



Research on COVID-19 vaccination

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1 Data set introduction

The data set for this report was obtained from the World Bank database, and it contains the following information:

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Background :

Research Question 1

Effects of government policies on the spread of COVID- 19 world-wide

Research Question 3

How do positive cases change relate to vaccination?

top 5 countries with highest daily new cases

Table 1: top 10 countries with highest daily cases

location	mean_daily_cases	mean_new_vax
United States	120485	460807
India	70729	2008029
France	56649	114808
Germany	50097	138851
Brazil	46861	372420
South Korea	39991	102167
United Kingdom	38446	110154
Italy	30754	102214
Russia	29095	203228
Turkey	27831	119240

Trend of trend of new cases vs fully vaccinated

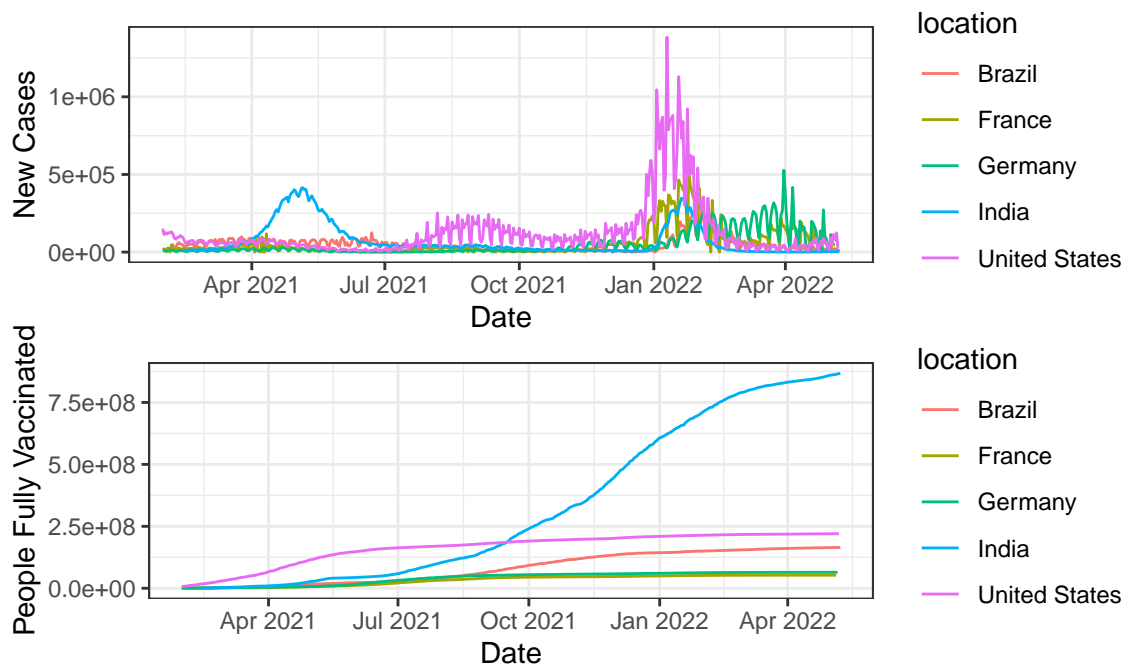


Figure 1: trend of new cases vs fully vaccinated

Trend of trend of new cases vs fully vaccinated

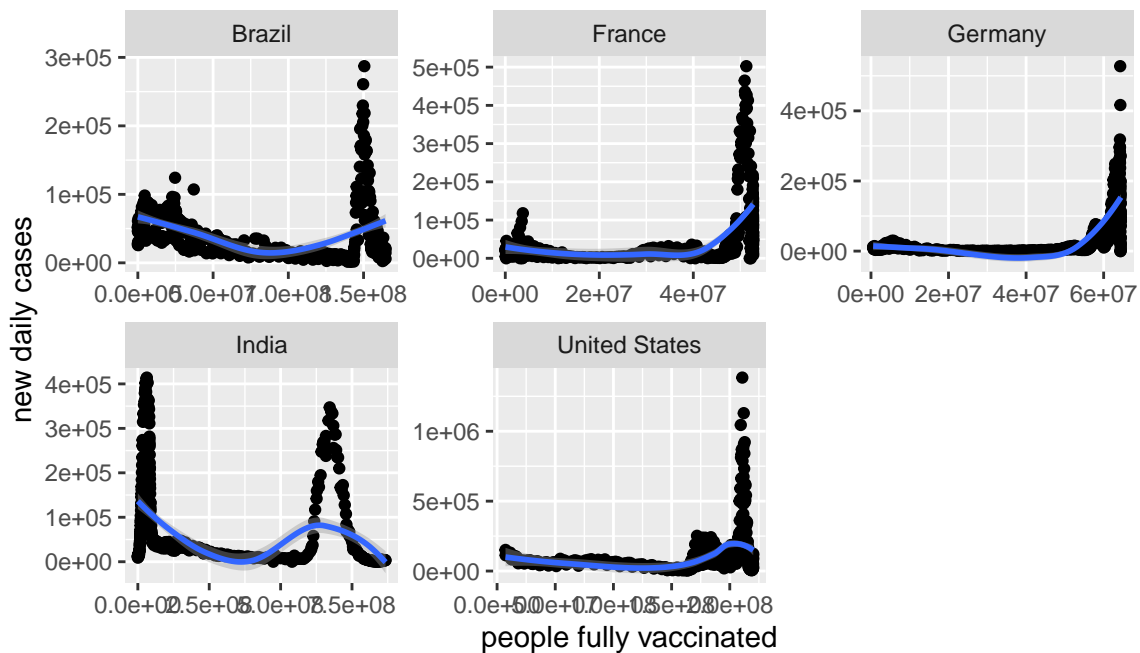


Figure 2: correlation between new cases vs fully vaccinated

We sorted out countries by the order of mean new daily cases, referring @ref(tab: tab1), the table showcases top 10 countries with highest mean value of daily cases, our research onward will based on the top 5 countries, US, Brazil, India, Germany, France. From table 1, United States has the highest daily cases and India did the best in terms of vaccination.

Line chart 1 showcases the trend of new cases and fully vaccinated people from 2021 to latest data, and from the line chart, there is no corresponding effect between them. Lipsitch and Dean (2020) mentioned that the effectiveness of vaccination varies within different condition of health, however, both direct and indirect protection reduce virus symptoms generally.

Plot chart 2 was generate to explore relationship between vaccination and new cases, with vaccination on x axis, daily cases in y axis, the graph did not show significant correlation between them, smooth line was added to overview general movement. the graph further prove there is no expected higher vaccination with lower infections in the top 5 countries. Chen et al. (2021) discussed the how mutation reduce the effectiveness of vaccination in terms of infection protection, and the research team mentioned we need to develop vaccine to deal with predicted mutation.

Research Question 3

How do ICU rates from COVID-19 relates to population of vaccination

Research Question 4

How do death rates from COVID-19 differ between people who are vaccinated and those who are not

CONCLUSIONS

References

- Chen, J, K Gao, R Wang, and GW Wei (2021). Prediction and mitigation of mutation threats to COVID-19 vaccines and antibody therapies. *Chemical science* **12**(20), 6929–6948.
- Lipsitch, M and NE Dean (2020). Understanding COVID-19 vaccine efficacy. *Science* **370**(6518), 763–765.