

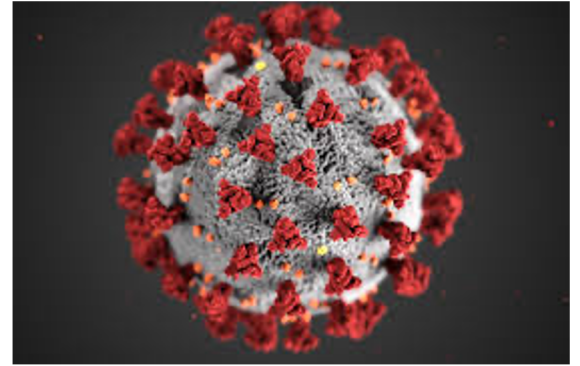
Statewide Mask Mandates vs COVID-19 Hospitalizations

The background is a solid teal color. It features several decorative elements: a large, semi-transparent pie chart in the upper right quadrant; several smaller, semi-transparent pie charts scattered in the upper right and middle right areas; and a semi-transparent bar chart in the bottom right corner with four vertical bars of increasing height.

A case study of six U.S. states

Background

COVID-19 overthrew the entire world order in 2020. Originating in Wuhan, China, the virus quickly spread across the globe infecting nearly 15 million people and killing over 600 thousand as of July 20th. The United States of America has been one of the hardest hit countries in the world, as cases continue to surge throughout its southern region. As states look for ways to slow the spread of the virus, many have introduced mask mandates in public places. While scientific evidence suggests masks play a vital role in slowing the spread of the virus, some Americans and politicians have doubted the effectiveness of these new mask laws.





Methods

- We will be analyzing the mask mandates issued in six U.S. states:
 - California (June 18th)
 - Connecticut (April 20th)
 - Illinois (May 1st)
 - Massachusetts (May 6th)
 - New Mexico (May 16th)
 - New York (April 15th)
- We will look for a correlation between the mask mandate and current hospitalizations
- Next, we will replace the total number of current hospitalizations with the change in hospitalizations from the previous day
- The data used will be from the 2 weeks before and 2 weeks after the mandate was issued
- Hospitalization data is from The Atlantic



California

Current Hospitalizations vs Mask Mandate

Logistic Regression:

P-value: 0.05327749

Odds ratio: 1.015663

T-test:

P-value: 0.0003307

Means: 4494.143 | 5418.857

Daily Change in Current Hospitalizations vs Mask Mandate

Logistic Regression:

P-value: 0.01457337

Odds ratio: 1.013698

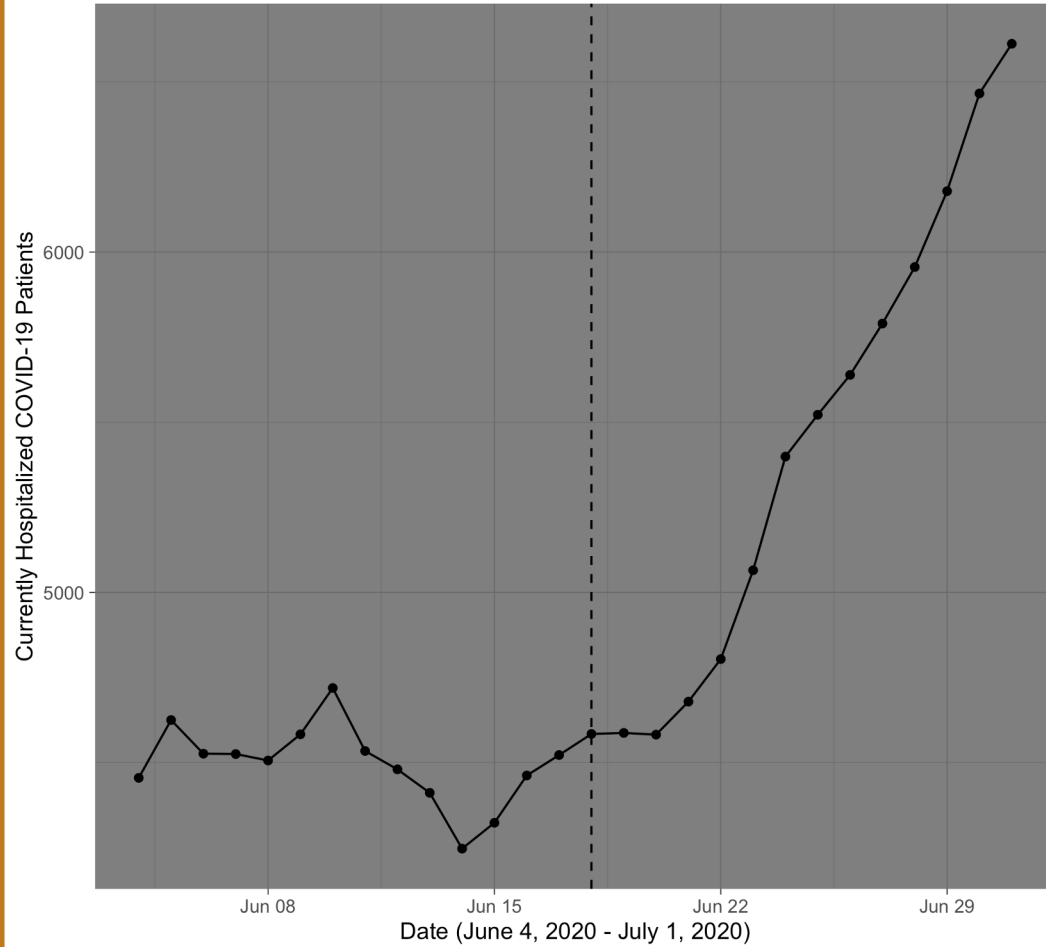
T-test:

P-value: 0.002072

Means: 5.153846 | 149.285714

Covid-19 Hospitalizations in California

Before and after mask mandate



Data provided by The Atlantic



Connecticut

Current Hospitalizations vs Mask Mandate

Logistic Regression:

P-value: 0.1935416

Odds ratio: 1.002556

T-test:

P-value: 0.197

Means: 1665.214 | 1771.857

Daily Change in Current Hospitalizations vs Mask Mandate

Logistic Regression:

P-value: 0.01550641

Odds ratio: 0.9390018

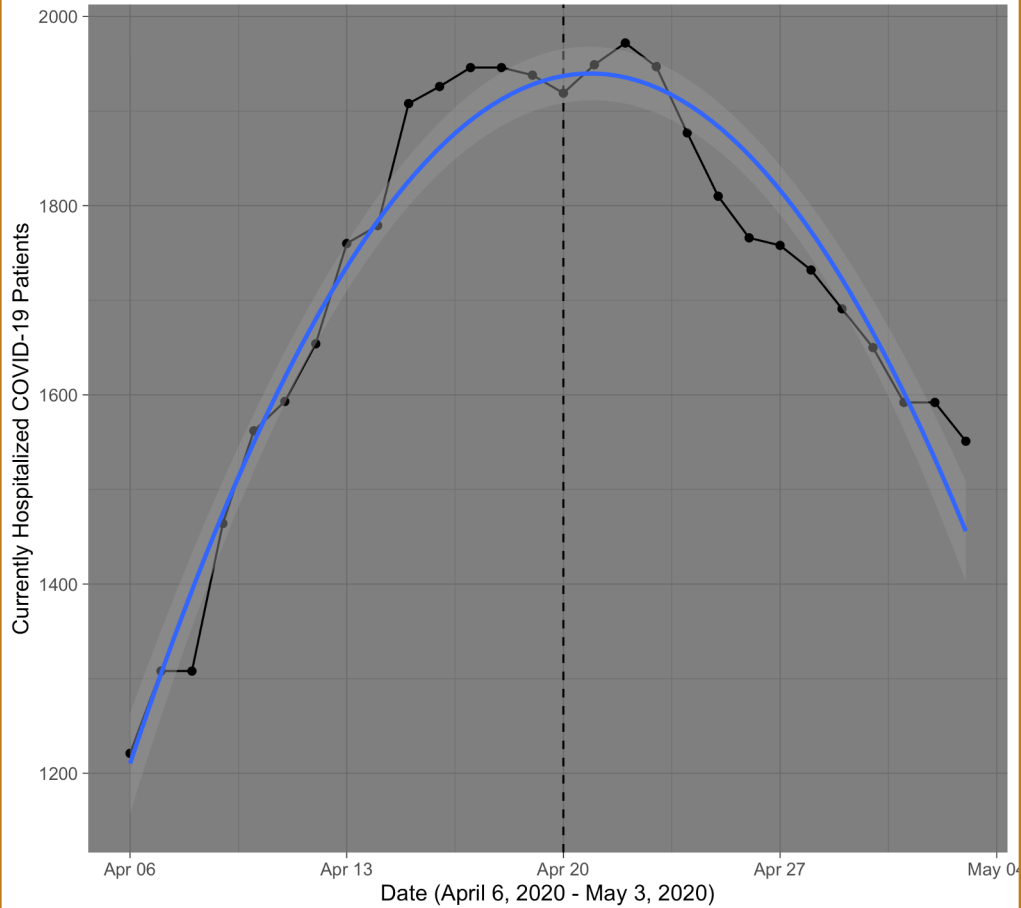
T-test:

P-value: 0.0001274

Means: 55.15385 | -27.64286

Covid-19 Hospitalizations in Connecticut

Before and after mask mandate



Data provided by The Atlantic



Illinois

Current Hospitalizations vs Mask Mandate

Logistic Regression:

P-value: 0.6331815

Odds ratio: 0.9990738

T-test:

P-value: 0.6471

Means: 4681.857 | 4646.286

Daily Change in Current Hospitalizations vs Mask Mandate

Logistic Regression:

P-value: 0.2853898

Odds ratio: 0.997441

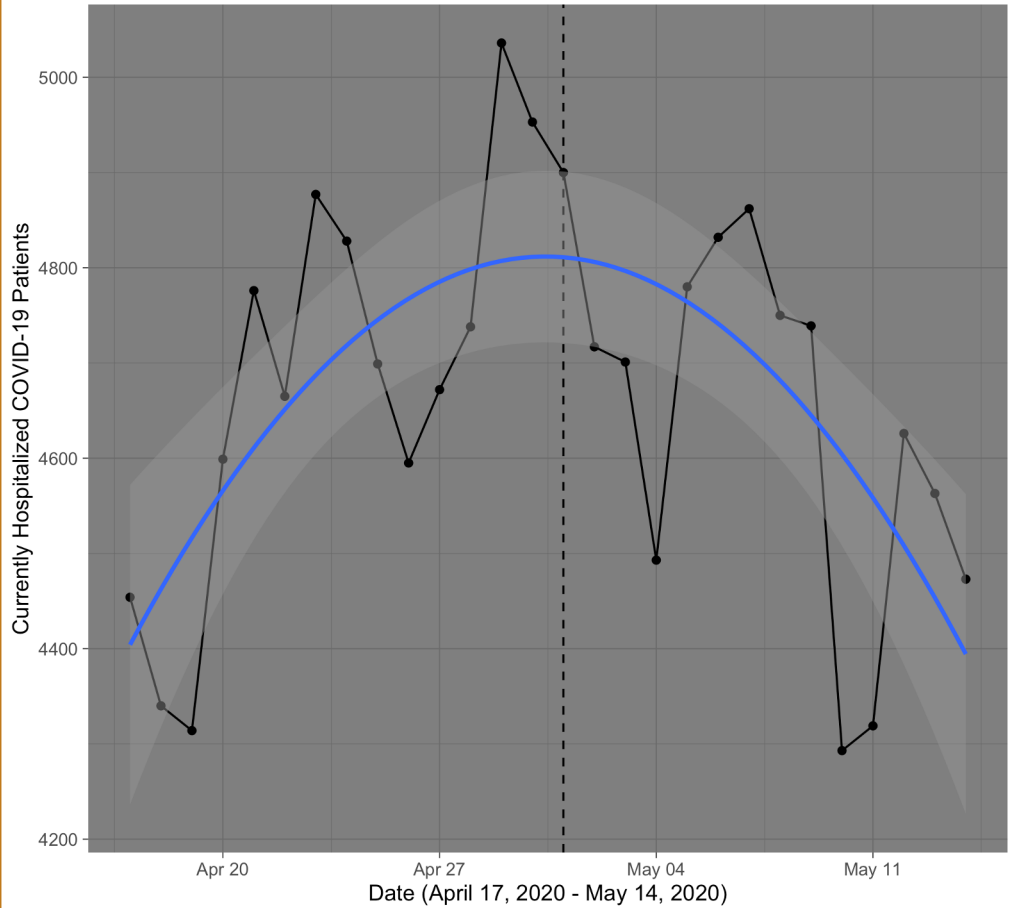
T-test:

P-value: 0.2889

Means: 38.38462 | -34.28571

Covid-19 Hospitalizations in Illinois

Before and after mask mandate



Data provided by The Atlantic



Massachusetts

Current Hospitalizations vs Mask Mandate

Logistic Regression:

P-value: 0.2128882

Odds ratio: 0.9704222

T-test:

P-value: 5.555e-07

Means: 3770.500 | 2996.857

Daily Change in Current Hospitalizations vs Mask Mandate

Logistic Regression:

P-value: 0.04804592

Odds ratio: 0.9827434

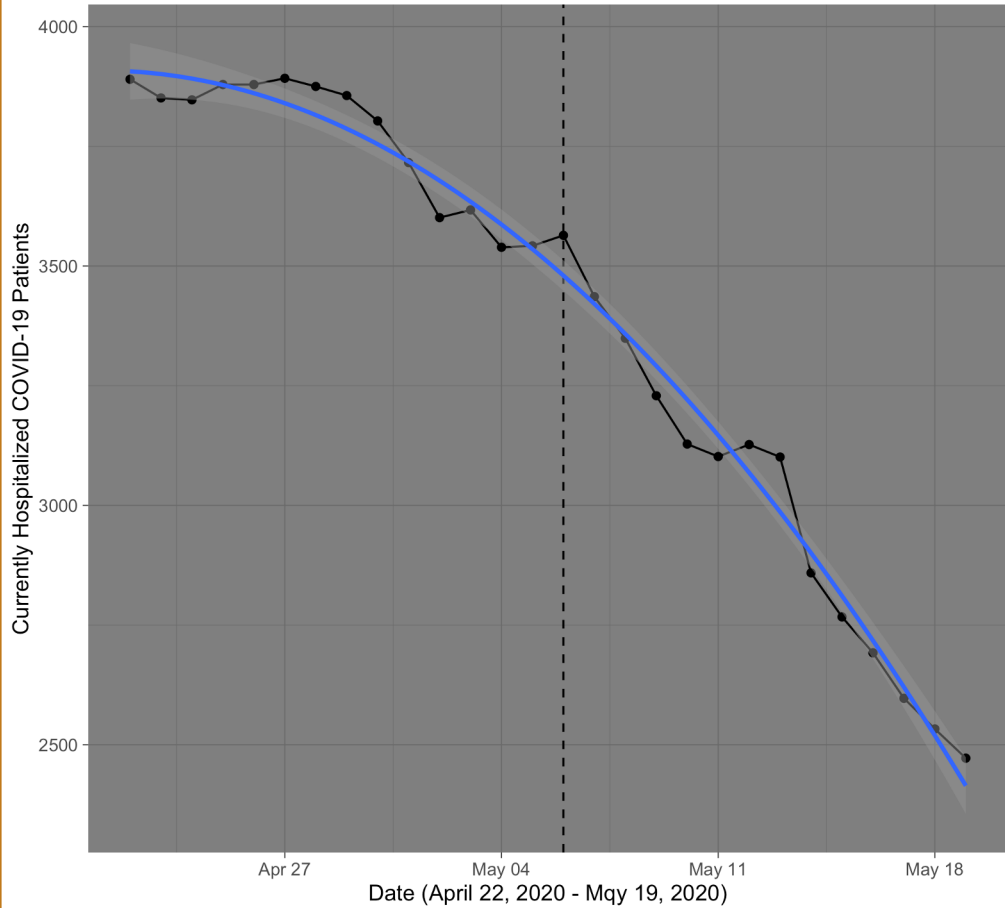
T-test:

P-value: 0.03268

Means: -26.76923 | -76.42857

Covid-19 Hospitalizations in Massachusetts

Before and after mask mandate



Data provided by The Atlantic



New Mexico

Current Hospitalizations vs Mask Mandate

Logistic Regression:

P-value: 0.01072564

Odds ratio: 1.330029

T-test:

P-value: 0.000466

Means: 189.1429 | 209.2857

Daily Change in Current Hospitalizations vs Mask Mandate

Logistic Regression:

P-value: 0.1373284

Odds ratio: 0.9215829

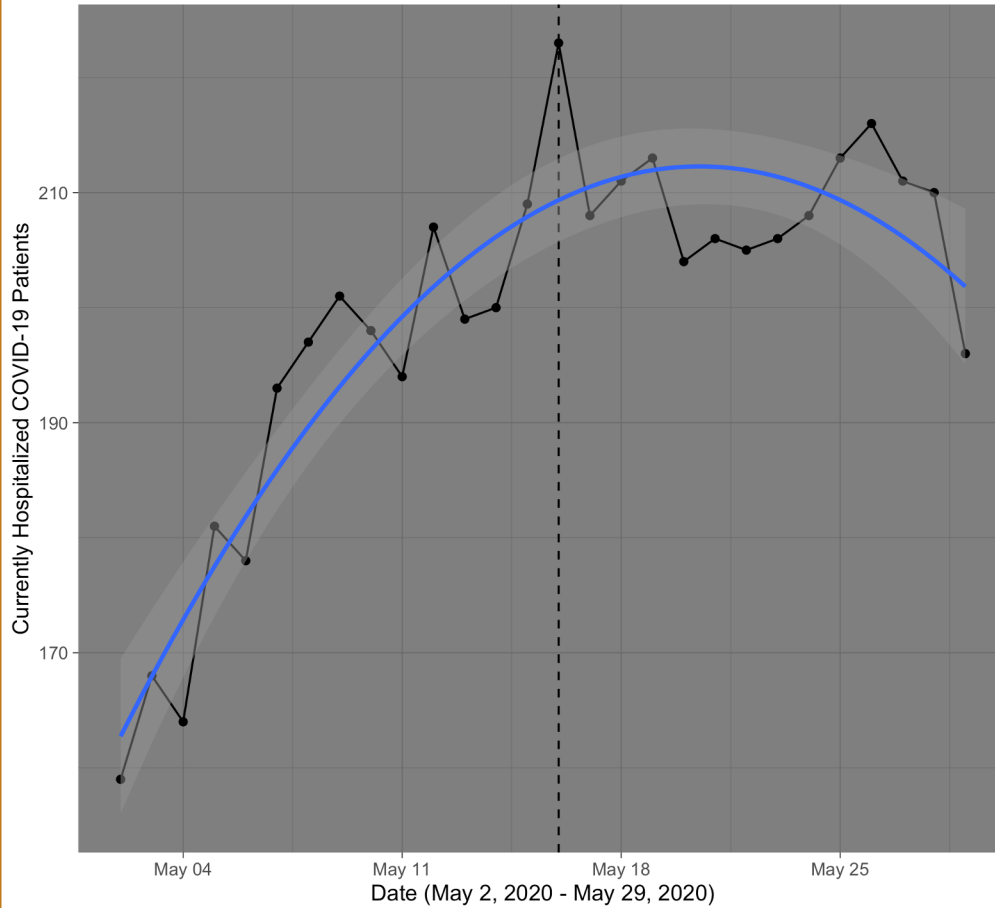
T-test:

P-value: 0.1312

Means: 3.8461538 | -0.9285714

Covid-19 Hospitalizations in New Mexico

Before and after mask mandate



Data provided by The Atlantic



New York

Current Hospitalizations vs Mask Mandate

Logistic Regression:

P-value: 0.06619568

Odds ratio: 0.999619

T-test:

P-value: 0.05673

Means: 16924.50 | 15393.57

Daily Change in Current Hospitalizations vs Mask Mandate

Logistic Regression:

P-value: 0.06066744

Odds ratio: 0.986418

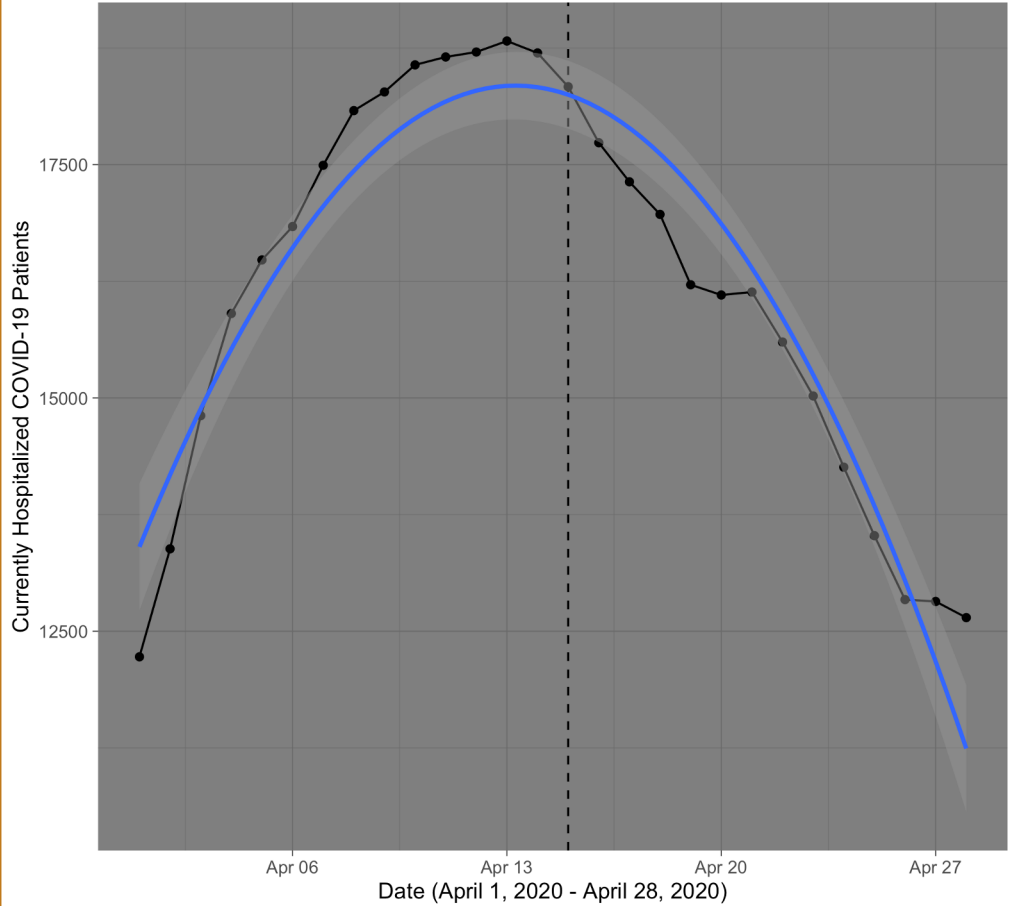
T-test:

P-value: 7.089e-06

Means: 497.7692 | -432.2143

Covid-19 Hospitalizations in New York

Before and after mask mandate



Data provided by The Atlantic



All 6 States

Current Hospitalizations vs Mask Mandate

Logistic Regression:

P-value: 0.7913827

Odds ratio: 0.9999922

T-test:

P-value: 0.7928

Means: 5287.560 | 5072.786

Daily Change in Current Hospitalizations vs Mask Mandate

Logistic Regression:

P-value: 0.000603897

Odds ratio: 0.9961534

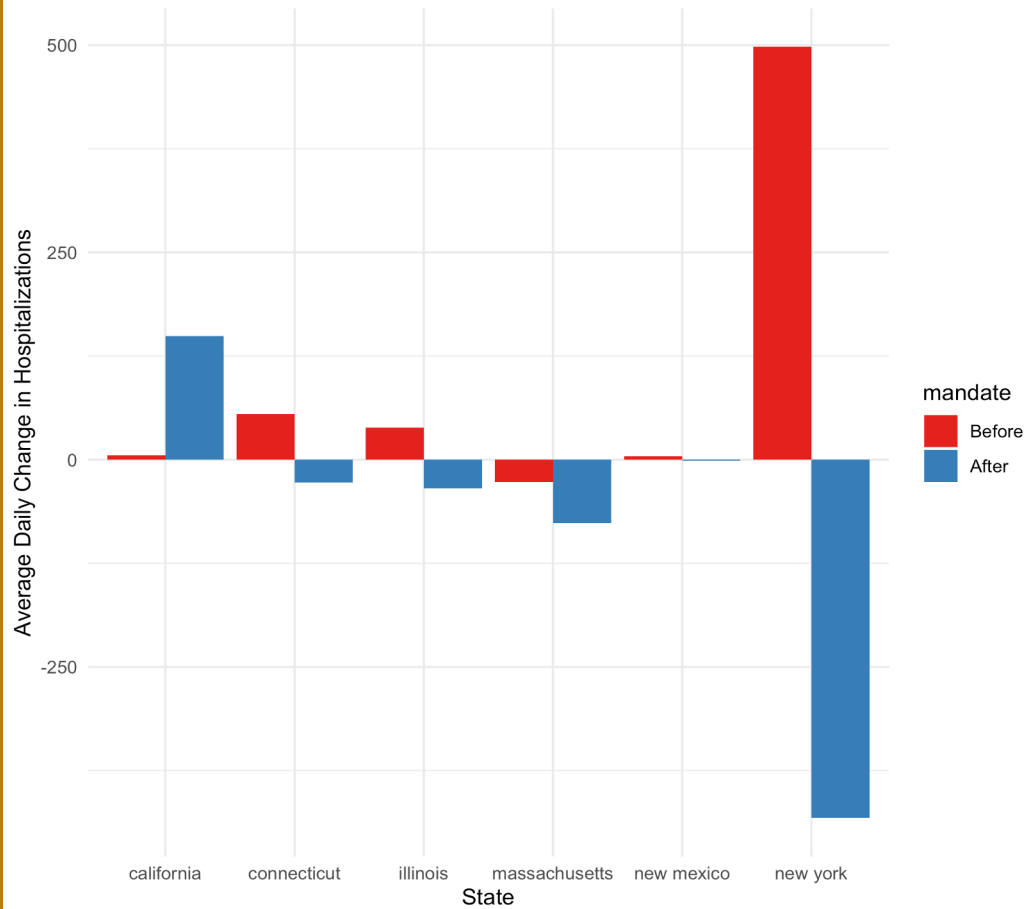
T-test:

P-value: 5.255e-05

Means: 95.58974 | -70.36905

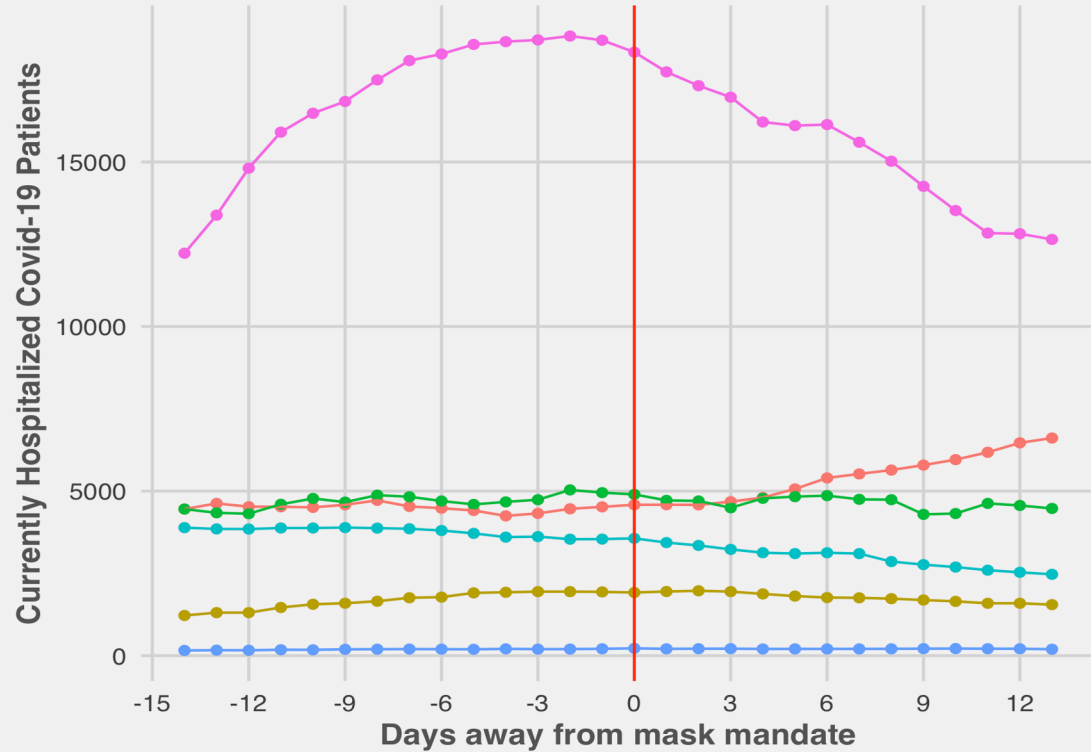
Daily Change in Covid-19 Hospitalizations

2 weeks before and 2 weeks after mask mandate



Data provided by The Atlantic

Covid-19 Hospitalizations

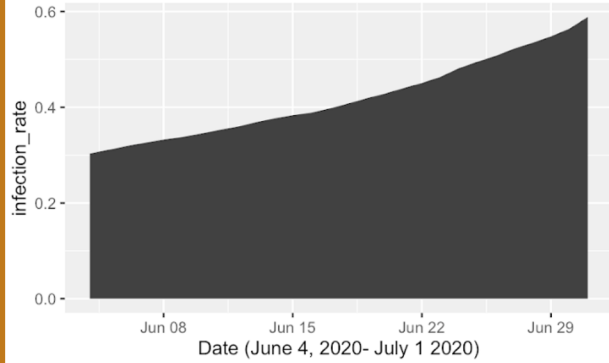


state

- california
- illinois
- new mexico
- connecticut
- massachusetts
- new york

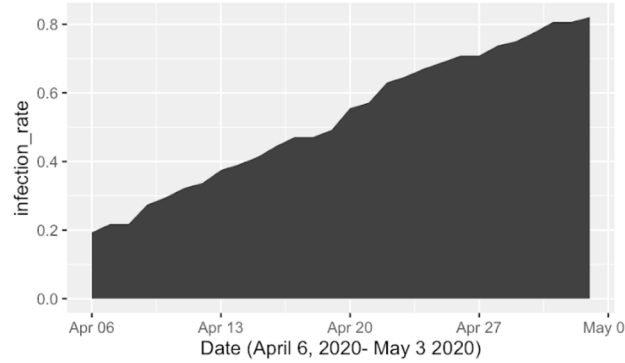
Data provided by the Atlantic

Positive case within the population of California



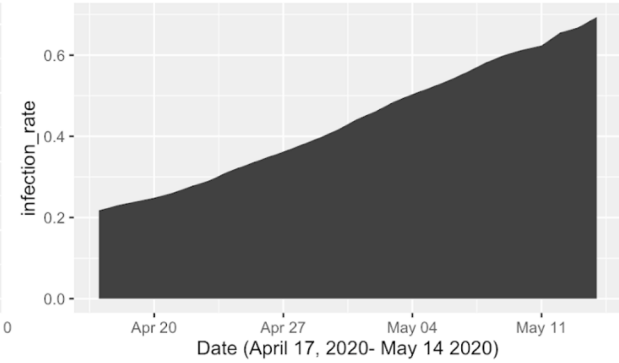
Data provided by the Atlantic

Positive case within the population of Connecticut



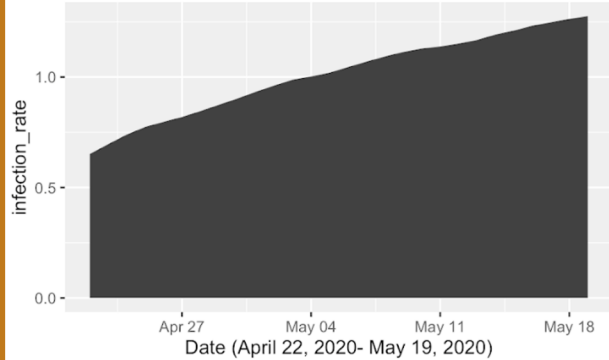
Data provided by the Atlantic

Positive case within the population of Illinois



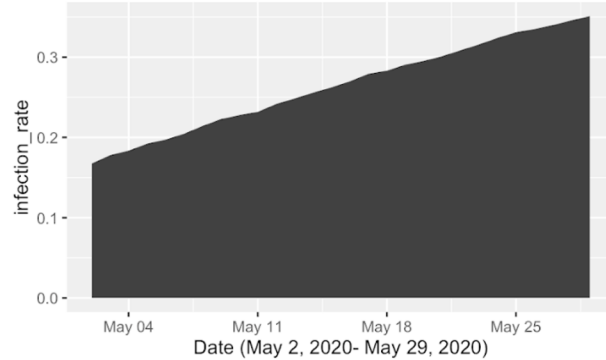
Data provided by the Atlantic

Positive case within the population of Massachusetts



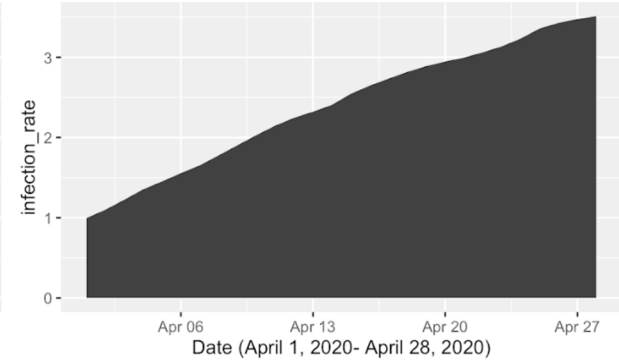
Data provided by the Atlantic

Positive case within the population of New Mexico



Data provided by the Atlantic

Positive case within the population of New York



Data provided by the Atlantic



Conclusions

- As an overall trend, hospitalizations were lower after the mask mandates.
- When looking at total current hospitalizations, there is no statistically significant correlation.
- In California and New Mexico the correlation is statistically significant, but it actually shows the mandate correlating with increased hospitalizations.
- In New York there is a somewhat significant correlation between the mask mandate and decreased hospitalizations.
- This statistic seems to be a poor measurement of the effects of the mask mandate since a high number of hospitalizations before it is put in place can lead to a correlation showing increased hospitalizations after the mandate even if they decrease slightly from the peak (see New Mexico graph as an example).



Conclusions (continued)

- The change in current hospitalizations from the previous day seems to be a more accurate indicator of the effects of the mask mandate.
- There is a statistically significant inverse correlation overall between the mask mandate and the change in hospitalizations from day to day.
- In terms of individual states, this correlation is statistically significant in Connecticut, Massachusetts, and New York.
- When using change in hospitalizations the mask mandate in New Mexico no longer correlates with increased hospitalizations, and instead has an insignificant correlation with a decreasing change in hospitalizations
- California seems to be an outlier amongst these states, as they still have a significant correlation between the mandate and an increasing change in hospitalizations
- No conclusions can be drawn about the effectiveness of the mandate in Illinois.



Summary

- There is limited evidence to suggest mask mandates were successful within 2 weeks in New York, Massachusetts, and Connecticut.
- The change in hospitalizations after the mask mandate in California was the opposite of what was intended.
- We do not have enough evidence to support a link between a mask mandate and COVID-19 hospitalizations in Illinois and New Mexico.
- While the overall association between a statewide mask mandate and a more negative change in hospitalized patients is encouraging, more research will need to be done to determine if this link is coincidental or a direct result of the regulations put in place.



Sources

<https://www.axios.com/states-face-coverings-mandatory-a0e2fe35-5b7b-458e-9d28-3f6cdb1032fb.html>

<https://www.cnet.com/health/where-are-face-masks-required/>

<https://covidtracking.com/data>

<https://covid19.healthdata.org/united-states-of-america>