Covid Vaccines Analysis

27.09.2023

Objective

To perform an in-depth analysis of COVID-19 vaccine data, focusing on vaccine efficacy, distribution, and adverse effects. The goal is to provide insights that aid policymakers and health organizations in optimizing vaccine deployment strategies.

Covid 19 Vaccine data

Vaccine Efficacy

All COVID-19 vaccines approved by WHO for emergency use listing have been through randomized clinical trials to test their quality, safety, and efficacy. To be approved, vaccines are required to have a high efficacy rate of 50% or above. After approval, they continue to be monitored for ongoing safety and effectiveness.

A vaccine's **efficacy** is measured in a controlled clinical trial and is based on how many people who got vaccinated developed the 'outcome of interest' (usually disease) compared with how many people who got the placebo (dummy vaccine) developed the same outcome. Once the study is complete, the numbers of sick people in each group are compared, in order to calculate the relative risk of getting sick depending on whether or not the subjects received the vaccine. From this, we get the efficacy – a measure of how much the vaccine lowered the risk of getting sick. If a vaccine has high efficacy, a lot fewer people in the group who received the vaccine got sick than the people in the group who received the placebo. So, for example, let's imagine a vaccine with a proven efficacy of 80%. This means that – out of the people in the clinical trial – those who received the vaccine were at an

80% lower risk of developing disease than the group who received the placebo. This is calculated by comparing the number of cases of illness in the vaccinated group versus the placebo group. An efficacy of 80% does not mean that 20% of the vaccinated group will become ill.

Vaccine Distribution

The greatest benefits within that approach will come from prioritizing full vaccination and boosters for high-risk populations – older adults, healthcare workers, and persons with co-morbidities including immunocompromised persons.

The COVID-19 Vaccine Delivery Partnership, a collective international effort with 'One Country Team', 'One Plan', and 'One Budget' was launched by WHO, UNICEF, and Gavi with international partners including the World Bank to intensify country readiness and intensify delivery support. It focuses on 34 low-coverage countries, with the government at the center, to accelerate COVID-19 vaccination.

Donate life saving vaccines

'Go Give One' is a COVID-19 fundraising campaign with no borders. Donate US$5 for a single vaccine for those in countries that cannot afford them.

COVID-19 Solidarity Response Fund

Donate to help countries prevent, detect, and respond to the COVID-19 pandemic.

Contribute to the ACT Accelerator

Donations to the ACT Accelerator fund the equitable distribution of life-saving tests, treatments, and vaccines.

Get involved

Help spread the word about vaccine inequity. You can raise awareness of the problem by sharing these materials and/ or writing to decision-makers.

The first meeting of G20 Finance Ministers and Central Bank Governors under the Indonesian Presidency was held on 17 and 18 February 2022. The communique requested WHO and the World Bank, and implementing partners to work further with countries to report on obstacles to, and accelerate, vaccine deployment strategies to get more COVID-19 vaccines into arms.

This report, produced to answer that request, has been prepared with the support of six international bodies involved in work to support higher levels of COVID-19 vaccination coverage and the leadership of the COVID-19 Vaccine Delivery Partnership (CoVDP) and ACT-Accelerator Hub.

Adverse effects of Vaccine

Vaccines are designed to give immunity without the dangers of getting the disease. It's common to experience some mild-to-moderate side effects when receiving vaccinations. This is because your immune system is instructing your body to react in certain ways: it increases blood flow so more immune cells can circulate, and it raises your body temperature in order to kill the virus.

Mild-to-moderate side effects, like a low-grade fever or muscle aches, are normal and not a cause for alarm: they are signs that the body's immune system is responding to the vaccine, specifically the antigen (a substance that triggers an immune response), and is gearing up to fight the virus. These side effects usually go away on their own after a few days. Common and mild or moderate side effects are a good thing: they show us that the vaccine is working. Experiencing no side effects doesn't mean the vaccine is ineffective. It means everybody responds differently.

There have been concerns about COVID-19 vaccines making people sick with COVID-19. However, none of the approved vaccines contain the live virus that causes COVID-19, which means that COVID-19 vaccines cannot make you sick with COVID-19. After vaccination, it usually takes a few weeks for the body to build immunity against SARS-CoV-2, the virus that causes COVID-19. So it's possible a person could be infected with SARS-CoV-2 just before or after vaccination and still get sick with COVID-19. This is because the vaccine has not yet had enough time to provide protection.

Insights to optimize vaccine deployment strategies

Priority Groups: Begin with clear prioritization based on risk factors.

Supply Chain Optimization: Ensure a well-managed supply chain to prevent shortages and wastage.

Diverse Distribution: Use various distribution channels, adapting to geographic and demographic needs.

Effective Communication: Communicate transparently to address vaccine hesitancy and concerns.

Healthcare Readiness: Strengthen healthcare facilities for safe and efficient vaccine administration.

Real-Time Monitoring: Continuously track progress and adjust strategies accordingly.

International Collaboration: Collaborate with other nations and organizations for a coordinated effort.

Adaptability: Be flexible in response to evolving circumstances, including new variants.

Private Sector Engagement: Partner with the private sector to leverage resources and expertise.

Community Involvement: Engage communities to ensure equitable access and participation.

Prototype

Step 1

Data Importing

In PowerBI desktop with the help of the get data option import the CSV data which is named as country_vaccinations and click load option.

Step 2

Data Cleaning

After loading the data and after analyzing the data | understood that there are 86512 rows and 15 columns. And in that some of the columns contained null values I have replaced the null values by 0 with the use of replace functions and started working on the data.

Step 3

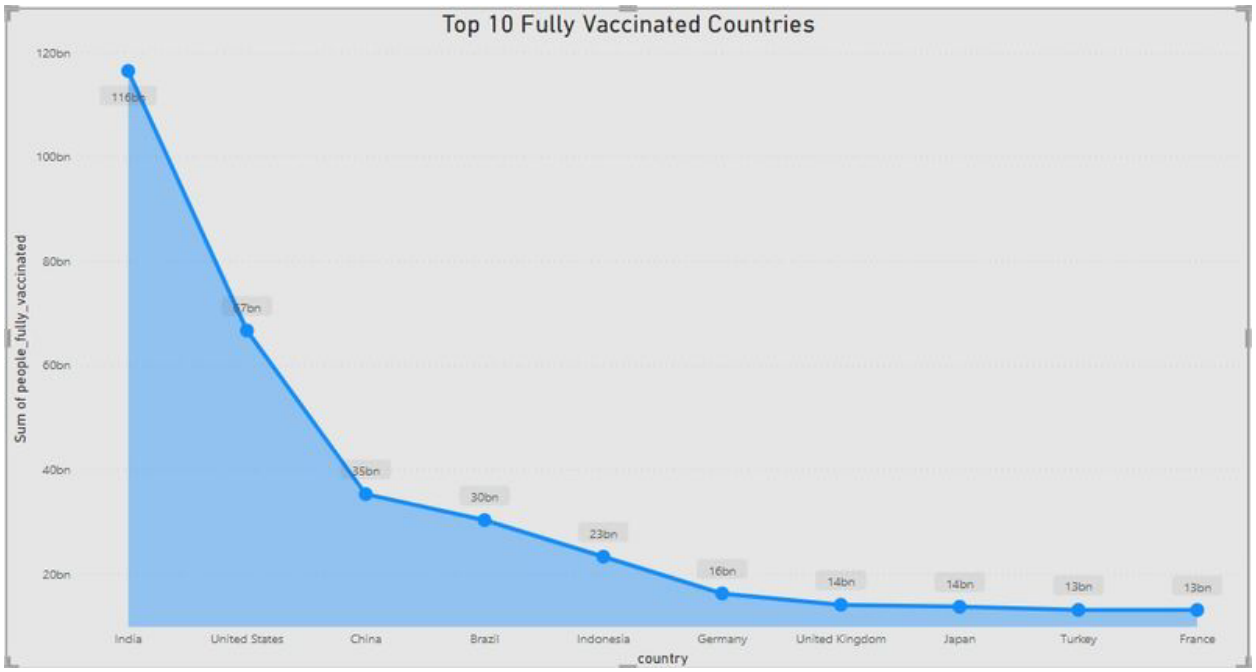
Visualizations

In the visualization part with the help of power BI desktop software I have used different kinds of charts, graphs, cards, and tables to display the data in a format which will be easy to understand.

Analysis

In the analysis part first | have analyzed the top 10 fully vaccinated countries by using area chart and have used the filter option to find the top countries and the result obtained as below,

From the below image, we can come to know that India is the top country in terms of full vaccination with 116 billion, followed by the United States of America and China with 67 billion and 35 billion respectively.



In the second analysis, we analyzed the top 5 vaccinated countries with the help of a pie chart and used the filter option to find the top countries with that, we came to know that India is the top country with more vaccinated people followed by the United States of America and Brazil.

Conclusion

Hence our project involves data collection, data preprocessing, exploratory data analysis, statistical analysis, and visualization of in-depth analysis of Covid-19 vaccine data, focusing on the vaccine efficacy, distribution and adverse effect.