**The Evolution of COVID-19 in New York State: A Visual Timeline**

MIS 6380.501

Group No. 7

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**1. Project Description:** This project aims to explore the multifaceted relationships between

healthcare infrastructure, vaccination efforts, and demographic factors on COVID-19

outcomes within New York State. The study investigates hospitalization patterns among

older populations, the correlation between vaccination rates and ICU occupancy, and the

impact of healthcare capacity on patient discharges and mortality rates. Additionally, it

examines the effect of confirmed COVID-19 cases on fatality rates across counties and

evaluates the delayed influence of vaccination doses on subsequent patient admissions. By

leveraging detailed hospitalization, vaccination, and demographic datasets, this project

seeks to provide insights into how healthcare resources and preventive measures influenced

COVID-19-related outcomes in different regions.

**2. Objective:** The objective of this project is to analyze the relationships between patient

demographics, healthcare capacity, and vaccination efforts on COVID-19 outcomes in New

York State. It aims to understand how factors such as age, vaccination rates, ICU occupancy,

and healthcare infrastructure influenced hospitalization rates, patient discharges, and

mortality. The study seeks to provide insights into how different elements of healthcare and

preventive measures impacted patient outcomes, with the goal of informing future

healthcare strategies and policy decisions during pandemics.

**3. Hypothesis:**

a) COVID-19 patients aged 65 years and above are more likely to experience hospitalization and fatalities compared to younger patients across various healthcare facilities. This is because older adults tend to have weaker immune systems and a higher prevalence of chronic health conditions, making them more vulnerable to severe outcomes of the virus.

b) In Queens County, there is an inverse correlation between the total number of COVID-19 vaccination doses administered and the number of newly occupied staffed ICU beds. Higher vaccination rates are expected to reduce the severity of infections, leading to fewer ICU admissions.

c) In counties across New York State, there is a positive correlation between the number of COVID-19 positive cases and the number of fatalities. Higher case counts indicate more widespread transmission of the virus, which increases the likelihood of severe cases and fatalities, especially in areas with limited healthcare resources.

d) In specific locations, there is no strong and significant correlation between the number of individuals receiving their first COVID-19 vaccination dose during a given quarter and the number of newly admitted COVID-19 patients in the subsequent quarter. This may be influenced by factors such as varying vaccine efficacy, timing of immunity onset, and differences in population behavior or exposure.

e) In healthcare facilities, there is a significant positive relationship between the number of staffed acute care beds and the number of patient discharges. Facilities with more staffed beds can handle a higher volume of patients, leading to an increased number of discharges due to their greater capacity to provide timely and effective care.

**4. Data Sources:**

▪ New York State Statewide COVID-19 Hospitalizations and Beds | State of New York

https://health.data.ny.gov/Health/New-York-State-Statewide-COVID-19-

Hospitalizations/jw46-jpb7/data\_preview

▪ New York State Statewide COVID-19 Testing (Archived) | State of New York

https://health.data.ny.gov/Health/New-York-State-Statewide-COVID-19-Testing-

Archived/xdss-u53e/data\_preview

▪ New York State Statewide COVID-19 Vaccination Data by County (Archived, Initial) |

State of New York

https://health.data.ny.gov/Health/New-York-State-Statewide-COVID-19-Vaccination-

Data/duk7-xrni/data\_preview

5. Number of Records:

▪ COVID-19 Hospitalizations Data

• Number of rows: 197,384

• Number of columns: 37

▪ COVID-19 Testing Data

• Number of rows: 82,052

• Number of columns: 8

▪ COVID-19 Vaccination Data

• Number of rows: 51,522

• Number of columns: 5

**6. Data Cleansing Tool:** We will be utilizing Python libraries, primarily NumPy and Pandas for

data cleaning and handling, which are well-suited for efficiently handling large datasets and

performing data cleansing tasks.

**7. Visualization Tool:** We are using Tableau for its ease of use and because it excels at creating

interactive, visually clear charts. Its mapping features make it ideal for comparing COVID-19

cases and employment rates across red and blue states. Additionally, Tableau is the primary

tool we are using for this course.