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## SHORT RESEARCH COMMUNICATION | VACCINATION

# COVID-19 Vaccination Rates by Global Universal Health Care Coverage Status

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## ABSTRACT

Healthcare coverage and the type of insurance have always played huge roles in public health outcomes. With coronavirus disease-2019 (COVID-19) vaccination now available across the world, we sought to determine vaccination rates across countries with Universal Health Care (UHC) coverage versus those without. We utilized the vaccination information from the Coronavirus (COVID-19) Vaccinations website, and calculated early vaccination rate for each country as of January, 13, 2021 by dividing the total number of vaccinations given to the total population of the country. We observed that the average early vaccination rate for countries with UHC was 1.55%, whereas that for countries without UHC was 0.51%. Countries with UHC are performing much better than those without UHC in this initial race for providing herd immunity across the globe.

**Key words:** • COVID-19 • Coronavirus; vaccination • Universal Health • Healthcare • Insurance • Coverage

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## I. Introduction

Corona virus disease 2019 (COVID-19) - a disease that started in one part of the world and resulted in a pandemic rattling the entire globe due to its high transmission and mortality rate over the past one year. After almost a year since the first case of COVID-19 was identified, vaccinations have been approved and the rollouts have begun in several parts of the world. The Centers for Disease Control and Prevention (CDC) officials have reported that the countries will have to vaccinate 75% - 85% of their populations to achieve herd immunity.<sup>1</sup> Healthcare coverage and

insurance type have both played important roles in public health, and countries with and without universal coverage have disparate health outcomes.<sup>2,3</sup> At the beginning of the pandemic, it was observed that despite the lower case numbers in countries with Universal Health Care (UHC), the case fatality rate (CFR) of countries with UHC was significantly higher than for those without UHC (10.5% versus 4.9%).<sup>3</sup> The reason for this variation was attributed to patient long wait times as well as struggles with allocation of essential resources to healthcare professionals. With commencement of global vaccinations, we sought

to determine whether UHC correlates with early COVID-19 vaccination rates.

## 2. Methods

We utilized the vaccination information from the COVID-19 vaccinations website which reports daily vaccination data from each country worldwide.<sup>4</sup> The information is gathered and compiled from official government communication channels in these countries. We utilized the latest information available for each country up to January 13, 2021. Given that vaccination commenced only recently, we therefore, used the term “early vaccination” as one that was offered less than three months when the first person in the world was vaccinated (Margaret Keenan in the United Kingdom, December 08, 2020) against COVID-19 using an officially and internationally validated vaccine. Next, we classified countries based on whether or not their healthcare delivery system practiced UHC.<sup>5</sup> Early vaccination rate for each country was calculated using the following formula:

$$\text{Early vaccination rate} = \frac{\text{Total number of vaccinations given}}{\text{Total population of the country}} \times 100$$

We presented the information on vaccination rates for each country stratified by UHC coverage using choropleth plots. Then by separating all countries with UHC coverage, total vaccinations given in each of these countries was totaled. The total was then divided by the sum of the population of all countries covered by UHC to obtain the combined vaccination rates for countries covered by UHC. The same process was then repeated for countries without UHC. All data analyses were conducted using R Version 3.5.1 (R Core Team, Vienna, Austria, 2018), RStudio Version 1.1.423 (R Studio Team, PBC, Boston, MA, 2020) and Tableau version 2020.1 (Salesforce, Mountain View, CA, 2020). No ethical approval was required for this study as the data was obtained from publicly available sources which did not contain any patient information.

## 3. Results

Out of the 47 countries which had initiated vaccination distribution as of January 13, 2021, 24

(51.06%) countries had UHC. The early vaccination rates for countries with and without UHC are presented in figure 1. We observed that the average early vaccination rate for countries with UHC was 1.55%, whereas the rate for countries without UHC was 0.51%. This difference in early vaccination rates between countries with and without UHC was statistically significant (p-value <0.01). Among countries with UHC, Israel had the highest vaccination rate of 22.34%, followed by United Arab Emirates (UAE) (14.10%), Bahrain (5.75%), United Kingdom (4.19%), and Denmark (2.02%). Among countries without UHC, the top 5 countries with the highest vaccination rates were the United States of America (USA), with vaccination rate 2.82%, followed by Estonia (1.02%), Lithuania (1.00%) Hungary (0.90%) and Croatia (0.84%).

## 4. Discussion, Conclusion, and Implications for Translation

At the time of this study, 47 countries had initiated COVID-19 vaccinations. From that number, more than 50% of the countries were covered by UHC.<sup>5</sup> This is astounding because there are 32 countries in the world with established UHC and out of these, 24 (75%) countries had already initiated vaccine distribution. From our study, we observed that countries with UHC had an overall vaccination rate that was more than three times that of countries without UHC (1.55% vs. 0.51%, p-value <0.01). Furthermore, Israel (the top country in the UHC category) had a vaccination rate that was 10 times higher than that of the USA (the top early vaccination country in the non-UHC category). At the time of this study, and within 2 weeks of the first Israeli person receiving the COVID-19 vaccination, Israel vaccinated 20% of its population by striking a deal with the vaccine manufacturer, Pfizer.<sup>6</sup> UAE and Bahrain were the first two countries in the world to approve a Chinese COVID-19 vaccine in early December,<sup>7</sup> and were able to achieve high vaccination rates within a month.

On the other hand, the USA was previously expected to initiate first dose of the vaccine to approximately 20 million people by the end of December 2020, but was only able to achieve a fifth of that target.<sup>8</sup> Low supply, vaccine hesitation leading to low demand, as well as inadequate planning and

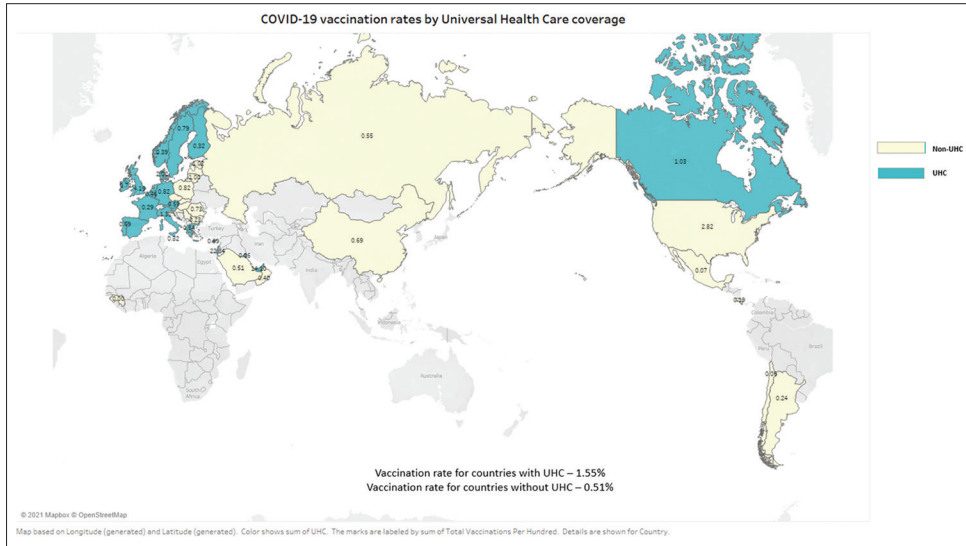


Figure 1: COVID-19 vaccination rates by Universal Health Care coverage

logistics have led to poor vaccination rates in the USA.<sup>8</sup> It has been noted that countries with UHC are performing better at vaccine dissemination because they have centralized and digitalized population healthcare data, which makes it easier to match the demand with supply.<sup>9</sup> Also, those who are eligible to receive a vaccine can schedule appointments easily either by using a hotline or a cellphone app.<sup>9</sup>

Globally, all countries have struggled to mitigate the growing COVID-19 infection and mortality rates, infrastructure management, burnout of healthcare professionals, and overall frustration among their population. At the onset of the pandemic, countries with UHC had worse COVID-19 outcomes as compared to those without UHC;<sup>3</sup> but in the current global vaccine race, countries with UHC are performing better than those without UHC. However, these preliminary results on early vaccination rates should be interpreted with caution since it is still too early to draw definitive conclusions. Further studies are recommended as vaccine distribution advances.

**Compliance with Ethical Standards**

**Conflicts of Interest:** None. **Financial Disclosure:** None. **Funding/Support:** None. **Ethics Approval:** None as the study was performed on publicly available data. **Acknowledgements:** None. **Disclaimer:** None.

**Key Messages**

- ▶ Out of the 47 countries which had initiated vaccination distribution till January 13, 2021, 24 (51.06%) countries were covered by UHC.
- ▶ The average early vaccination rate for countries with UHC was 1.55%, whereas the rate for countries without UHC was 0.51% (p-value <0.01).
- ▶ Israel (the top country in the UHC category) had a vaccination rate that was 10 times as high as that of the United States (the top early vaccination country in the non-UHC category).

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