COVID-19 Global Data Tracker Project

May 8, 2025

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import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px

# Set plot style
sns.set(style="darkgrid")
plt.rcParams["figure.figsize"] = (12, 6)

# Load Dataset
df = pd.read_csv('owid-covid-data.csv')

# Convert 'date' column to datetime
df['date'] = pd.to_datetime(df['date'])

# Preview dataset
print(df.shape)
df.head()

# Data Cleaning

# Focus on selected countries
countries = ['Kenya', 'United States', 'South Africa']
df = df[df['location'].isin(countries)].copy()

# Fill missing numeric values
columns_to_fill = ['total_cases', 'total_deaths', 'total_vaccinations',␣
 ↪'new_cases', 'new_deaths']
df[columns_to_fill] = df[columns_to_fill].fillna(0)

# Calculate death rate
df['death_rate'] = df.apply(lambda row: row['total_deaths'] /␣
 ↪row['total_cases'] if row['total_cases'] > 0 else 0, axis=1)

# Preview cleaned data
df[['location', 'date', 'total_cases', 'total_deaths', 'death_rate']].head()
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# EDA - Cases & Deaths Over Time

# Line plot: Total cases over time
plt.figure()
sns.lineplot(data=df, x='date', y='total_cases', hue='location')
plt.title('Total COVID-19 Cases Over Time')
plt.ylabel('Total Cases')
plt.xlabel('Date')
plt.show()

# Line plot: Total deaths over time
plt.figure()
sns.lineplot(data=df, x='date', y='total_deaths', hue='location')
plt.title('Total COVID-19 Deaths Over Time')
plt.ylabel('Total Deaths')
plt.xlabel('Date')
plt.show()

# Daily New Cases Comparison

plt.figure()
sns.lineplot(data=df, x='date', y='new_cases', hue='location')
plt.title('Daily New COVID-19 Cases')
plt.ylabel('New Cases per Day')
plt.xlabel('Date')
plt.show()

# Visualizing Vaccination Progress

# Line plot: Total vaccinations over time
plt.figure()
sns.lineplot(data=df, x='date', y='total_vaccinations', hue='location')
plt.title('Total COVID-19 Vaccinations Over Time')
plt.ylabel('Total Vaccinations')
plt.xlabel('Date')
plt.show()

# Choropleth Map (Latest Data)

# Get latest data for each country
latest_df = df.sort_values('date').groupby('location').tail(1)

# Plot cases per country
fig = px.choropleth(
    latest_df,
    locations="iso_code",
    color="total_cases",
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    hover_name="location",
    color_continuous_scale="Reds",
    title="Total COVID-19 Cases by Country (Latest)"
)
fig.show()
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(429435, 67)
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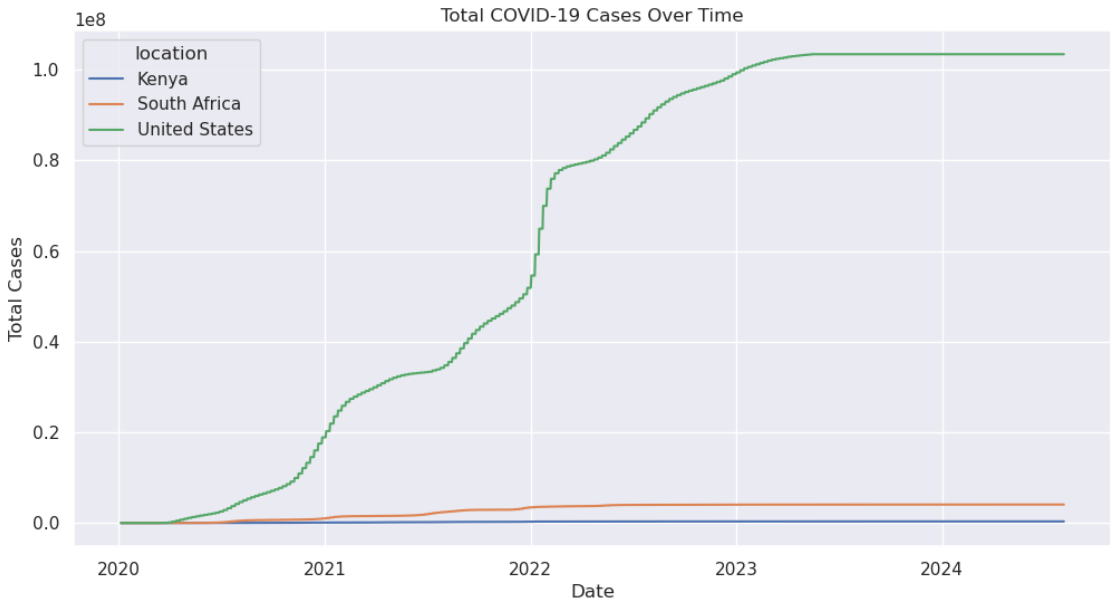
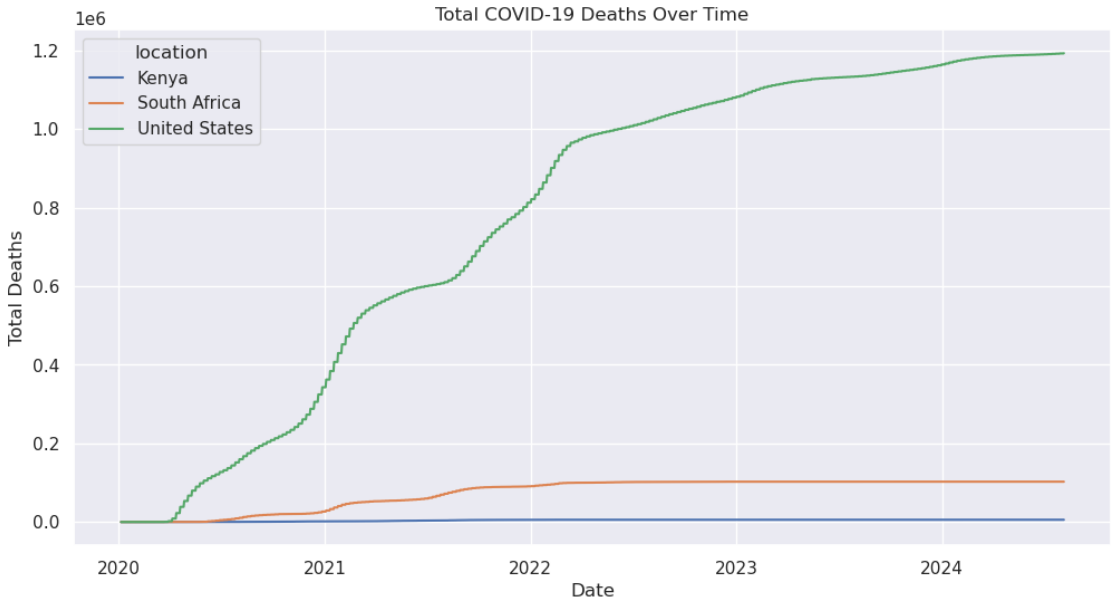
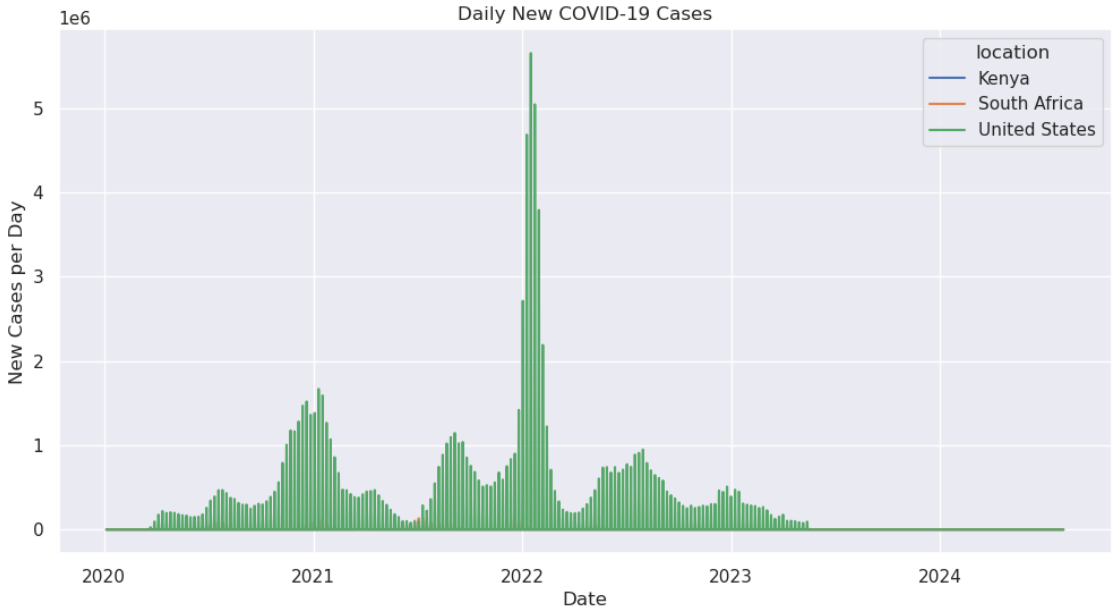
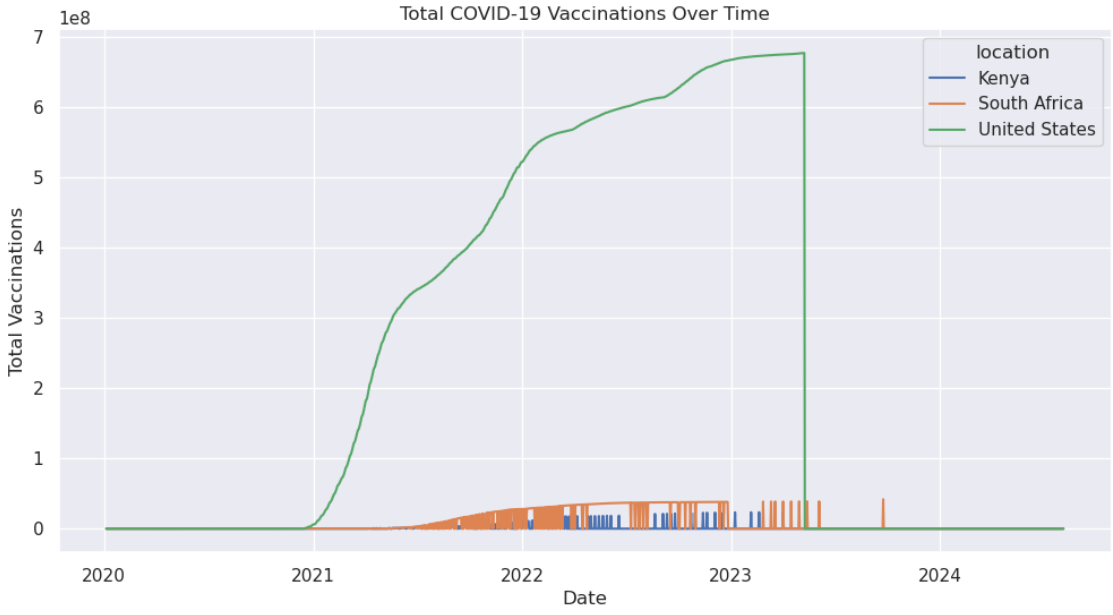
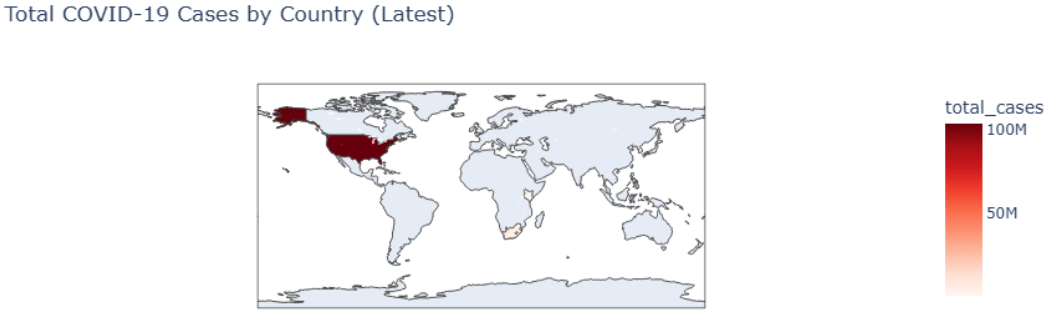





Daily New COVID-19 Cases
1e6
New Cases per Day
Date
location
Kenya
South Africa
United States
0
1
2
3
4
5
2020
2021
2022
2023
2024


Total COVID-19 Vaccinations Over Time
1e8
Total Vaccinations
Date
location
Kenya
South Africa
United States
0
1
2
3
4
5
6
7
2020
2021
2022
2023
2024



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Insights & Reporting
1. COVID-19 Case Progression:
United States experienced the highest total number of COVID-19 cases compared␣
 ↪to Kenya and South Africa, which can be attributed to its larger population␣
 ↪and early widespread transmission.

South Africa and Kenya saw a much slower increase in total cases compared to␣
 ↪the United States, though South Africa's total cases rose significantly in␣
 ↪certain periods.

2. Total Deaths:
United States also reported the highest number of total deaths. However, the␣
 ↪death rate in South Africa is notably higher than the United States and␣
 ↪Kenya, which could point to differences in healthcare systems or testing␣
 ↪accuracy.

3. Daily New Cases:
During the peak periods of COVID-19 waves, all three countries showed large␣
 ↪spikes in new daily cases, with Kenya showing a later spike compared to␣
 ↪South Africa and the United States, which had earlier surges.

4. Vaccination Progress:
United States led the charge in terms of the total number of vaccinations,␣
 ↪reflecting a quicker vaccine rollout compared to South Africa and Kenya.

South Africa began vaccinating later, but showed significant progress in␣
 ↪mid-2021, with cases of vaccine hesitancy affecting the overall rate of␣
 ↪vaccination.

5. Choropleth Map - Latest Cases:
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The choropleth map clearly highlights the United States as having the most␣
 ↪significant burden of COVID-19 cases compared to South Africa and Kenya,␣
 ↪which reflects their respective outbreak levels as of the most recent data.

Conclusion
This analysis highlights the significant differences in COVID-19 trends across␣
 ↪the three countries, including cases, deaths, and vaccination progress.␣
 ↪While the United States experienced the highest overall impact, South Africa␣
 ↪and Kenya's data reflect more controlled growth, though healthcare access␣
 ↪and vaccine rollout remain key factors.
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