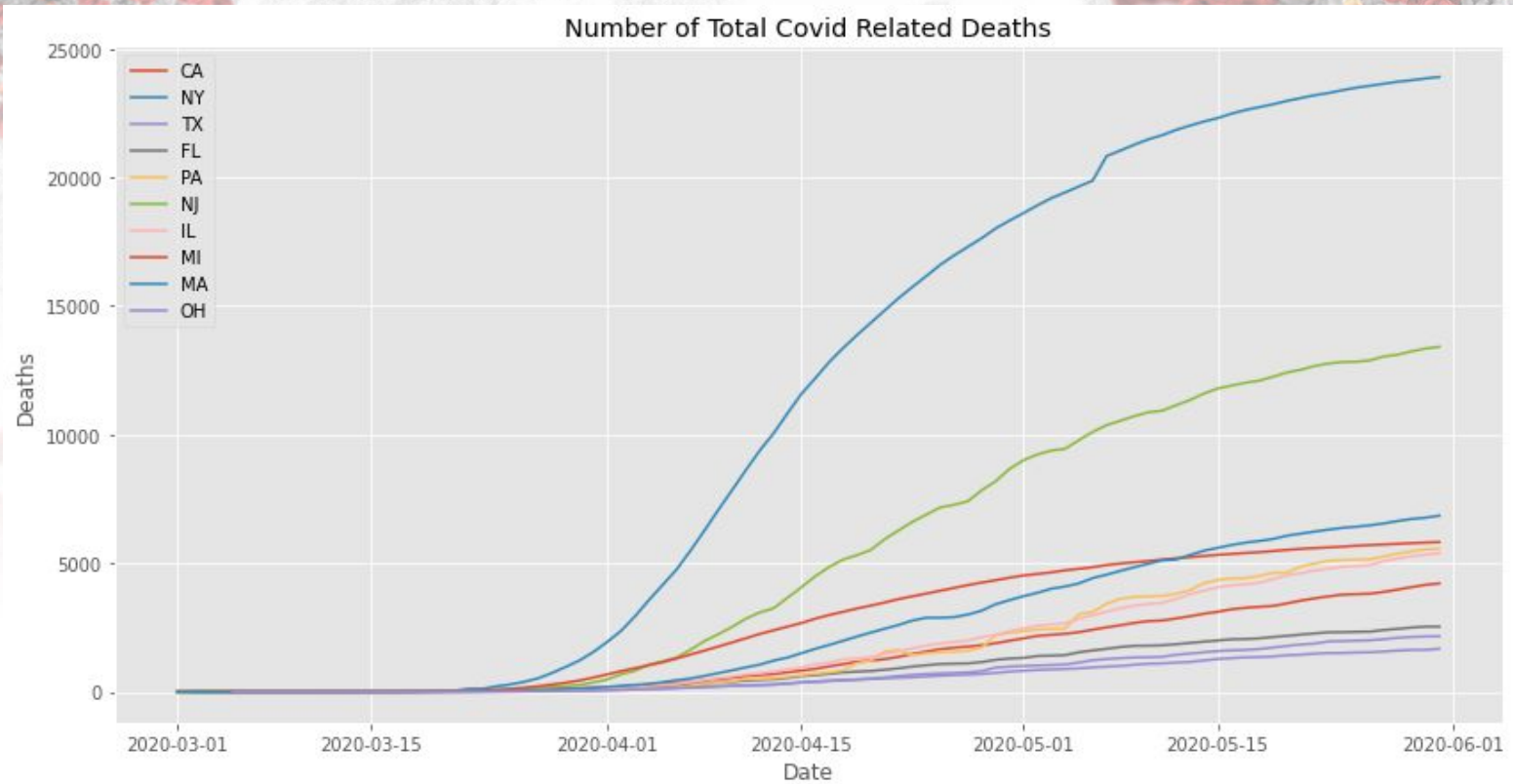


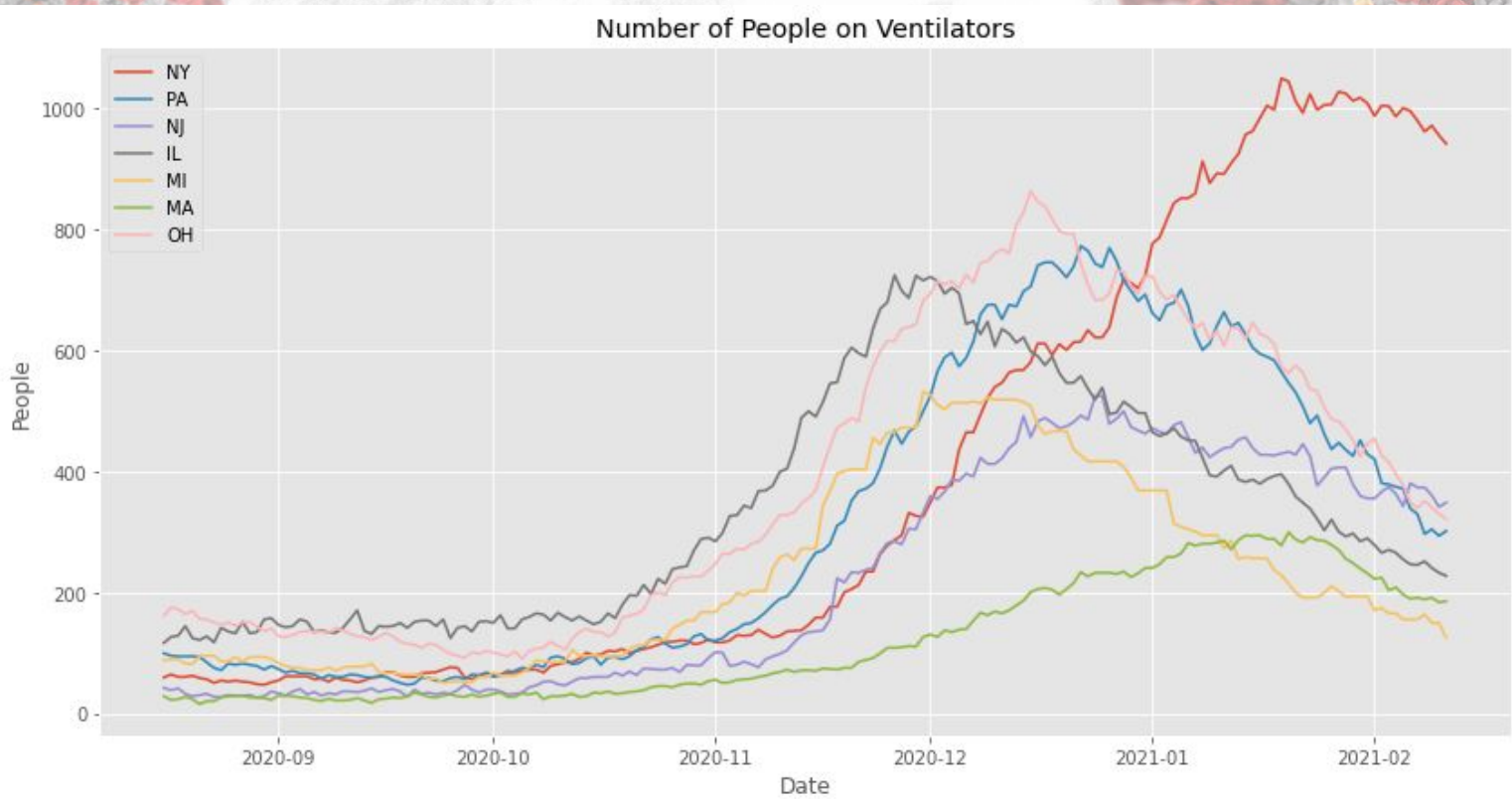
# COVID-19 Forecasting

Joseph Denney

# Problem and Purpose

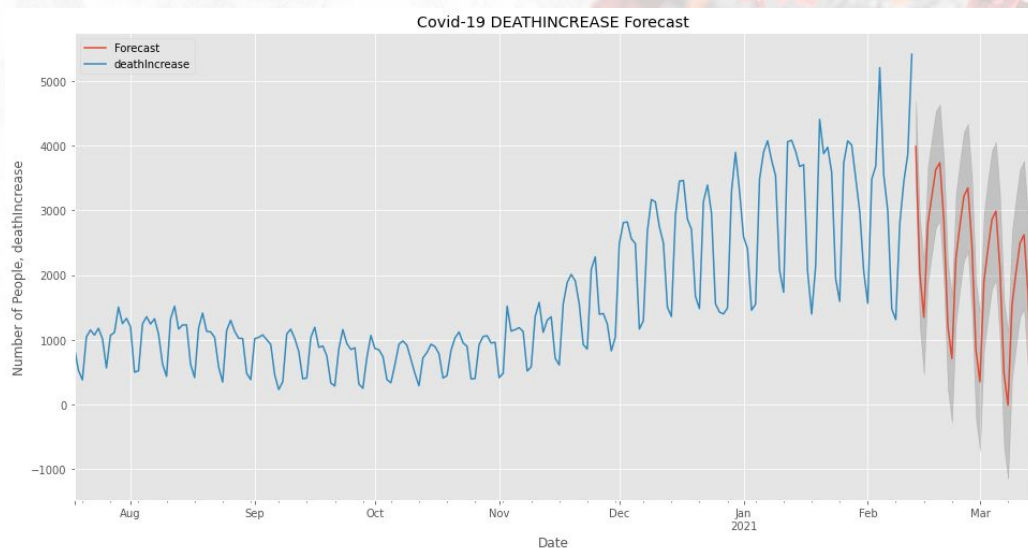


# The Data



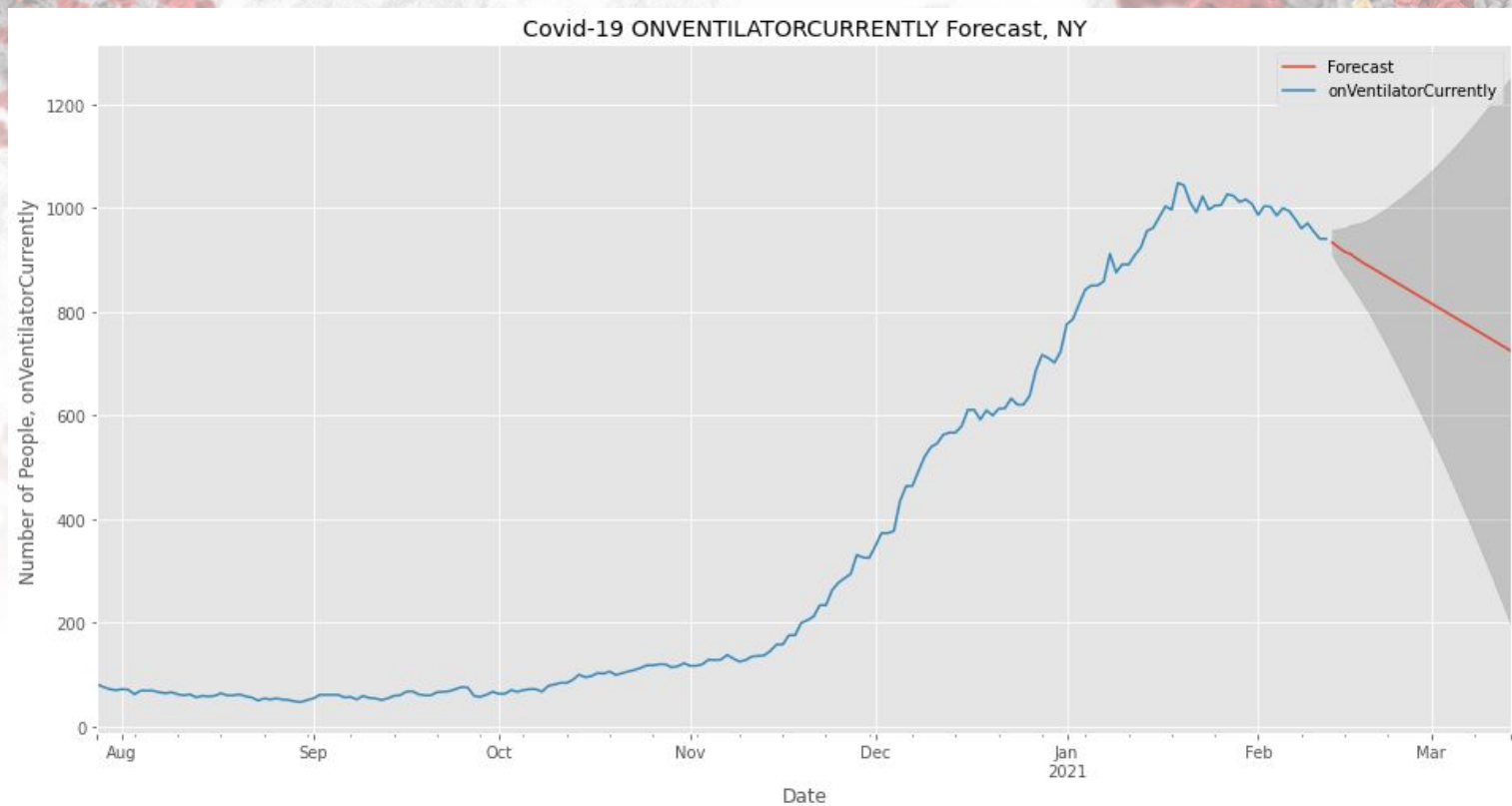
# Intro to SARIMAX

- Seasonal AutoRegressive Integrated Moving Average eXogenous.
- The model is built to handle (S)easonal data and predicts future data points by looking at previous data points (AR) as well as the slope of the trend (MA)
- SARIMAX modeling automatically integrates the data, meaning it differences the data so that the data is stationary for the model to work with.
- Finally, the X portion of SARIMAX is where the model can take in time series data for other variables in order to better predict a target variable. In our case, the target is deaths.

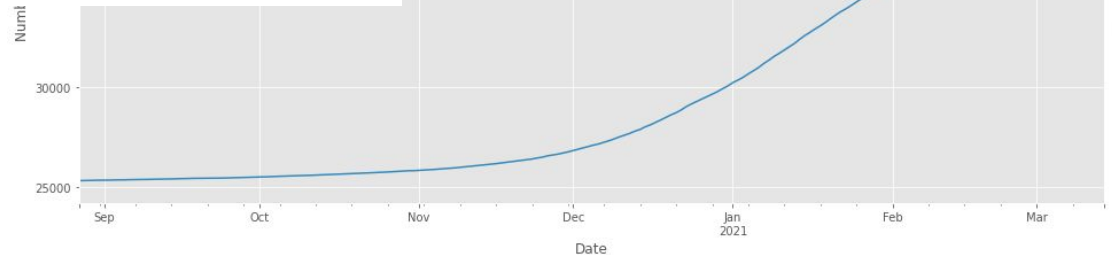
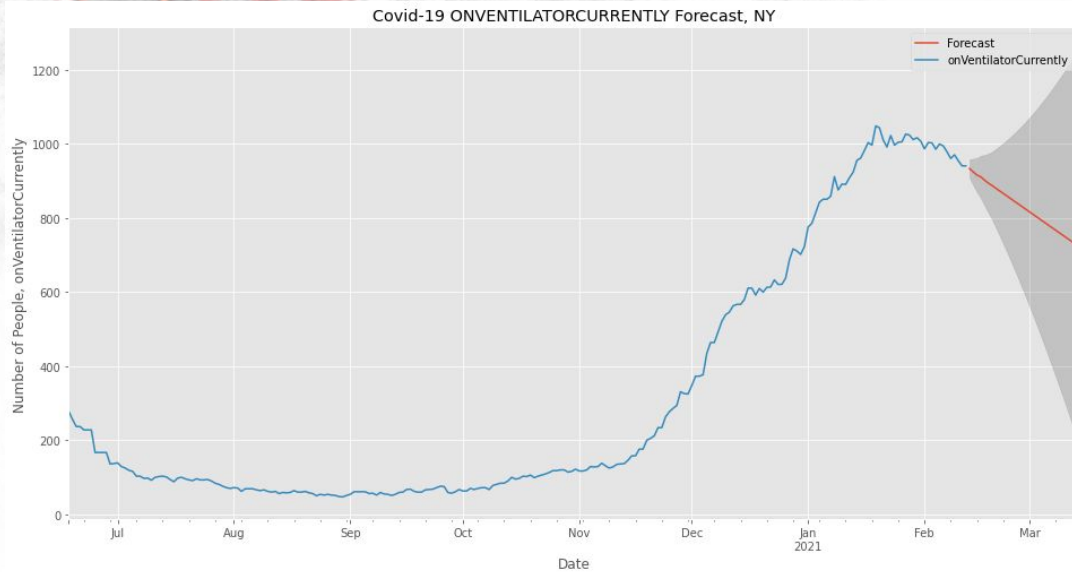




# SARIMAX

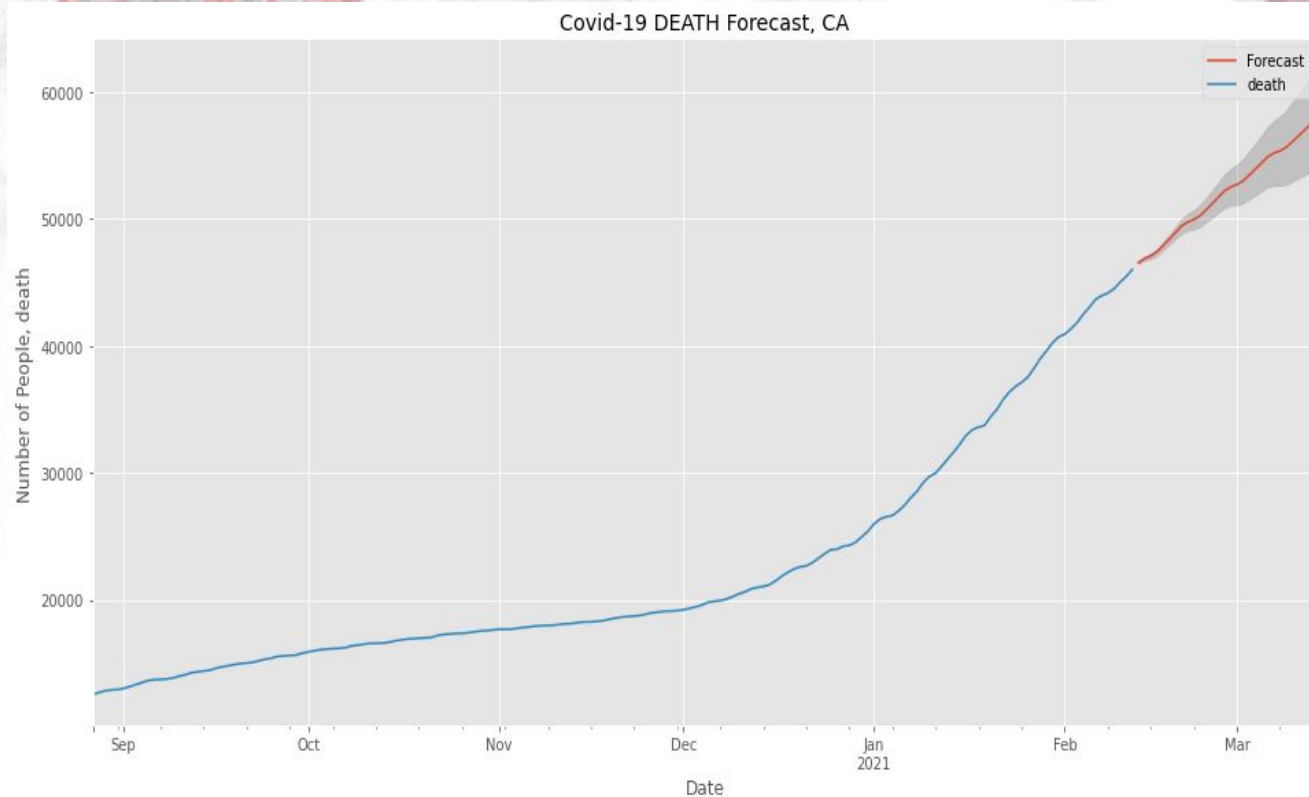


# New York Forecast



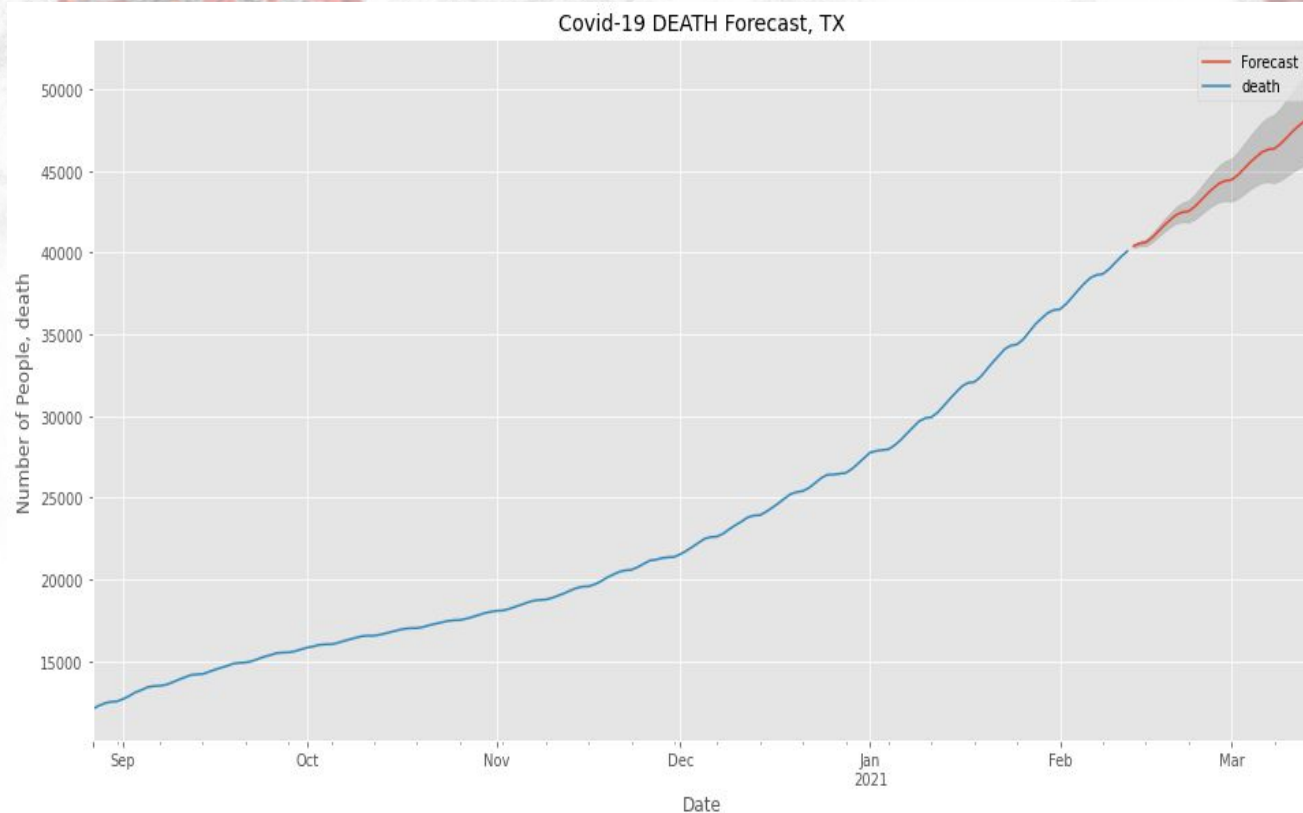
- Equally affected by the initial Covid wave and the post-2020 holidays.
- Private gatherings are allowed, limited to 10.
- Business are greatly suffering as a result of less traffic and high rent.

# California Death Forecast



- Hardest hit by the post-2020 holidays.
- Private gatherings are allowed.
- Los Angeles was at ICU capacity for weeks over the 2020-2021 winter season.

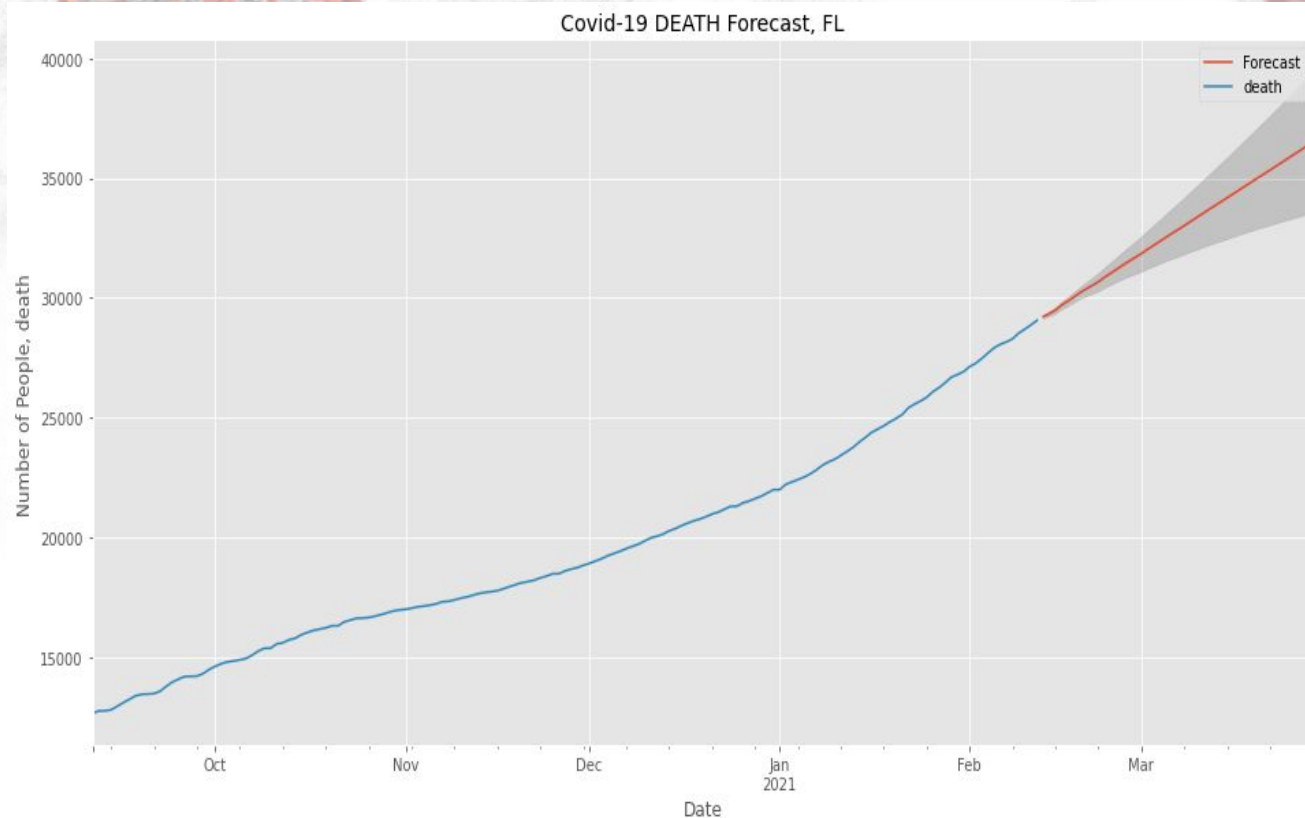
# Texas Deaths Forecast



- Continual growth in Covid infections.
- Private gatherings and social gatherings are allowed.
- Cases have decreased but there is concern about overall ICU bed availability.

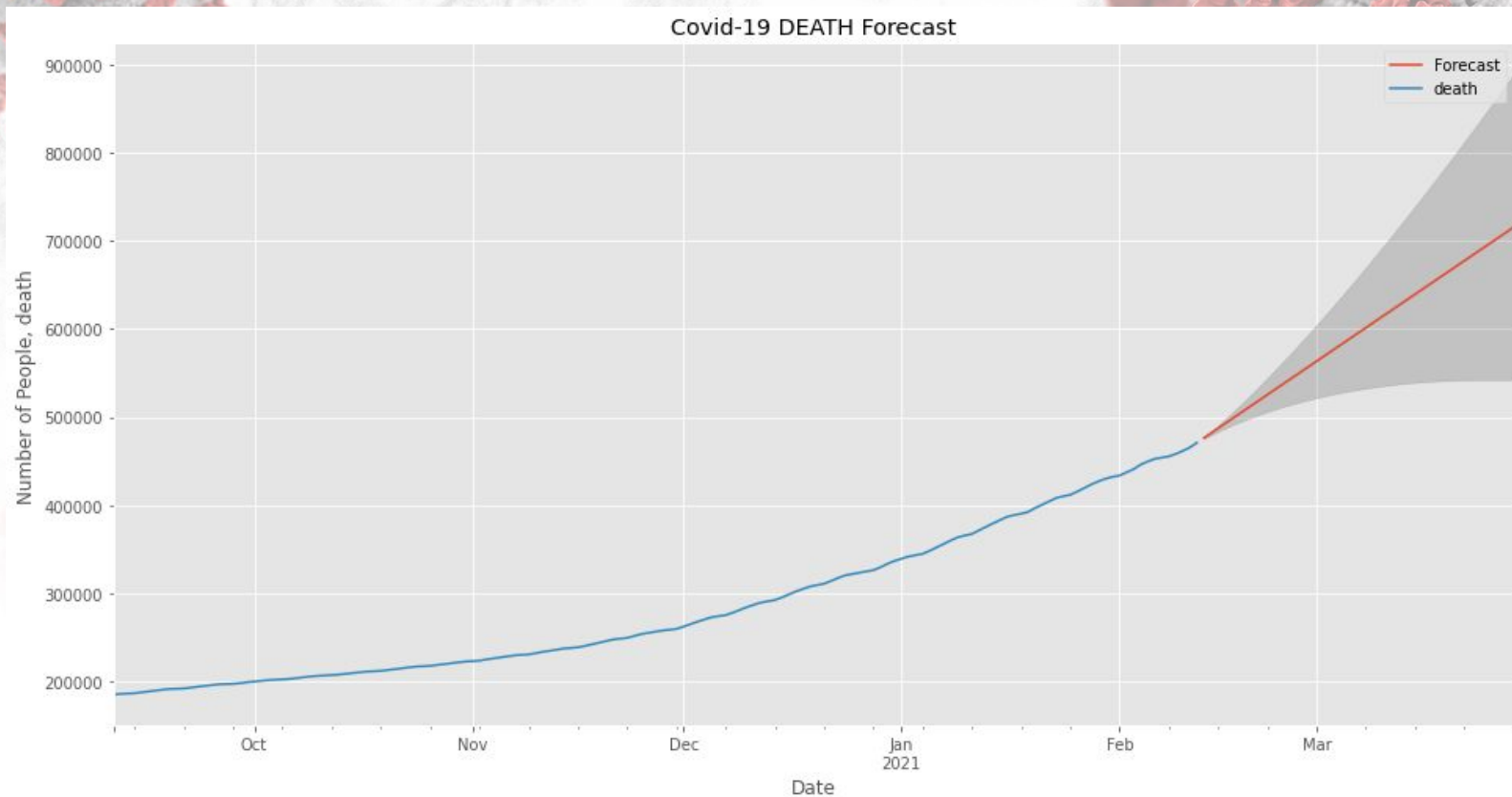


# Florida Deaths Forecast



- Florida monitors daily numbers on their website and they are reporting decreases in death rates over the last 2 weeks despite the Super Bowl.
- There are 0 travel restrictions.
- Private and public gatherings are allowed.

# United States Deaths Forecast



# Conclusions and Recommendations

1. *Wear a mask*
2. *Stay away from individuals not from your household, a minimum of 6 feet.*
3. *Use the drive-thru whenever possible. Have food delivered. The restaurant industry needs help!*
4. *Utilize grocery delivery services - grocery stores continue to stay extremely busy but there are services that are helping individuals pay their bills that can help limit the spread of this disease.*
5. *Limit your time indoors with friends and family not in your household and wear a mask when taking that time with them. Gather with as few people as possible.*

# Future Work

## Severe Acute Respiratory Syndrome (SARS-CoV)

*First reported in 2002*



**Total cases:** 8,098 from 17 countries  
**Total deaths:** 744

## Middle East Respiratory Syndrome (MERS-CoV)

*First reported in 2012*



**Total cases:** more than 2,500 from 21 countries  
**Total deaths:** approximately 860

## COVID-19 (SARS-CoV-2)

*First reported in 2019*



**New cases reported daily**

On March 11, 2020, the World Health Organization declared COVID-19 a global pandemic. The last pandemic reported was the H1N1 flu pandemic in 2009, which killed hundreds of thousands globally.



**Thank you!**

**STAYING  
SAFE  
TOGETHER**

**WEAR YOUR MASK**



**SO OUR BUSINESS  
CAN STAY OPEN**