64%) have been fully vaccinated.

Age - Perhaps not surprisingly, those 65 and older have the highest rates of being fully vaccinated. Owing to their vulnerability to COVID-19, the elderly population was and remains the highest-priority age group for vaccinations and boosters.

More than 85% of those 65 and older have been fully vaccinated. Just over half of adults age 18-64 (63%) have been fully vaccinated, as have 34% of those under age 20. A total of 53% of those fully vaccinated have received a booster shot.

Vaccine trends - Figure 20 presents the 7-day average number of vaccinations in Summit County. Daily vaccinations grew slowly at first then built momentum over the first two months of 2021. After a brief lull, vaccinations began to rise sharply in late March (about 1,100 per day) to a peak of about 4,100 per day on April 13th. However, vaccinations began to drop off quickly afterward, falling to a low of 680 per day in early June.

While it is difficult to reliably associate the sudden decline in vaccinations with one or more particular causes, it is worth noting that the U.S. Food and Drug Administration and the CDC recommended a pause in the administration of the Johnson and Johnson (J & J) one-dose vaccine on April 13th. This pause, caused by the emergence of 6 cases of blood clotting in patients taking the J & J vaccine, lasted 11 days. Even though the vaccine was again cleared for distribution, vaccination rates never recovered.
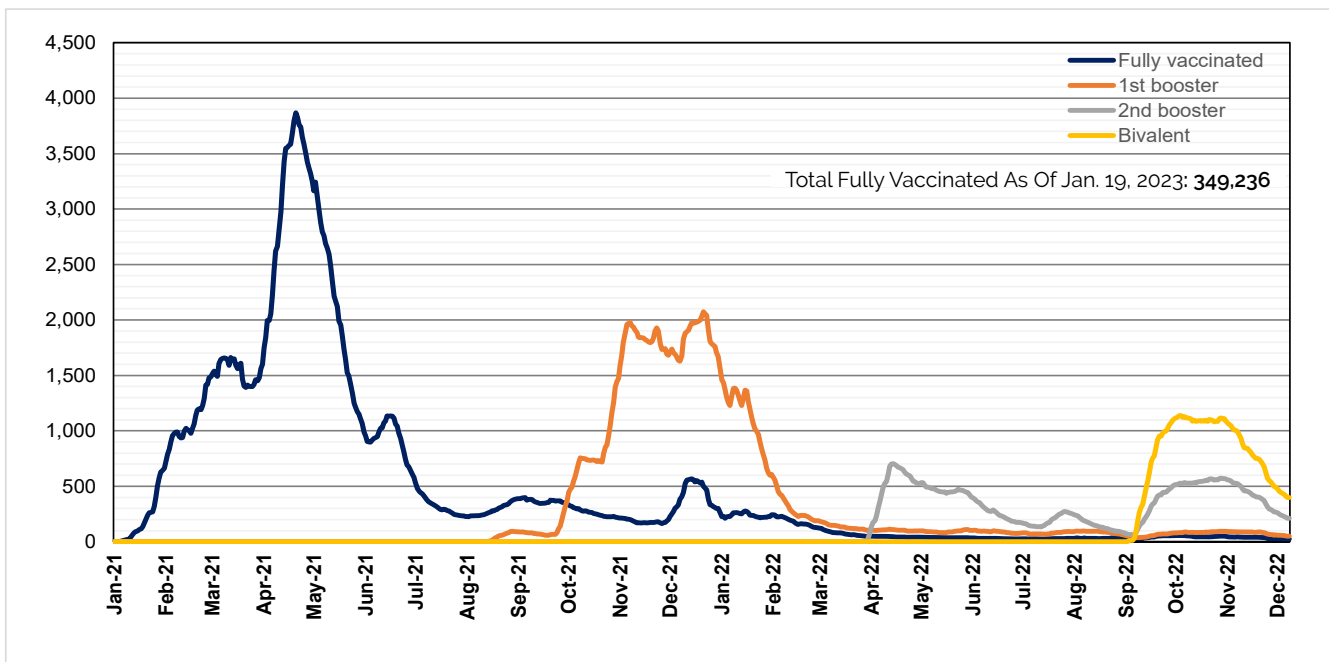

Figure 20: *Number of Summit County Residents Fully Vaccinated Against COVID-19, As Of December 2022 (7-Day Moving Average)*

Map 13a shows the estimated percentage of each census tract that is fully vaccinated and boosted.

Map 13b shows the overall density of COVID-19 cases since the beginning of the pandemic in 2020. These maps show that many of the areas with the lowest vaccination rates are also located in more socially vulnerable areas. In addition, many of these areas are hot spots for COVID-19 cases.
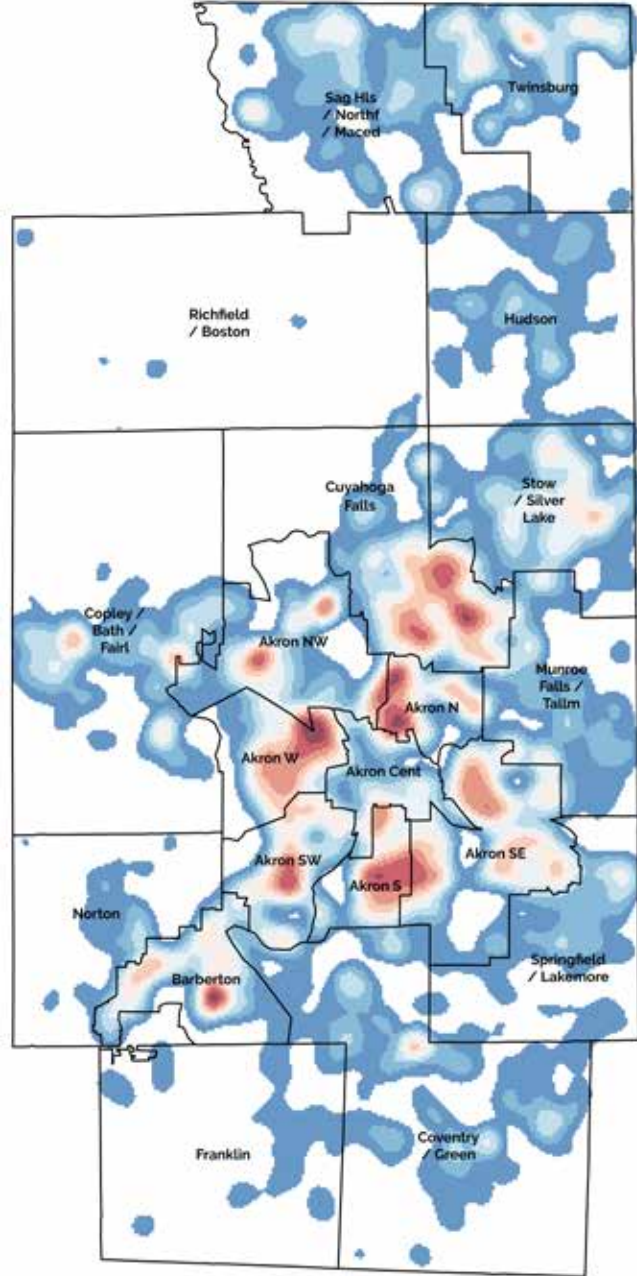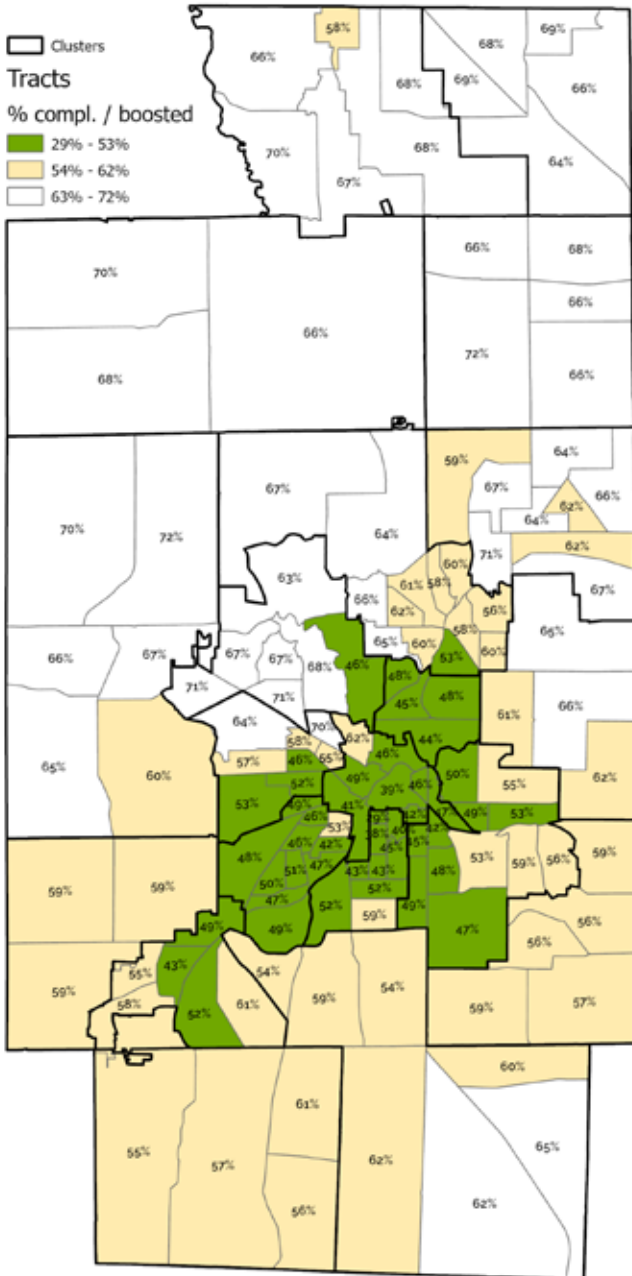
Maps 13a and 13b: *Overall COVID-19 Vaccination Rates by Census Tract (12a) and COVID-19 Case Density (12b). For Map 12b, areas in red have higher case densities, while blue areas have lower case densities.*

COVID-19 Variants

...Viruses have a mutation rate that's much, much higher than humans or other animals, and they replicate at a rate that's really, really fast. So in other words, one virus-infected cell makes 100,000 copies of itself, and all those copies can go out and start replicating. So mutations occur randomly, but because the virus replicates at such a fast rate, you also accumulate mutations really fast.

-- Virologist Andrew Pekosz [3]

In early May 2021, the Alpha or "B.1.1.7" COVID-19 variant accounted for nearly 70% of all COVID-19 cases in the U.S. Meanwhile, the Delta or "B.1.617.2" variant only accounted for 1.5% of all COVID-19 cases.

After it's first appearence in early May (seen in the upper chart), Delta took about 12 weeks to drive out other variants. By early August 2021, Delta's four related viruses became the dominant strains of COVID-19, accounting for more than 95% of all COVID-19 infections by August 2021.

However, Delta did not remain dominant for long. Arriving near the end of 2021, the Omicron variants drove the Delta viruses out in less than 4 weeks; three times faster than Delta swept away previous variants. As of early 2022, the Omicron variant accounted for over 95% of all COVID-19 infections. As 2022 draws to a close, the four original Omicron variants identified in summer 2021 have now turned into 17 identifiable variants. The top four of those variants account for over 86% of all Omicron cases in CDC Region 5 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin). The Delta virus still survives, but accounts for less than 1% of all cases in Region 5.

[3] Cruickshank, S. (2021, July 19). Decoding delta: How viruses mutate and what can be done about it. The Hub. https://hub.jhu.edu/2021/07/19/andrew-pekosz-delta-variants/.
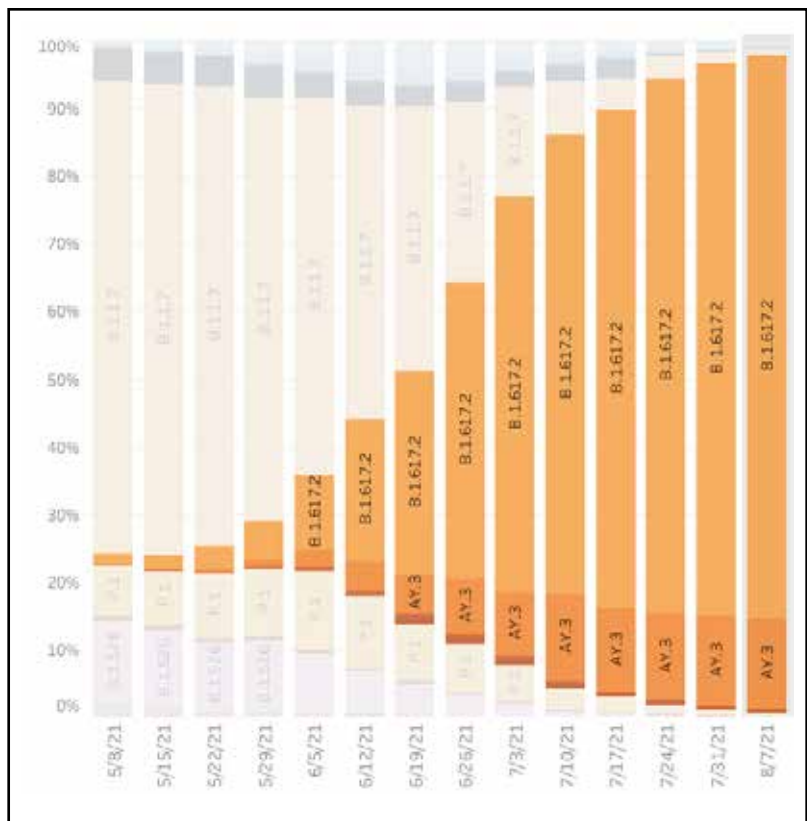
Figures 21 and 22:
*Comparison of the Growth in Delta Variant Cases (**upper chart**) to Growth in Omicron Variant Cases (**lower chart**), U.S. Region 5 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin), Source: CDC and SCPH. CDC Variant Tracker:*

https://covid.cdc.gov/covid-data-tracker/#variant-proportions.