

## **DSCI 510 HW5 Project Description**

**Description:** For this project, I identify some countries (USA, Brazil, India, Russia, Mexico, France, UK, Peru, Bulgaria, Bosnia and Herzegovina, Hungary, Georgia) with regard to the highest number of death rate, deaths, and confirmed cases from the url, and then I have created the dataset `cases_and_deaths_dataset.csv` with each country's death rate, death number, total number of confirmed cases of covid-19, and the date, March 29, 2022, for analysis; according to data about the countries from dataset named `cases_and_deaths_dataset.csv`, then I created the dataset `covid_vaccine_dataset.csv` with each country's vaccination rate, vaccination number, and the date, March 29, 2022, for analysis; in addition, another dataset titled `population_and_recovered_dataset.csv` with each country's population, number of recovered, and the date, March 29, 2022, for analysis. After getting these data information, there is the analysis about how the fully vaccination affect recovered situation for these countries with severe situation during the covid-19 pandemic.

**Motivation:** It's been 2 years since covid-19 started in 2020, and there are more and more people around the world get the fully vaccinated (fully vaccination represents that people get two doses of Covid-19 vaccines and one dose of booster vaccine); therefore, I am really curious about whether the fully vaccinations could affect people the country with severe situations (high death rate, high deaths, and high confirmed cases) or not by March 29, 2022, the date that I wanted to started this project.

### **Data Sources:**

1: Total Cases, Death Rate, and Deaths by Country Over the World (<https://www.bbc.com/news/world-51235105>)

One dataset table from this URL shows the total number of confirmed cases, death rate, and deaths from over 100 different countries respectively by March 29th, 2022 after covid-19 outbreak. I will use top 5 countries (US, Brazil, India, Russia, and Mexico) based on the highest number of covid-19 death cases during this covid-19 outbreak, other 5 top countries (US, India, Brazil, France, and UK) in terms of highest cases of covid-19, and other top 5 countries (Peru, Bulgaria, Bosnia and Herzegovina, Hungary, and Georgia) with regard to highest death rates for this covid-19 outbreak into my analysis dataset 1.

	<b>&lt;anonymous&gt;</b>	<b>date</b>	<b>country</b>	<b>cases</b>	<b>deaths</b>	<b>death_rate</b>
1	1	by 3/29/2022	US	80459923	986953.0	300.680731856901
2	2	by 3/29/2022	Brazil	30355919	662964.0	314.127214319699
3	3	by 3/29/2022	India	43060086	522223.0	38.2183997881515
4	4	by 3/29/2022	Russia	17880154	367521.0	254.562583093917
5	5	by 3/29/2022	Mexico	5733925	324134.0	254.072236690471
6	6	by 3/29/2022	France	27567552	142074.0	211.861376980847
7	7	by 3/29/2022	UK	21978198	173693.0	259.885608318051
8	8	by 3/29/2022	Peru	3561677	212761.0	654.438743132863
9	9	by 3/29/2022	Bulgaria	1153506	36856.0	528.343789301268
10	10	by 3/29/2022	Bosnia and Herzegovina	376841	15762.0	477.491669191154
11	11	by 3/29/2022	Hungary	1894278	46101.0	471.86530861113
12	12	by 3/29/2022	Georgia	1654313	16800.0	451.566532684009

Fig 1. cases\_and\_deaths\_dataset

## 2. Number of Vaccination and Vaccination Rate by Country Around the World (<https://www.bbc.com/news/world-51235105>)

Another dataset table from this website reflects the total number of fully vaccinations and vaccination rates from over 100 different countries respectively by March 29th, 2022 after covid-19 outbreak. Based on dataset 1, I will track the number of doses of vaccination and vaccination rates from countries of dataset 1 around the world during this covid-19 outbreak and put these data into my analysis dataset 2.

	<b>&lt;anonymous&gt;</b>	<b>date</b>	<b>country</b>	<b>dose_rate</b>	<b>dose_total</b>
1	1	by 3/29/2022	US	66.0737	572829658.0
2	2	by 3/29/2022	Brazil	76.3579	426987455.0
3	3	by 3/29/2022	India	61.0542	1876721584.0
4	4	by 3/29/2022	Russia	50.2311	165983904.0
5	5	by 3/29/2022	Mexico	61.3724	198353262.0
6	6	by 3/29/2022	France	77.9067	142707489.0
7	7	by 3/29/2022	UK	72.86	142014650.0
8	8	by 3/29/2022	Peru	80.0522	71096207.0
9	9	by 3/29/2022	Bulgaria	29.7917	4376702.0
10	10	by 3/29/2022	Bosnia and Herzegovina	25.9259	1924950.0
11	11	by 3/29/2022	Hungary	64.2728	16498370.0
12	12	by 3/29/2022	Georgia	31.7212	2876960.0

Fig 2. covid\_vaccine\_dataset

## 3. Detailed Information of Different Countries Related to Covid-19 (<https://about-corona.net/documentation>)

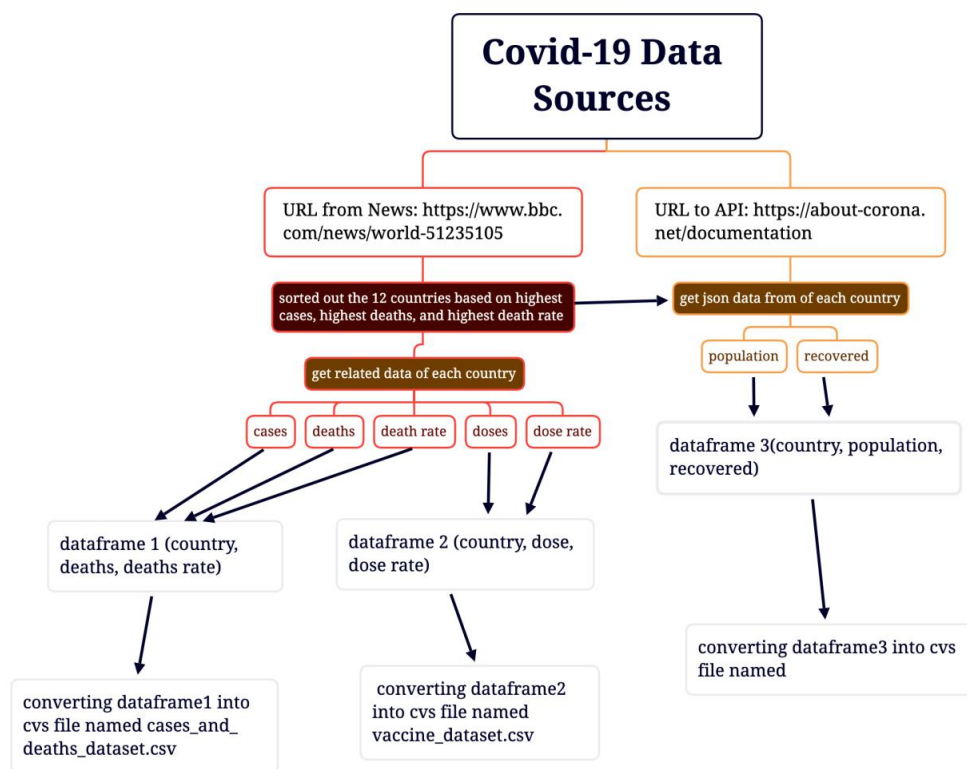
json Link: <https://corona-api.com/countries>

Based on dataset 1 and dataset 2, I will use this API to identify the countries which I choose from dataset 1 and dataset 2 to get the overall number of recovered cases and population of each country by March 29th, 2022 in my analysis dataset 3.

	<anonymous>	date	country	population	recovered
1		1 by 3/29/2022	Bosnia and Herzegovina	4590000	192218
2		2 by 3/29/2022	Bulgaria	7148785	429030
3		3 by 3/29/2022	Brazil	201103330	20326408
4		4 by 3/29/2022	France	64768389	6709622
5		5 by 3/29/2022	Georgia	4630000	573542
6		6 by 3/29/2022	India	1173108018	32876319
7		7 by 3/29/2022	Hungary	9982000	781794
8		8 by 3/29/2022	Mexico	112468855	2971000
9		9 by 3/29/2022	Russia	140702000	6574608
10		10 by 3/29/2022	Peru	29907003	0
11		11 by 3/29/2022	USA	310232863	33112993
12		12 by 3/29/2022	UK	62348447	6131137

Fig 3. population\_and\_recovered\_dataset

#### FLOWCHART FOR DATASET GENERATION:



Presented with XMind

#### Analysis performed:

Firstly, the features of each country should be took a look, therefore, I get each country's population number by March 29th, 2022 from Population\_and\_Recovered\_Dataset, death number by March 29th, 2022 from Cases\_and\_Deaths\_Dataset, dose number by March 29th, 2022 from Covid\_Vaccine\_Dataset, and recovered number by March 29th, 2022 from Population\_and\_Recovered\_Dataset.

The following are bar charts of each country's death number, population, dose number, and recovered number respectively.

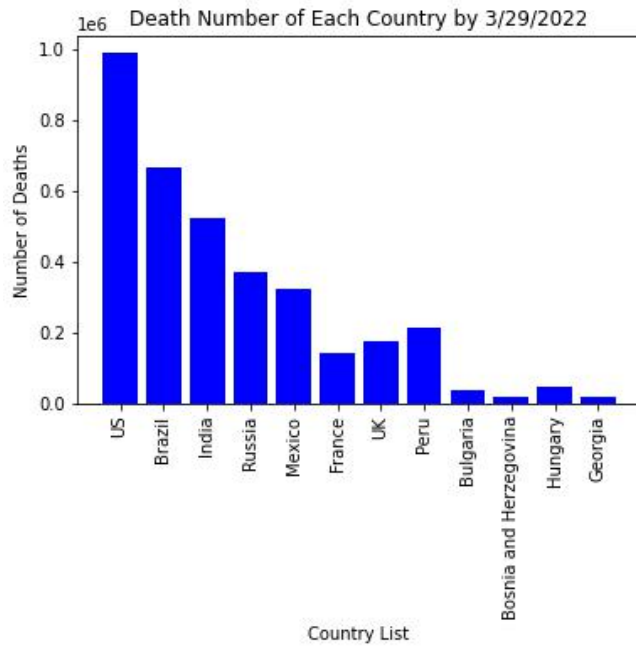


Fig 4. Bar Graph for Death Number of Each Country by 3/29/2022

Based on the graph of death number of each country above, the death number of US, Brazil, and India were the highest by March 29th, 2022, because the death number in US, Brazil, and India was over 500,000, especially US with approaching to 1,000,000; on the other hand, the number of deaths from Bosnia and Herzegovina, and Georgia was the lowest respectively by March 29, 2022, because only under 100,000 people in Bosnia and Herzegovina, and Georgia died respectively by March 29th, 2022.

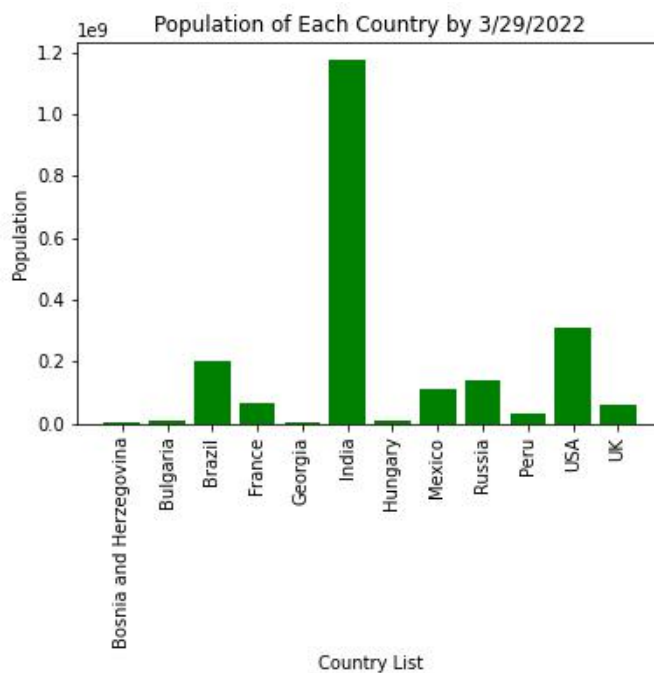


Fig 5. Bar Graph for Population of Each Country by 3/29/2022

In terms of bar graph of population of each country above, the population in India was highest with about 1,100,000,000 by March 29, 2022, while the population of Bosnia and Herzegovina, Georgia, Bulgaria, and Hungary was the lowest respectively by March 29, 2022, with under 100,000,000 respectively.

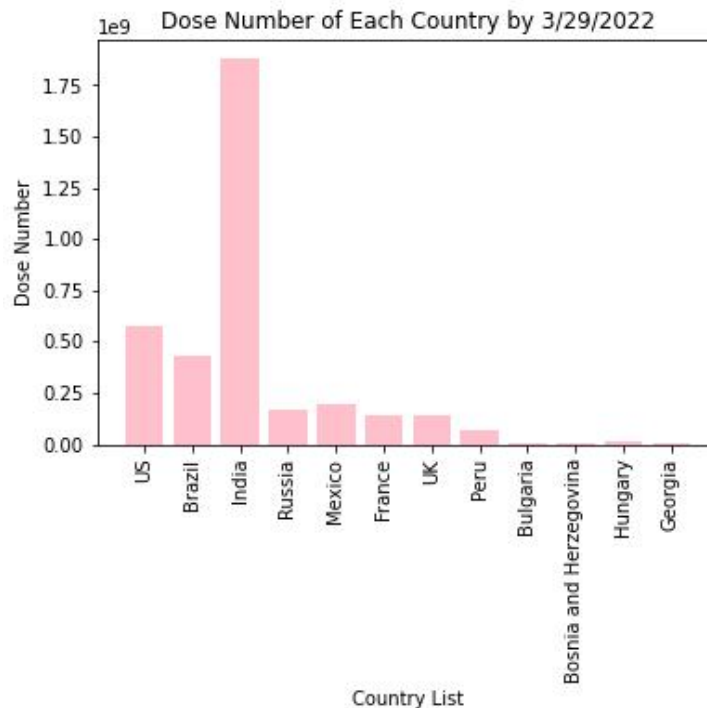


Fig 6. Bar Graph for Dose Number of Each Country by 3/29/2022

According to the bar graph of dose number of each country above, we could notice that the dose number of US, Brazil, and India respectively was higher than that of any other country respectively by March 29, 2022 with over about 400,000,000 respectively, maybe due to the maximum death number, especially India, a country with surprising over 1,750,000,000 getting fully vaccination. In addition, the dose the dose number of France was almost the same as that of UK with about 150,000,000, meanwhile, the number of people getting fully vaccinated in Bosnia and Herzegovina, Georgia, Bulgaria, and Hungary respectively is still lowest with only under 100,000,000 by March 29, 2022.

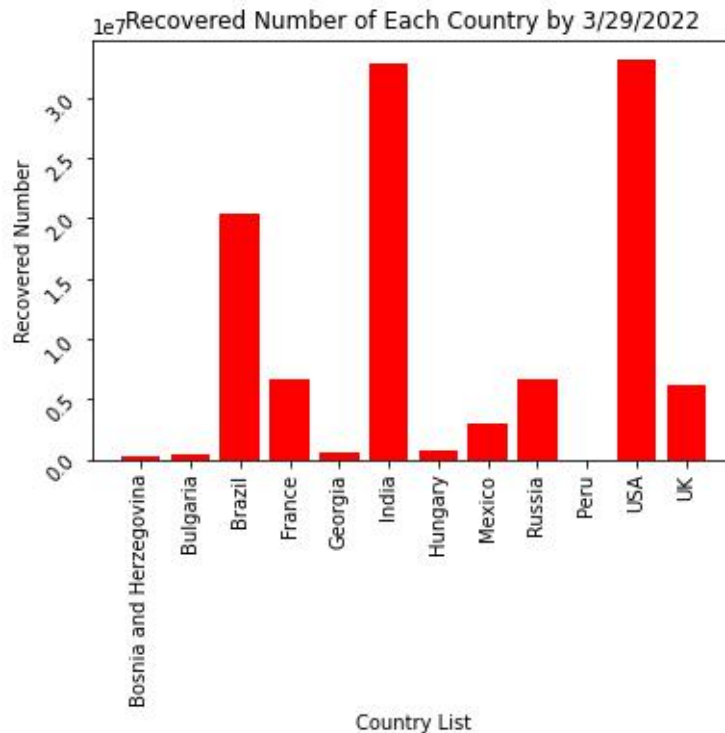


Fig 7. Bar Graph for Recovered Number of Each Country by 3/29/2022

As for the bar graph for recovered number of each country above, the number of the recovered number of US, Brazil, and India respectively was higher than that of other countries respectively by March 29th, 2022, maybe because of highest death number and dose number, clearly, the recovered number for India and USA respectively was over 30,000,000, and the recovered number of Brazil was about 20,000,000 by March 29th, 2022. Meanwhile, the recovered number in Russia, UK and France was the same respectively with about 7,000,000. Surprisingly, the number of people getting recovered in Peru is the lowest with only 0 by March 29th, 2022.

After analyzing each country's population, death number, dose number, and recovered number by March 29th, 2022, respectively, we have to think about the effect of fully vaccination nationally by March 29th, 2022, because data of each country's population, death number, dose number, and recovered number only shows the comparisons globally, in the end, I get the recovered percentage in each country, specifically, I just use recovered number of each country to divide the population of each country to see the how the recovered effect from covid-19 vaccine nationally by March 29, 2022.

The following graph is what I have obtained for recovered rate of each country.

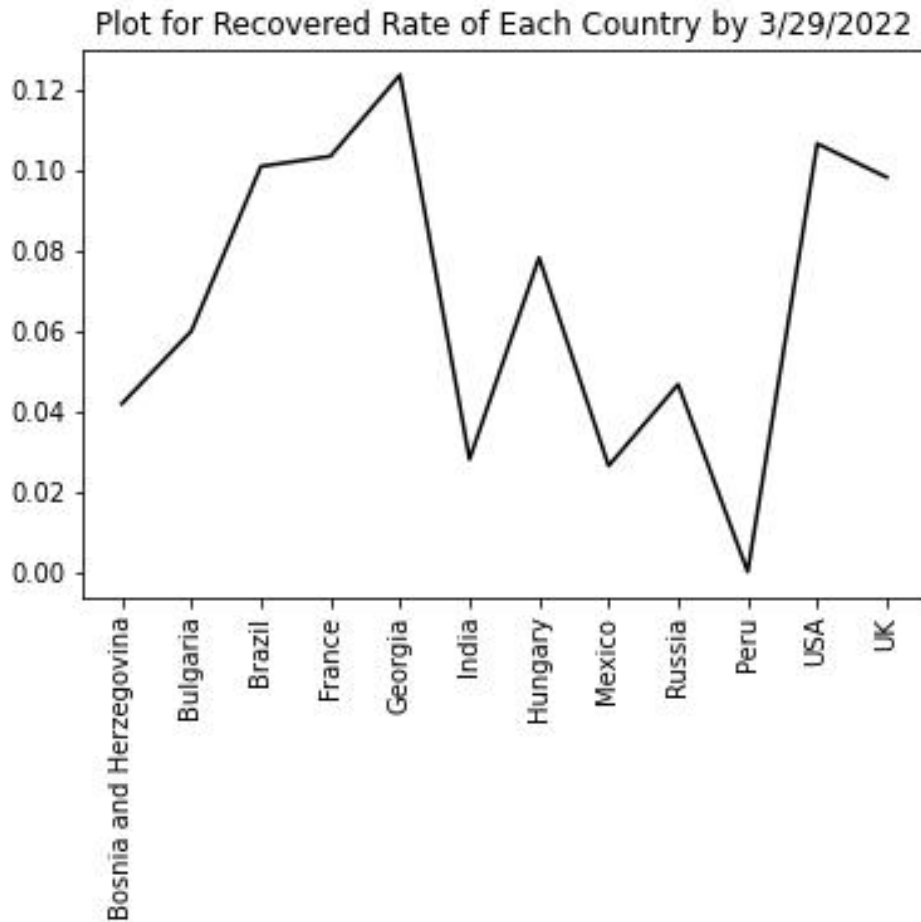


Fig 8. Plot for Recovered Rate in Each Country by 3/29/2022

In terms of plot for recovered rate of each country above, the standard for effectiveness of fully vaccination by March 29, 2022 is whether the recovered rate was above or equal to 0.06 or not by March 29, 2022, based on this plot chart above, these countries shows the overall effectiveness of fully vaccination: Bulgaria, Brazil, France, Georgia, Hungary, USA, UK, while these countries shows minimal effect of fully vaccination: India, Mexico, Russia, Peru, Bosnia and Herzegovina.

The fully vaccination shows no effective on Peru, because there were about 100,000,000 people from Peru getting fully vaccination but there was no recovered people by March 29, 2022. Besides Peru, as for India, even though the dose number, population number, recovered number was largest while death number was lower than that of Brazil and USA (kindly note: USA from Bar Graph for Recovered Number of Each Country by 3/29/2022 and Plot for Recovered Rate in Each Country by 3/29/2022 is the same as US from other graphs), the recovered rate in India was not really high with about 0.03, compared with other countries, especially with USA and Brazil, this means that fully vaccinations shows the least effect towards people from India. Meanwhile, the Mexico's recovered rate was almost same as India's by March 29, 2022,



and Russia's recovered rate was the highest among countries with recovered rate which was lower than 0.06, even though Russia's dose number was lower than Peru's and Russian's population was slightly higher than Peru's. In addition, even though the recovered number in UK, Russia, and France was almost same, only Russia showed the ineffectiveness of fully vaccination mainly because of slightly higher population. Furthermore, among Bosnia and Herzegovina, Georgia, Bulgaria, and Hungary with least population, minimum dose number, slight recovered number and minimum deaths, Georgia's recovered rate was highest with almost 0.12 by March 29th, 2022, and the recovered rate in Bulgaria was about 0.06 by March 29th, 2022, and Hungary was higher than 0.06 by March 29th, 2022, but Bosnia and Herzegovina only got 0.04 recovered rate by March 29th, 2022, this phenomenon means that the fully vaccinations seems almost effective towards country with minimum population.

**Conclusion:**

Based on the analysis, there exists the conclusion that fully vaccination was not remedy the for every country with severe situations (high death rate, high deaths, and high confirmed cases) by March 29th, 2022, because some countries' recovered rate was not above 0.06 based on each country's population and recovered number by March 29, 2022, therefore, covid-19 might still be a big challenge in the world.