



# Does Vaccination Work

For Macomb County, Michigan

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## Research Question



How did the progression of COVID-19 cases and deaths change in Macomb County, Michigan in 2021, after more and more people got vaccinated?

# Data



- [COVID-19 data from John Hopkins University](#) from the Kaggle.
  - License: Attribution 4.0 International (CC BY 4.0)
  - This dataset allows me to access the number of confirmed cases and deaths by US county, from January 2020 to present, by US County by Day.
- [COVID-19 Vaccinations in the United States,County](#) from CDC.
  - License: Public Domain U.S. Government
  - This dataset allows me to access the total number and percentage of people who are fully vaccinated, and the percentage of county level fully vaccinated population from January 2021 to present, by US County by Day.
  - Note: No COVID-19 vaccines available to the public in 2020, so the assumption is the vaccination rate is zero for all counties in 2020.
- [United States COVID-19 County Level of Community Transmission Historical Changes](#) from CDC.
  - License: unknown
  - This dataset allows me to access the following weekly data points, from January 2020 to present, by US County:
    - Total number of new cases per 100,000 persons within the last 7 days
    - Percentage of positive diagnostic and screening nucleic acid amplification tests (NAAT) during the last 7 days
    - Community Transmission Level Indicator [low, moderate, substantial, high, blank]

Tool used: Kaggle API & CDC API (data cleaning), Tableau Public (visualizations)

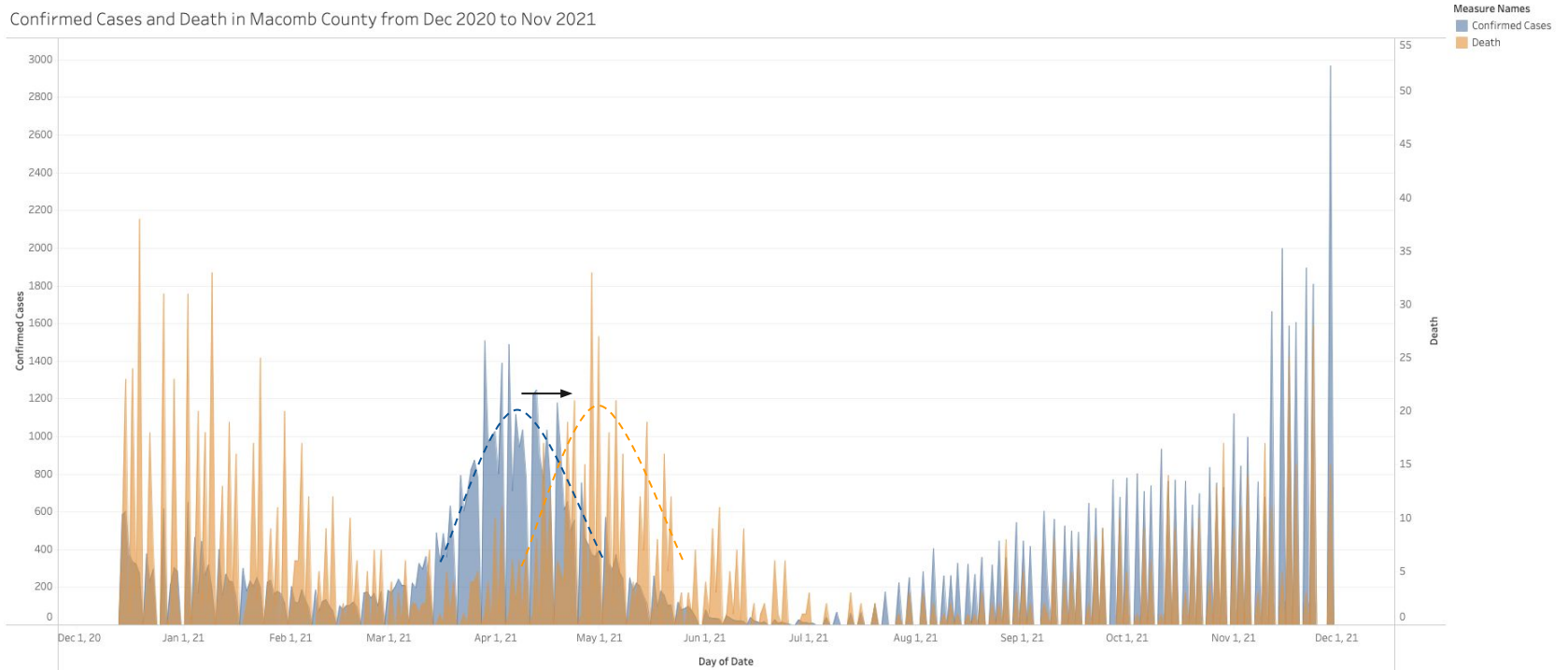
# Major Data Points



- **Date** (12/15/2020 - 11/30/2021)
- **Confirmed Cases** in Macomb County, MI
- **Death** counts in Macomb County, MI
- **Percent of people who are fully vaccinated** (have second dose of a two-dose vaccine or one dose of a single-dose vaccine) based on the jurisdiction and county where recipient lives
- **Community Transmission Level Indicator**
  - **Low** Transmission Threshold: Counties with fewer than 10 total cases per 100,000 population in the past 7 days, and a NAAT percent test positivity in the past 7 days below 5%;
  - **Moderate** Transmission Threshold: Counties with 10-49 total cases per 100,000 population in the past 7 days or a NAAT test percent positivity in the past 7 days of 5.0-7.99%;
  - **Substantial** Transmission Threshold: Counties with 50-99 total cases per 100,000 population in the past 7 days or a NAAT test percent positivity in the past 7 days of 8.0-9.99%;
  - **High** Transmission Threshold: Counties with 100 or more total cases per 100,000 population in the past 7 days or a NAAT test percent positivity in the past 7 days of 10.0% or greater.
  - **NA**: total new cases in the past 7 days are not reported (county data known to be unavailable) and the percentage of positive NAATs tests during the past 7 days (blank) are not reported.

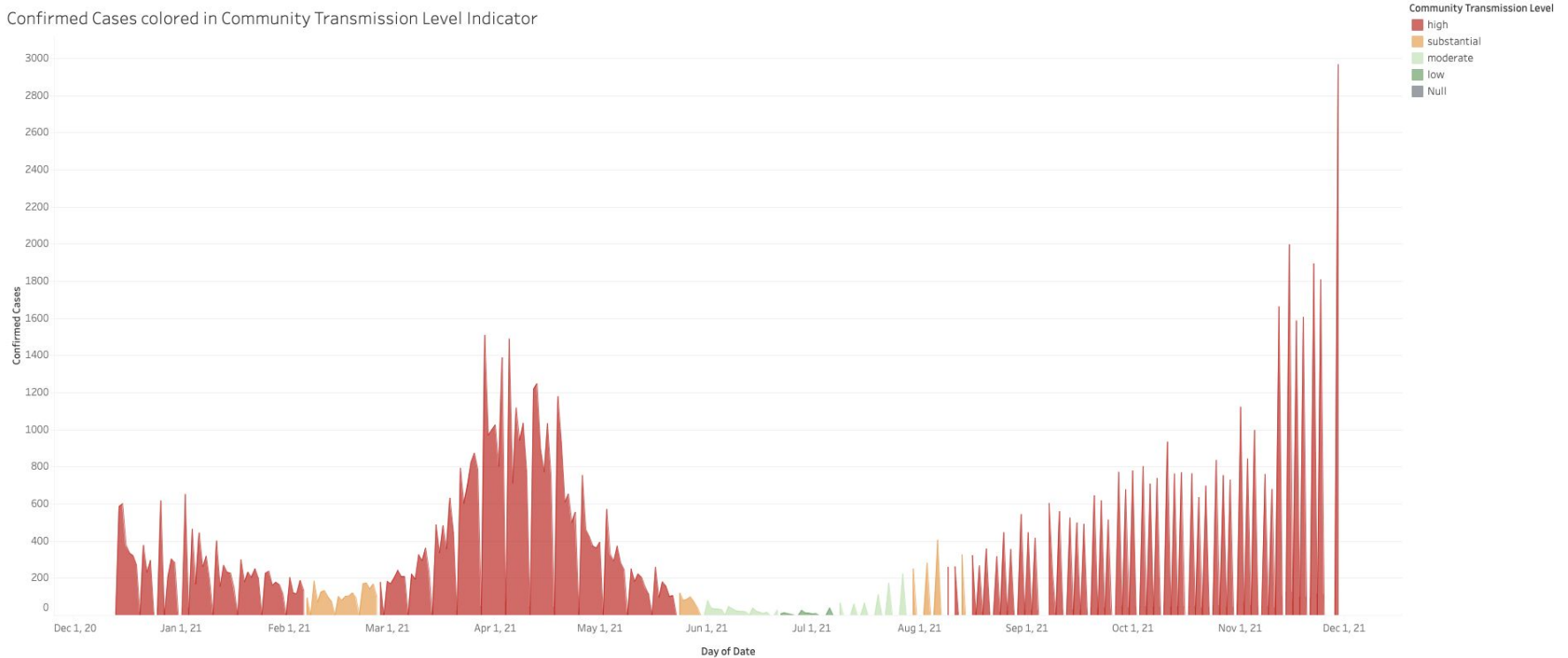
# Confirmed Cases & Death: Same trend, slightly shifted...

Confirmed Cases and Death in Macomb County from Dec 2020 to Nov 2021



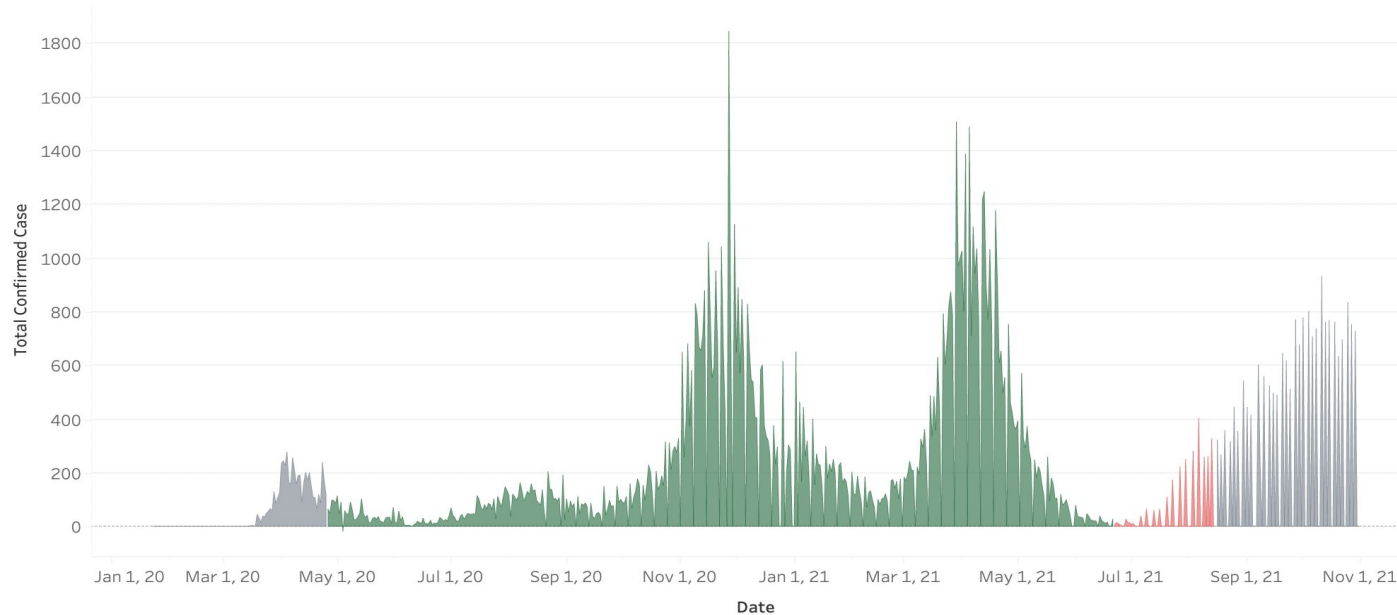
# Community Transmission Level Indicator

Confirmed Cases colored in Community Transmission Level Indicator



# Previously: Masking Policies & the Progression of Confirmed COVID-19 Cases

Confirmed COVID Cases in Macomb County, MI

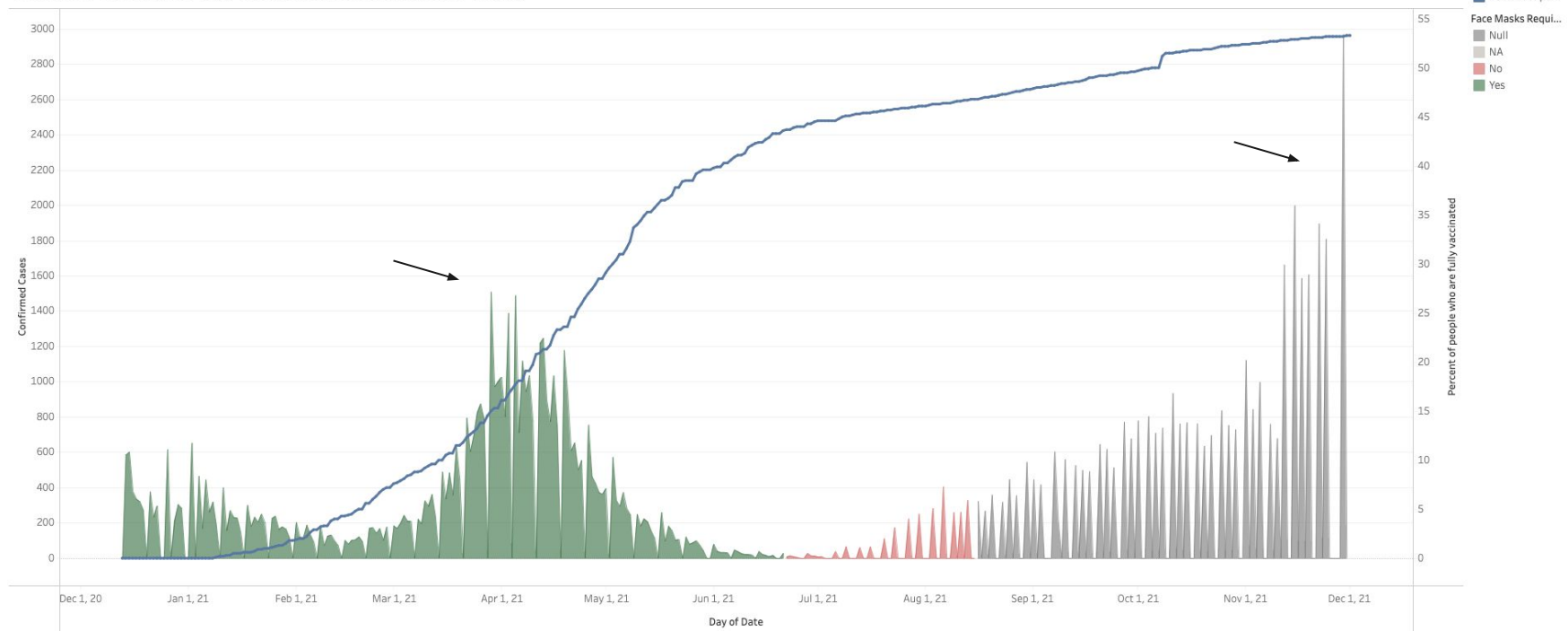


Face Masks Required in Public

NA No Yes

# Adding “Percent of people who are fully vaccinated” on top...

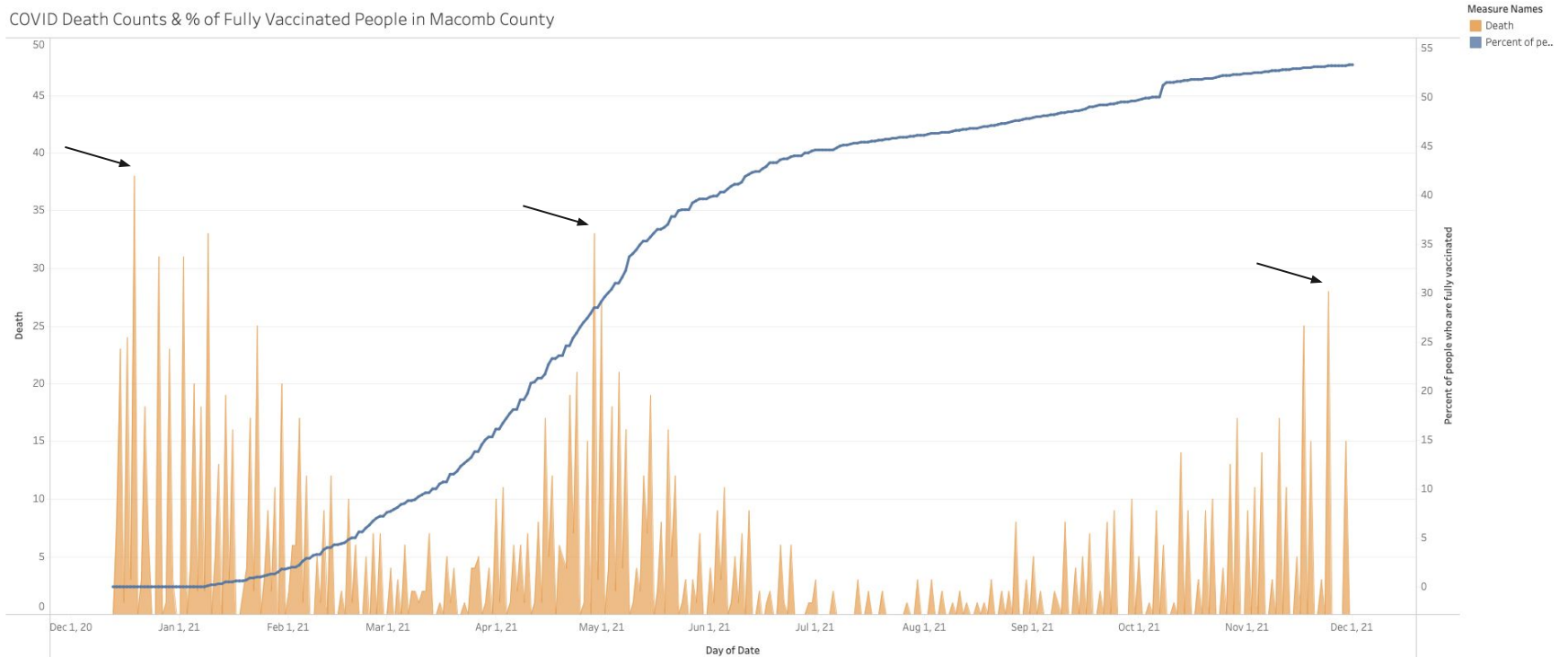
Confirmed Cases & % of fully vaccinated people in Macomb County





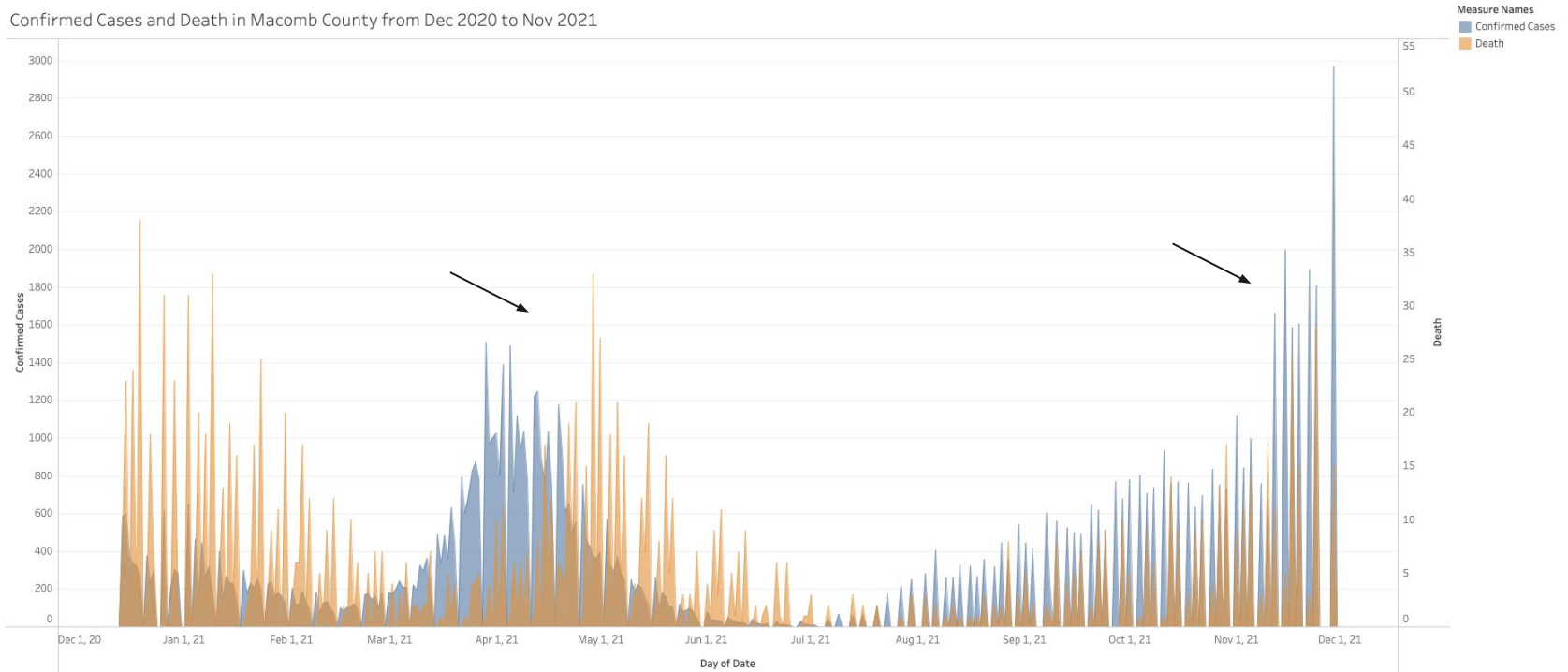
# Vaccination: Peaks of Death count did not go as high as before...

COVID Death Counts & % of Fully Vaccinated People in Macomb County



# Compare 2nd peak with 3rd peak: More confirmed cases, less death counts

Confirmed Cases and Death in Macomb County from Dec 2020 to Nov 2021





# Does Vaccination Work

- Prevent transmission?
  - Did not observe any obvious patterns from these sets of data to conclude vaccination prevent transmission.
- Prevent death?
  - Observation: death count was lower after the ~half of people are fully vaccinated.

Does Vaccination Work? No correlation between the progression of COVID-19 cases and deaths in Macomb County, Michigan in 2021, and the vaccination rate.



Thank you.