Final Project Report: Visualizing World Vaccination Progress Over Time

Target Users

Our webpage is for every user – whether you're a healthcare expert, policymaker, researcher, or just someone who wants to keep an eye on how COVID-19 vaccines are being used worldwide. We made it easy to understand, by using 3 kinds of charts which are the Choropleth Map, Race Bar Chart, and Stacked Area Bar Chart.

For healthcare experts and researchers: Evaluate the necessity of booster shots based on the progress of vaccinations and the emergence of new virus variants, adapting strategies to ensure ongoing protection and public health.

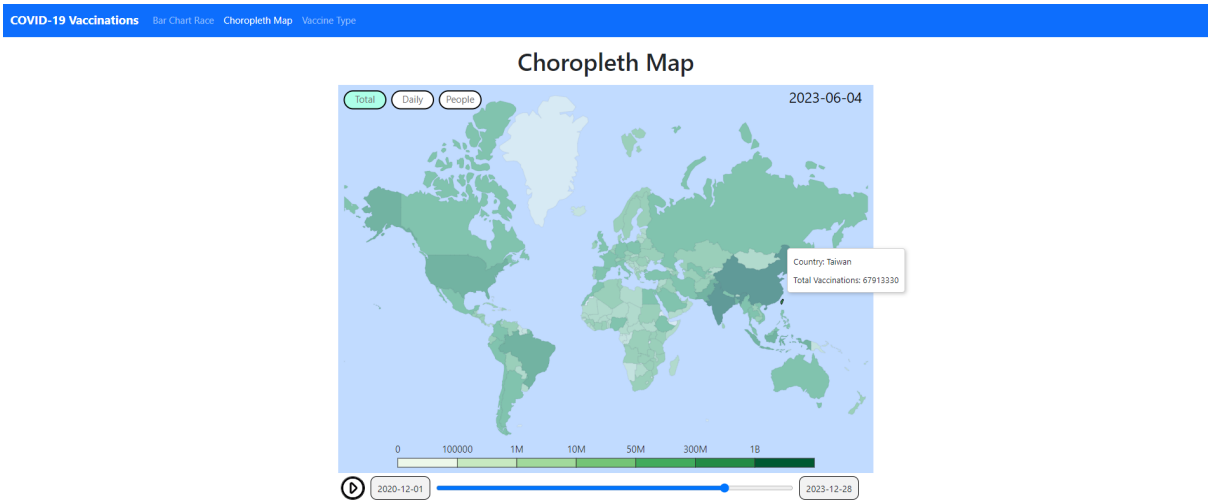
For policymakers: To Prevent Future Outbreaks by Learning from Previous outbreaks and using this knowledge and data to create plans that stop similar problems from happening again. Also can teach people to take part in future vaccination efforts based on the positive impact that happened at that time

For general users: Can see how the vaccination process happened in the past and compare the rate between countries, see which vaccines are being used, and feel empowered to make the choices where you might need a booster shot.

Our Website

[Link]

Choropleth Map



The Reason to use Choropleth Map: We chose the map to give a quick, global view of total vaccination, and help users understand the overall situation. It also helps highlight where vaccinations are high or low in different country

Data Source: Data on COVID-19 (coronavirus) by Our World in Data

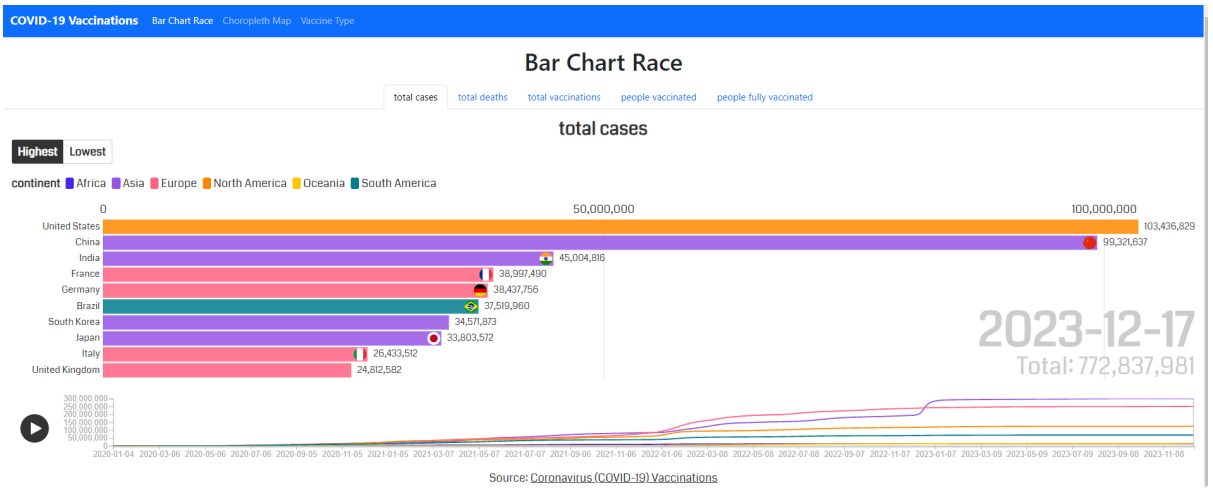
Chart Content:

- Draw a world map using GeoJSon Data
- Each country on the map is filled with color representing the selected vaccination data type (total, daily, or people)
- The color intercity varies based on the vaccination date for each country

Addition Function:

- Users can switch between 3 categories of vaccination data (total, daily, or people) using the button
- Slide bar for choosing specific dates.
- Tooltip to display the country name and relevant vaccination based on the selected category
- Play/stop button that starts or stops an animation cycling through different data

Race Bar Chart



The Reason to use Race Bar Chart: The Race Bat Chart effectively shows which countries have the highest and lowest total death numbers. This chart clearly compares between countries.

Data Source: [Data on COVID-19 (coronavirus) by Our World in Data]

Data Preprocessing:

- Reading The data from the main COVID-19 dataset
- Selected the specific feature which are "continent", "location", "date", and “target value”
- Handling the date data by creating a pivot table to reorganize data by continent and location.
- Filling Missing Values: The code that we have written checks missing information. If a country has a picture available, it adds the link to the dataset. Then, it looks at the number, fixing any gaps by filling them with the last maximum value.
- Saving the processed data to a new CSV file.

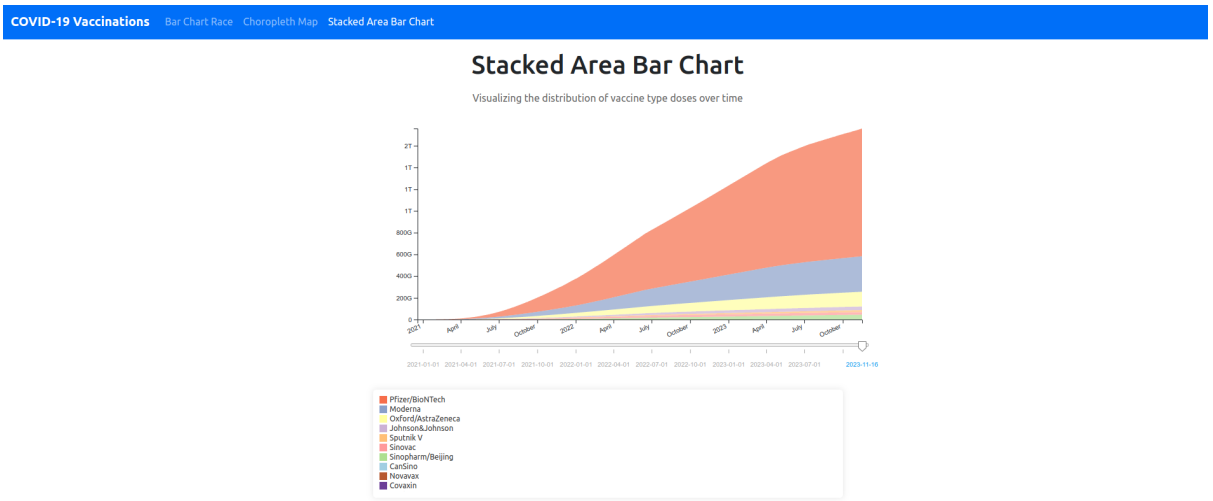
Chart Content:

- Use the [Flourish] to render the Bar Chart Race.
- Display bars representing different countries.
- Bars move horizontally to show changes in target value (total cases, total deaths, total vaccination, people vaccinated, and people fully vaccinated) over time.

Addition Function:

- Option to view either the top 10 highest or lowest countries.
- Play/Pause button
- Bar Chart Details:
    - Display the value for each country
    - Display the name and flag of the country for each bar
    - Each color of the bar chart represents each continent
    - Line Chat: Showing the total vaccination each color of the line represents the continent
    - Option for selecting the target value for the chart: total case, total deaths, total vaccination, people vaccinated and people fully vaccinated

Stacked Area Bar Chart



The Reason to use Stacked Area Bar Chart:

- The Stacked Area Bar Chart is good at showing how the total number of vaccine doses for each type increases over time. This helps people see the overall progress.
- The Chart's stacked layers make it easy to compare how much each vaccine type is used. The user can quickly see which vaccines are more popular.
- The user can notice if there are any changes in vaccine popularity. Users can easily observe shifts or if certain vaccines become more dominant over time.

Data Source: Data on COVID-19 (coronavirus) by Our World in Data

Data Preprocessing:

- Reading the data: reading a CSV file named 'covid-vaccine-doses-by-manufacturer.csv'
- Handling Date data: Convert the "Day" column, representing the date of vaccination to DateTime format
- Filter Date by Date rage
- Grouping Date by "Day" and sunning Does: group date by "Day" column and calculate the total dose for each vaccine type
- Saving the processed data to a new CSV file.

Chart Content:

- The horizontal axis represents time (date of vaccination)
- The vertical axis represents the cumulative number of vaccine doses
- Different colored areas represent the type of vaccine, each stacked on top of the others.
- The height of each colored area at a specific point on the horizontal axis indicates the total cumulative dose for that type up to that date.

Addition Function:

- Slide bar for users to select the dates.
- Tooltip to display the details of the number of each vaccine type up to date that the user has selected.

User Impact:

- Popular Choices: By looking at this graph, users can see which vaccines are used more often or are more popular. This can help the user decide which booster to get. If a lot of people used a certain vaccine in the past, users might feel safer choosing the one for their booster shot. Popular vaccines are often seen as more trustworthy.
- Health Guidelines: Users can see this graph and compare it to health rules. If a lot of people followed the guidelines in the past, you might want to choose a booster shot that fits with those rules.

Example Scenario

Alex's Booster Campaign Planning

Alex is a healthcare professional planning booster dose campaigns. Here's how he uses the

1. **Choropleth Map:** Finding Areas with Low Vaccination
    - Situation: Alex wants to know where vaccination coverage is low.
    - How Alex uses It:
        - He looks at the Choropleth Map to see which regions have lower vaccination coverage.
        - By using the slider, Alex can focus on the current status of vaccination in different areas.
        - The tooltip provides detailed information, helping him decide where booster doses are needed.
2. **Race Bar Chart:** Understanding Global Booster Adoption
    - Situation: Alex needs to understand how boosters are adopted worldwide.
    - How Alex uses It:
        - Switching to the Race Bar Chart, Alex selects "People Vaccinated" to see global trends.
        - The play/pause button helps him observe how different countries have embraced booster campaigns.
        - This chart gives a clear picture of booster adoption, assisting Alex in planning specific campaigns.
3. **Stacked Area Bar Chart:** Analysing Historical Booster Trends
    - Situation: Alex wants to analyze historical trends in booster preferences.
    - How Alex uses it:
        - Exploring the Stacked Area Bar Chart, Alex observes how different vaccines have been used historically for boosters.
        - Adjusting the date slider, he can see trends over time, helping him make informed decisions on vaccine supply and distribution.

In Summary

- The Choropleth Map helps Alex find regions with low vaccination coverage for targeted booster campaigns.
- The Race Bar Chart aids in understanding global booster adoption patterns, assisting in campaign planning.
- The Stacked Area Bar Chart allows Alex to analyze historical trends, contributing to informed decisions on vaccine supply and distribution strategies.