COVID-19 Policy Recommendations for Caladan

This report highlights our goal in assisting the Commonwealth of Caladan in mitigating impending waves of COVID-19 cases and reducing related mortality. We aimed to utilize policy measures from ten representative countries to pinpoint strategies that are both minimally restrictive and effective, keeping the growth rate of the rolling averages of deaths under 1% and new cases below 3% over a consistent 30-day period. The primary goal was to root out public health strategies that curb the spread of COVID-19 while causing minimal disruption to society. This required a detailed examination of data pertaining to how various government policies influence case and death rates, thus supporting evidence-based policy decisions.

To begin our data exploration, using the Azure data factory pipeline, we extracted data from multiple sources including Azure SQL Database, Cosmos DB, and an onsite virtual machine. The datasets were extracted and loaded as parquet files to an ODS container. We utilized the Azure data flow for data filtering of redundant columns and the processed data was loaded into Azure Synapse Analytics to create external tables. These external tables were loaded to Power BI to begin our visualization process.

On Power BI, we created the growth rates for the 30-day rolling averages of cases and deaths. We conducted some exploratory data analysis by visualizing this data on a line graph and creating constant lines indicative of 1% and 3% for growth rates of death and cases respectively. From here, we used a zoom slicer to observe the time periods wherein the growth rate for both cases and deaths were below these line thresholds. We observed the levels of different policies implemented and created hypotheses of policies that impacted the shape of the graph. This exploratory data was backed up by our confirmatory data analysis, involving linear regression.

We highlighted the most effective and unrestricted policies for our country, Caladan, from our linear regression findings, where the highest negative coefficients indicate that as the policy is implemented, the growth rate of cases and deaths would decrease. These techniques allowed us to determine how different policy interventions impacted the growth rates of COVID-19 cases and deaths. This choice of statistical method was pivotal for its ability to demonstrate the direct effects of policy alterations on public health, assisting in strategic resource allocation and policy execution.

The regression analysis revealed certain policies with notably negative coefficients, signifying their effectiveness in decreasing virus spread. Particularly, rigorous stay-at-home orders and cancellations of public gatherings showed strong associations with decreased case and mortality growth. This evidence-based methodology facilitated the prioritization of strategies that are likely to diminish the pandemic's burden effectively.

Based on our analytical insights, we recommend the following measures, chosen for their proven impact in significantly reducing transmission rates, as evidenced by the analyzed growth trends:

- Prohibition of mass gatherings and public events - Level 2
- Closing of public transportation systems - Level 1
- Mandatory face-covering regulations - Level 2
- Enforcement of stay-at-home directives - Level 1

To determine the levels of implementations of the policies, we aligned our recommendations with the average of the policy levels implemented by the 10 model countries over the time period ranging between April 2020 to July 2020. We considered the population of Caladan of 3.2 million habitants and weighed the average levels for specific policies implemented by New Zealand and Sweden due to the similarity in population.

This initiative provides the Commonwealth of Caladan with a robust, empirically-supported framework for implementing effective and minimally intrusive public health policies, thus optimizing outcomes in the continuing management of the pandemic and mitigating any future waves.

Appendix

Challenge 1: Amelia Jennings, Namita Rajasubramanian
Challenge 2: Grace Chong, Neri Ajiatas Arreaga, Amelia Jennings
Challenge 3: Namita Rajasubramanian
Challenge 4:
    Data Architecture: Amelia Jennings
    Schema: Amelia Jennings
    Power BI Analysis: Grace Chong, Namita Rajasubramanian
    Executive Summary: Neri Ajiatas Arreaga, Grace Chong
    Powerpoint Slides: Neri Ajiatas Arreaga, Namita Rajasubramanian