

### The Effects of COVID-19 Vaccination Campaign on SARS-CoV-2 Pandemic Worldwide

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#### Abstract

Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread from China to countries worldwide. The WHO declared that the outbreak constitutes a Public Health Emergency of International Concern (PHEIC) in January 2020. COVID-19 is spreading worldwide, with more than 140 million confirmed cases and three million deaths across over 193 countries. COVID-19 vaccination is considered one of the best strategies to control the pandemic worldwide. As of Apr 19, 2021, the Oxford-AstraZeneca was the most widely used COVID-19 vaccine worldwide, followed by the Pfizer-BioNTech and Sputnik V.

Since the global first COVID-19 vaccine program has launched in the United Kingdom, more than 156 countries have initiated mass COVID-19 vaccination programs, and 6.4% of the worldwide population have received at least one dose of the vaccine. Israel has the highest COVID-19 vaccination rate globally; around 61.8% population had received at least one dose of the COVID-19 vaccine, and 57.5% were fully vaccinated. Comparing to its highest epidemic rates in January, the Israeli health authorities revealed the incidence had dropped 97%, and mortality had decreased 91.5% among the population. According to our observation, the incidence and mortality rates in UK and United States have also declined as the vaccination rates increasing.

However, vaccination is not the only critical factor to control the epidemic. Chile's COVID-19 vaccination program rollout was fast and broad, with 40.5% population had received at least one dose of vaccine, and 28.4% were fully vaccinated. While Chile has

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reached one of the highest COVID-19 vaccination rates worldwide, the most recent incidence rate increased 230%, and the mortality rate also surged 170% among the population. A similar situation of increasing vaccination but more case and death rates occurred in France, Germany, and many countries.

Nevertheless, the global rollout of vaccines is no longer a guarantee of victory over COVID-19. The WHO indicates that cases surging might be fueled by highly contagious variants, increasing social interactions, easing public health control measures, anti-epidemic fatigue, vaccine hesitate, and low coverage and unfair distributions of vaccination. This study concludes that vaccines alone might not end the current epidemics but conduct public health and social measures to control the COVID-19.

**Keywords:** COVID-19, COVID-19 vaccine, Variants of SARS-CoV-2, Vaccination hesitancy, Government stringency index