Does the COVID Vaccine Reduce Hospitalization Rates?

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Introduction

The COVID vaccine is a highly controversial topic, due to the efficacy and the forced vaccinations demanded by some governments. The media blames the unvaccinated for infecting the vaccinated people, so is this truly a vaccine? Perhaps this "vaccine" is just a method to reduce severe COVID reactions? There is an ongoing fear of being hospitalized by COVID, especially those that are high risk or immunocompromised. This experiment makes the assumption in which the COVID vaccine will help with the severe COVID reactions. Therefore, if the vaccine is truly helping the population, then the hospitalization rates will decline. The official government responses are unclear on how well the vaccine is working on our population. This experiment will try to unveil the truth behind the vaccines, and perhaps ease some fears in the process.

Objective

The purpose of this experiment is to analyze the effectiveness of the COVID vaccine by comparing the hospitalization rates in 2020 and 2021 in six different countries: Canada, France, Italy, Spain, United Kingdom, and United States.

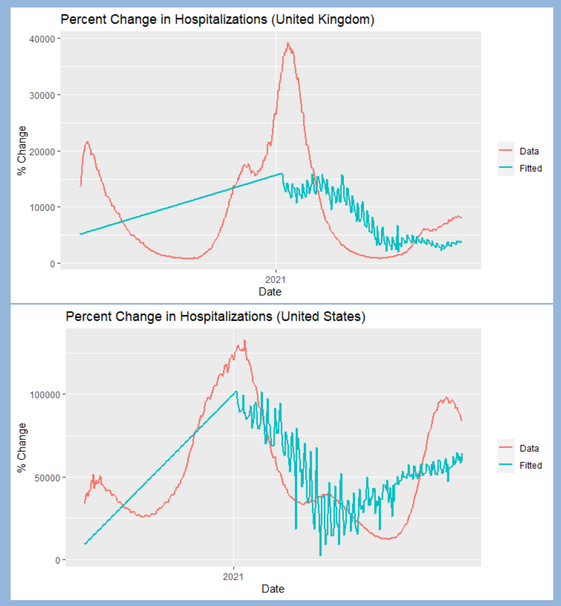
Methods

The dataset was pulled from Our World In Data. Countries were selected based on high COVID rates, and if they reported their hospitalizations and vaccinations numbers. Model selection was based on Stepwise and Best Subset predictors. Two predictors were selected. "new_vaccinations" shows new doses administered per day, and "people_fully_vaccinated" is the total number of fully vaccinated people (a two dose vaccine must have two doses to be counted). The six countries were separated and turned into time series datasets to be analyzed. Time series was chosen because the data is recorded daily. Regression is used to identify relationships between variables. A time series regression model using the least squares estimation was used:

fit.Canada <- tslm(hosp_patients ~ new_vaccinations + people_fully_vaccinated + trend, data = dfCanadaTS)

Results

The red line shows the percent change in hospitalizations, and the fitted line shows the prediction rate. Every country, except the United States, have lowered hospitalization rates. These countries had a high hospitalization rate, then a massive drop off in their hospitalization rate. The United States showed an initial drop, but the hospitalization rates appear to be steadily increasing.



Conclusion

The COVID vaccine appears to be helping with hospitalization rates. Most countries had a successful decline in hospitalization rates, except the United States. Out of all six countries, the US has the lowest vaccination rate at 58%, which could contribute to the higher hospitalization rates. The other countries are around 70-80% vaccination rate.

Are these changes in hospitalization rates due solely to the vaccine, or could this be correlated with seasonality? The model attempts to take seasonality into account, but there has only been one winter season of COVID. Once the 2021-2022 winter season is over, then a good comparison could be made to discuss seasonality. Everyone's hospitalization rates were high during the winter months, so this drop off could be attributed to vaccines, seasonality, or both.

References

Hannah Ritchie, Edouard Mathieu, Lucas Rodés-Guirao, Cameron Appel, Charlie Giattino, Esteban Ortiz-Ospina, Joe Hasell, Bobbie Macdonald, Diana Beltekian and Max Roser (2020) - "Coronavirus Pandemic (COVID-19)". *Published online at OurWorldInData.org.* Retrieved from: 'https://ourworldindata.org/coronavirus' [Online Resource]