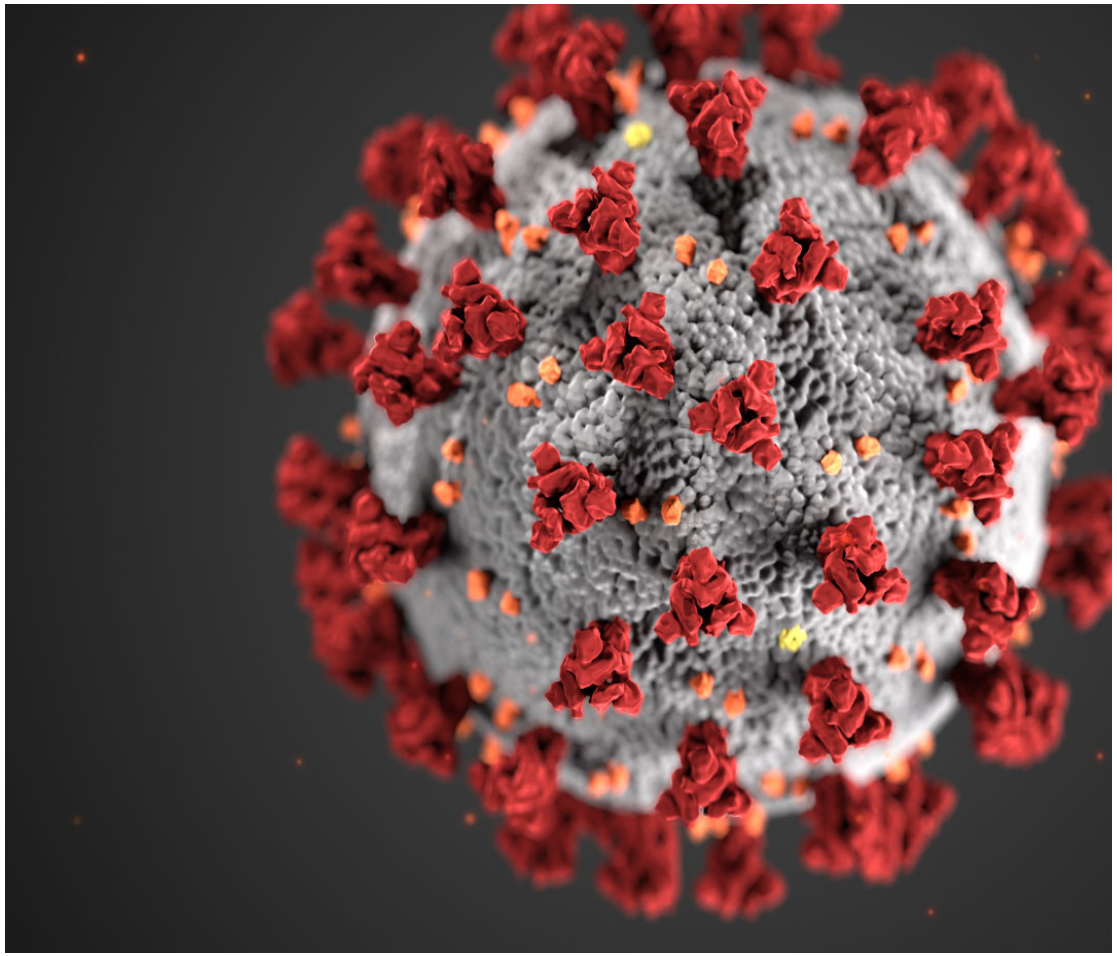
EFFECTS OF COVID-19 LOCKDOWN ON AIR QUALITY AND MORTALITY ACROSS CONTINENTAL UNITED STATES

Mohammad Hashem Askariyeh
Research Scientist
Texas A&M University

May 5, 2021

Introduction

- COVID 19 Pandemic
  - Lockdowns
  - Social Impacts
  - Reduced Mobility
  - Improved Air Quality



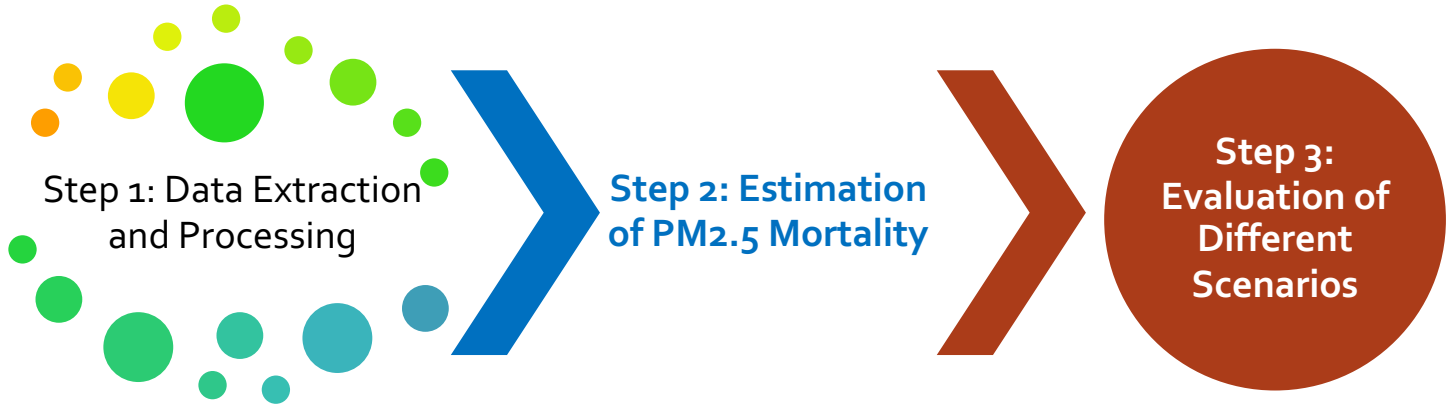
Gaps

- Nonuniform distribution of particulate matter
- No studies combined the satellite data with that of the ground measurement stations data to evaluate the air quality impact of COVID-19.

Objectives

- To integrate observational air quality data from EPA and other state agencies monitoring networks with satellite data and epidemiological studies to quantify, on short-term and long-term scales, the health benefits of the lockdown measures imposed in response to the COVID-19 pandemic.
- Comparison of the mortality burden from COVID-19 to the avoided deaths resulting from improved air quality for different scenarios.

Work Plan



Predict PM2.5 Concentrations as 1 km grid cells using ML

Satellite AOD data from MODIS Terra – MAIAC calibrated by AERONET surface data at 1km resolution grid cells across US

Ground measurement data (EPA and State agencies monitoring network)

Mortality Estimation at 1 km grid cells

Mortality models from epidemiological short-term time-series studies

Immediate restart

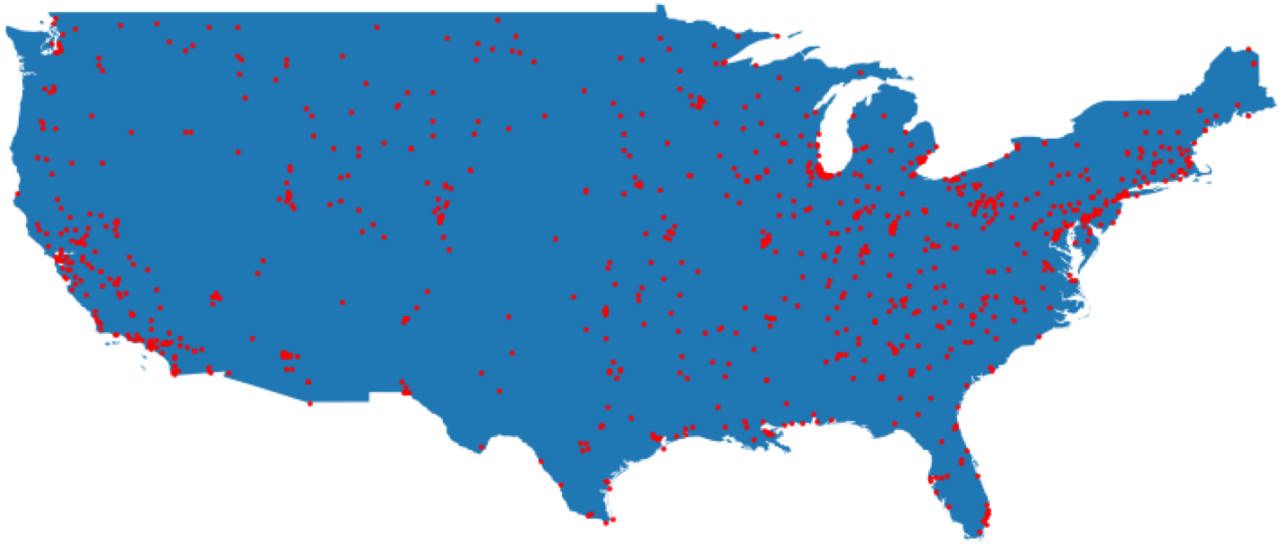
Gradual restart

Fall/Winter Outbreak

Permanent Lockdown

Data Extraction

Approximately 300 Measurement Points



AOD Satellite Data

Useful for:

- Environmental engineering, insurance and real estate industries to understand the population exposure to air pollution based on their location
- Policy makers to evaluate the effect of different measures
- Those who have the data and can process and sell it (e.g., Google and Microsoft)
- Application developers to combine individual locations and provide person-specific exposure

Thank You!

Any Questions?

Mohammad Hashem Askariyeh
mh.askariyeh@gmail.com