

# COVID-19 Global Data Tracker Report

Author: Stephen Kalwenzi

Date of Completion: 13th May 2025

## 1. Introduction

This report presents an analysis of the global COVID-19 pandemic using publicly available data from Our World in Data. The goal is to understand the spread of the virus, death rates, and the progress of vaccination campaigns across countries.

Three countries were selected for focused analysis: Kenya, United States, and India. The analysis spans multiple dimensions of the pandemic, including total cases, deaths, new infections, and vaccinations.

## 2. Data Sources and Preparation

The primary dataset (owid-covid-data.csv) was obtained from Our World in Data, which aggregates global COVID-19 statistics.

Steps followed:

- Loaded the dataset using pandas.
- Filtered for the countries of interest.
- Handled missing data by interpolating numeric columns.
- Converted date values to datetime format for time series analysis.
- Created new variables such as the death rate.

## 3. Key Trends and Visualizations

A. Total Cases Over Time:

- United States showed the highest number of total confirmed cases.
- India experienced a steep rise during the second wave (mid-2021).
- Kenya maintained relatively low total case numbers.

#### B. Total Deaths Over Time:

- United States led in cumulative deaths.
- India showed a sharp increase in deaths aligned with the second wave.
- Kenya had comparatively low deaths.

#### C. Daily New Cases:

- India's second wave was sharp and short.
- Kenya had intermittent waves.

#### D. Death Rate:

- Death rate =  $\text{total\_deaths} / \text{total\_cases}$ .
- U.S. and India had consistent rates, Kenya's varied more.

### 4. Top 10 Countries by Total Cases

A bar chart analysis revealed:

- United States, India, and Brazil dominate in total cases.
- France and Germany also among the top 10.

### 5. Vaccination Progress

#### A. Cumulative Vaccinations:

- United States led early in vaccine rollout.
- India ramped up mid-2021.
- Kenya lagged behind.

#### B. Percent Vaccinated:

- High-income countries had higher vaccination percentages.
- Vaccine equity remains an issue globally.

### 6. Choropleth Map: Global Vaccination Rates

The map visualized:

- High vaccination rates in Portugal, Chile, and UAE.
- Moderate rates in U.S., Europe, South America.
- Low rates in many African countries.

## **7. Key Insights**

1. United States had the highest total cases and deaths.
2. India had a sharp second wave in 2021.
3. Kenya reported lower cases and deaths.
4. Vaccination rollouts were faster in high-income nations.
5. Death rates strongly correlated with total cases.

## **8. Conclusion**

This analysis highlights disparities in COVID-19 outcomes and vaccine access. It also showcases how data science can inform public health surveillance and decision-making.