Pandemic Preparedness

with paw patrol

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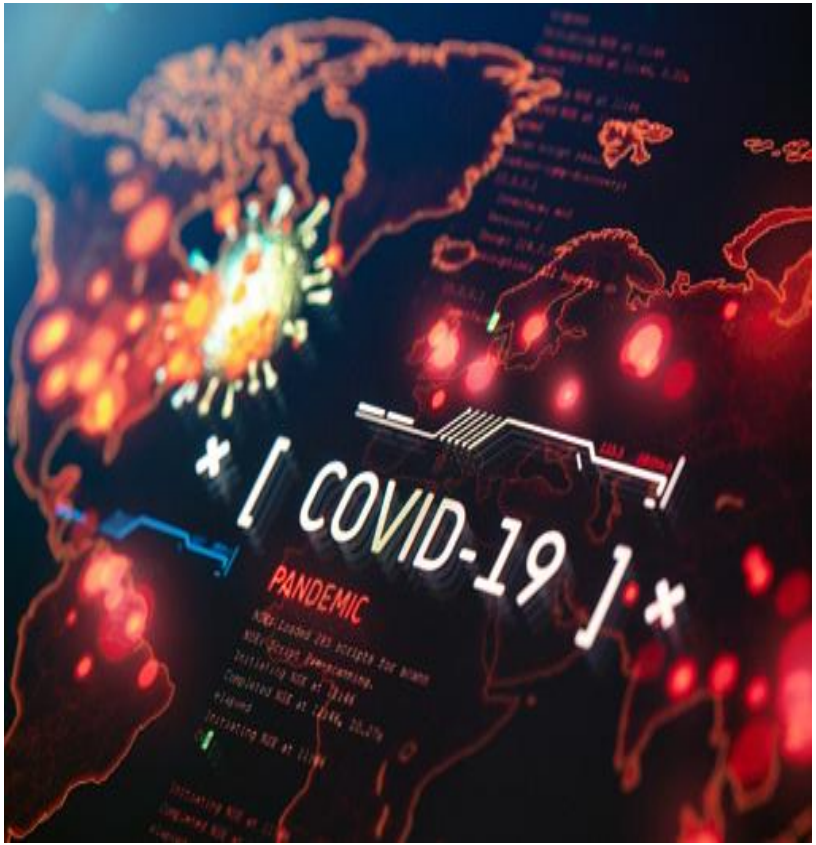
WHAT IS A PANDEMIC?

The most relevant pandemic in recent years is the COVID-19 pandemic that has spread across a large region affecting a substantial number of individuals and continues to evolve into multiple, more aggressive strains of the initial virus. This virus evolution is arguably due to a lack of preparedness and lack of outbreak infrastructure; in our exploratory data analysis project we will investigate the relationship between elements of preparedness: declaration of emergency, vaccination rate, social restrictions, and vaccination accessibility and COVID-19 deaths and hospitalizations.

WHAT IS PREPAREDNESS?

Essentially, we want to answer the question: what factors indicate an adequate level of preparedness to handle a pandemic?

We found it plausible to define that areas with lower covid cases and deaths were/are more adequately prepared to face a pandemic.

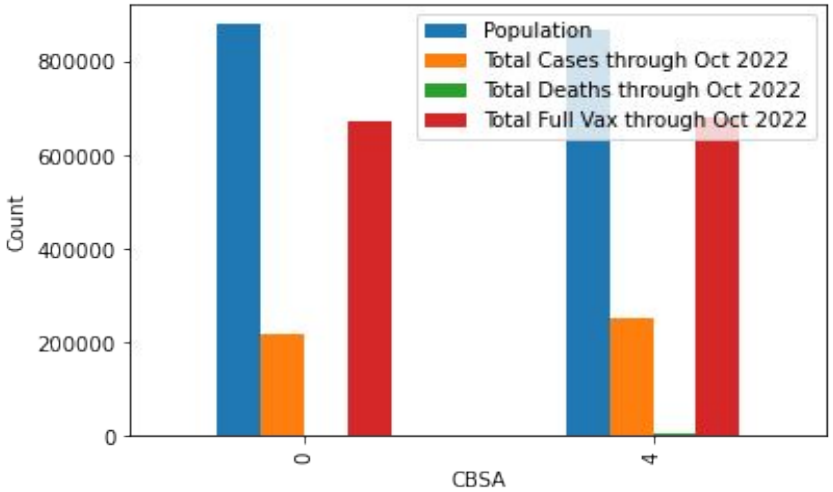


Is there a relationship between a population's level of education and COVID cases?

Null Hypothesis: There is no relationship between a population’s education and covid cases.

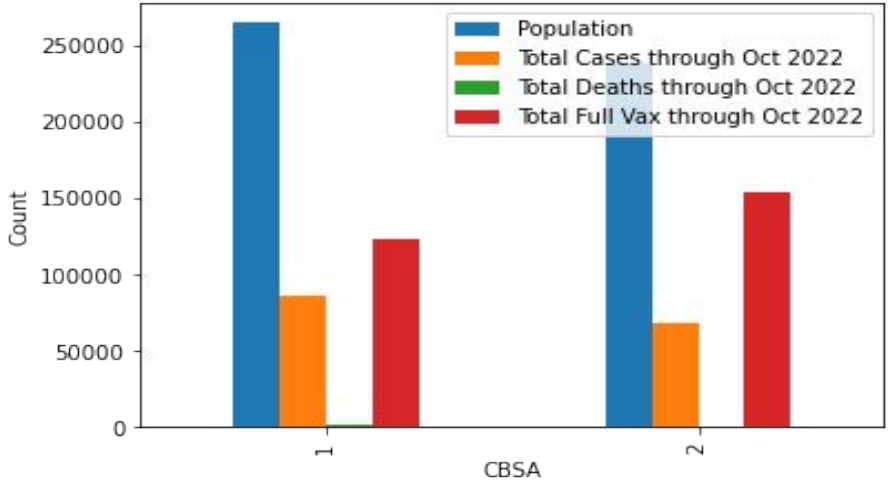
Alternative Hypothesis: There is a relationship between a population’s education and covid cases. More specifically, areas that have a larger percentage of “educated” adults had less COVID cases.

The relationship between a population's level of education and COVID cases.



CBSA 0 has a median age of 40.6 years old; 30.35% of adults ≥ 25 have college degrees.

CBSA 4 has a median age of 30.1 years old; 23.90% of adults ≥ 25 have college degrees.



CBSA 1 has a median age of 36 years old; 28.03% of adults ≥ 25 have college degrees.

CBSA 2 has a median age of 40.7 years old; 27.45% of adults ≥ 25 have college degrees.

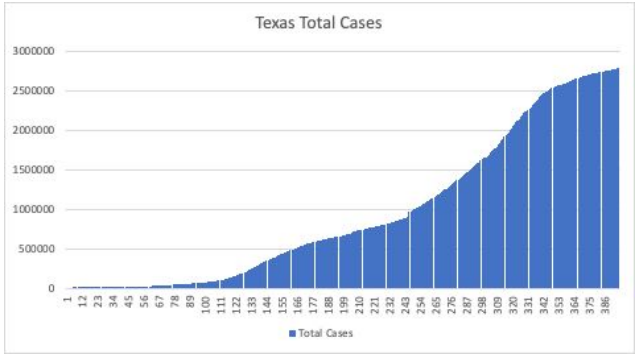
After running a one way AnoVa between % of adults with college degrees and the Total COVID Cases, the p-value ≈ 0.1724 fails to reject the null hypothesis that there is no relationship between education level and COVID cases.

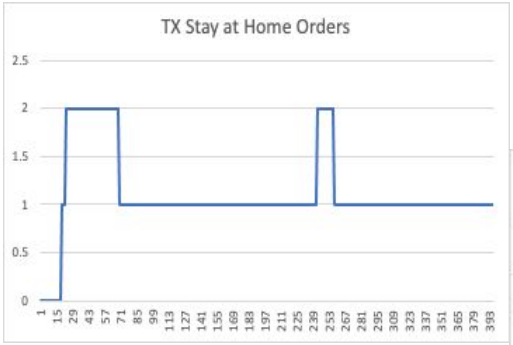
After running a one way AnoVa between % of adults with college degrees and the Total COVID Deaths, the p-value ≈ 0.1772 fails to reject the null hypothesis that there is no relationship between education level and COVID deaths.

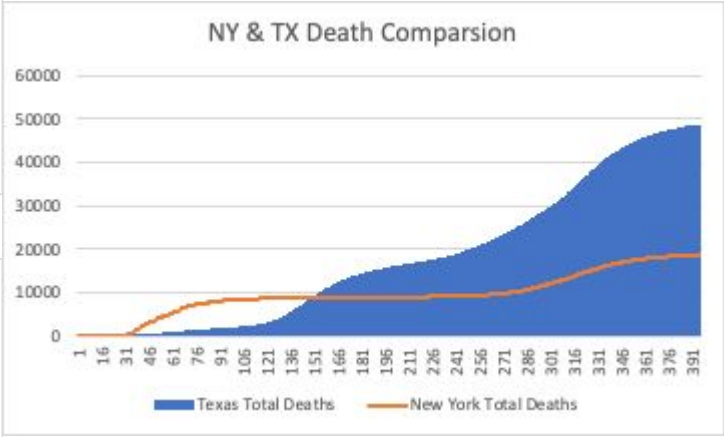
How does state government policy response affect the volume of COVID-19 cases?

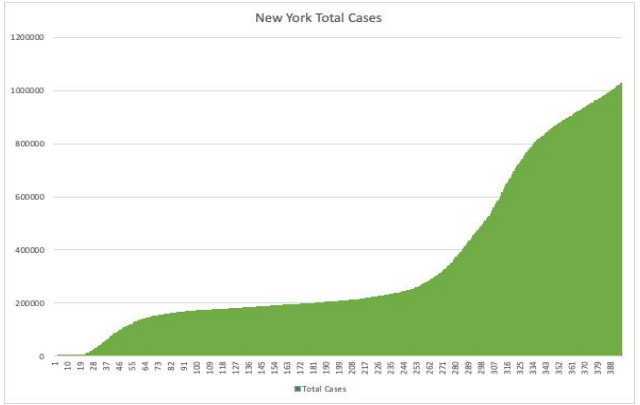
Hypothesis: Implementation of government policy influences the volume of COVID-19 cases. (More specifically, we suspect areas with more policies/restrictions implemented had less COVID cases.)

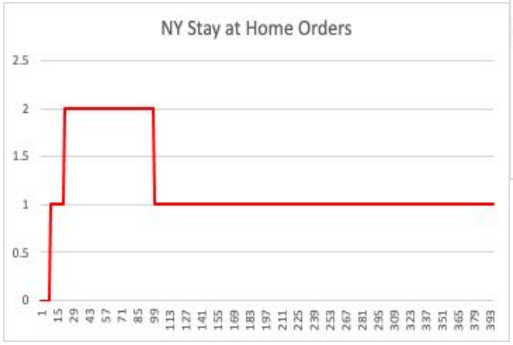
The relationship between government policy and COVID-19 cases.









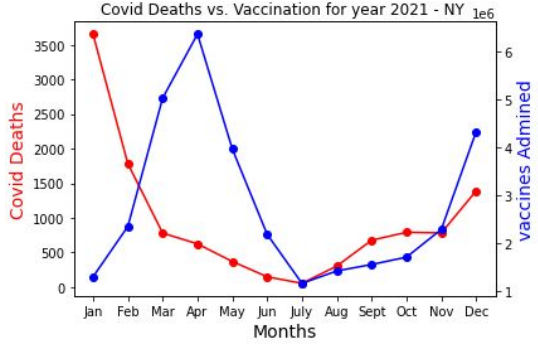


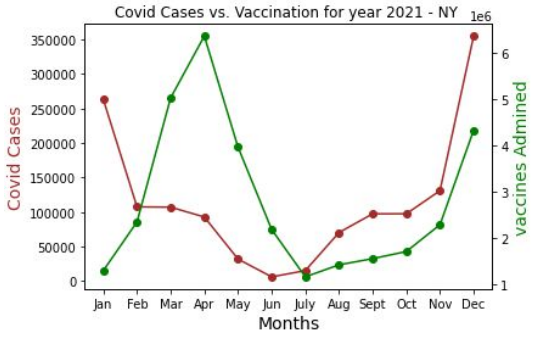
0 - no measures 1 - recommend not leaving house 2 - require not leaving house with exceptions for daily exercise, grocery shopping, and 'essential' trips 3 - require not leaving house with minimal exceptions (eg allowed to leave once a week, or only one person can leave at a time, etc)

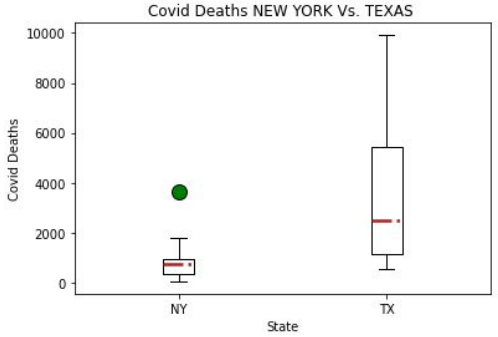
How does vaccination administration impact the rate or volume of COVID cases?

Hypothesis: The rate of vaccine administration has an effect on the volume of COVID-19 cases. More specifically, we suspect that areas that vaccinated a larger portion of their population had less COVID cases.

The relationship between vaccine administration and COVID cases...

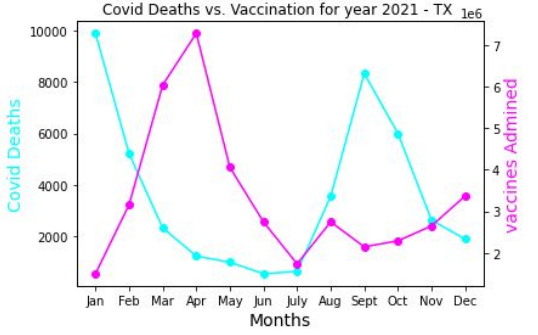


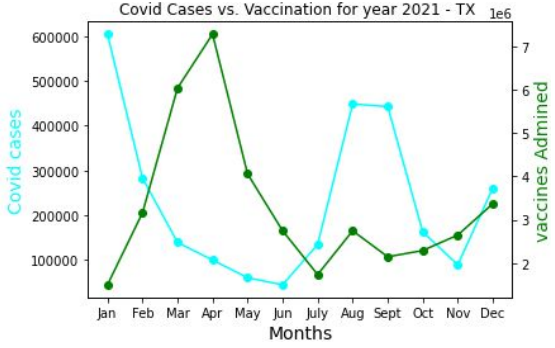


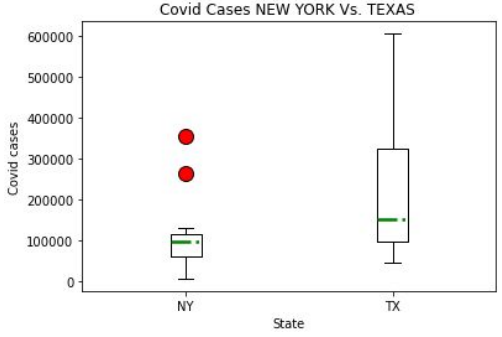


The number of COVID cases / deaths reduced drastically as the number of people vaccinated increased between the months from January to April, 2021. From April till July 2021, the number of deaths kept reducing in spite of reduction in number of people getting vaccinated.The total opposite happens after July, wherein the number of cases and deaths kept increasing even though number of people getting vaccinated increased.

A distribution is considered "**Positively Skewed**" when mean > median. It means the data constitute higher frequency of high valued scores. Overall data is positively skewed.







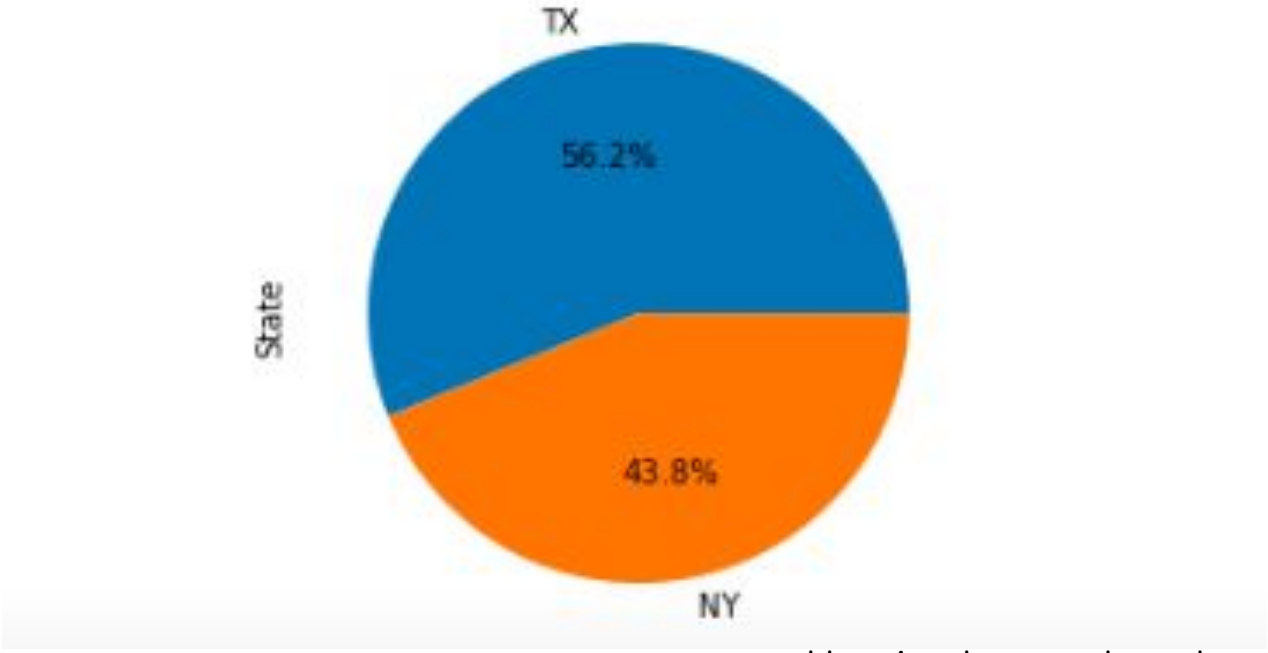
How does vaccine accessibility impact the volume of COVID cases?

Hypothesis: Vaccine accessibility has an influence on the volume of COVID cases. (More specifically, we suspect areas with more vaccination sites had less COVID cases.)

After further analysis, I found that there was no impact on the volume of COVID cases due to vaccine accessibility. Both New York and Texas had an exact average commute time to the vaccine sites. There was fairly an even amount of vaccine sites available to those individuals who wanted to get vaccinated. In addition, both states had a median commute time of 37.5 mins commute time to the vaccination sites. To conclude, the vaccine accessibility did not impact the volume of COVID cases since there were no major limitations on commute time or accessibility.

```
The average commute times to a vaccination site for each state is:
State
NY    37.5
TX    37.5
Name: Max Travel Time, dtype: float64.
The most prevalent commute times for each state are:
State
NY     0    30
       1    45
TX     0    30
       1    45
Name: Max Travel Time, dtype: int64. The median commute time for each state is:
State
NY    37.5
TX    37.5
Name: Max Travel Time, dtype: float64
```

Vaccine accessibility for Texas versus New York



Here is a bar graph to show the vaccination sites percentage of both Texas and New York. Texas has a 12.4% of more vaccination sites.

Areas for further exploration and analysis…

- Compounding demographic factors
- Extent of level of education
- Individual political identities of population
- The spikes in data that appear in both Kokila's (post vax analysis) and Krishna's (pre vax analysis)
- Cross analysis of the different policy choices between each region that could have contributed to outcomes
- Analysis of outcomes in the US localities vs demographically similar localities in other global regions comparing their policy choices and their duration