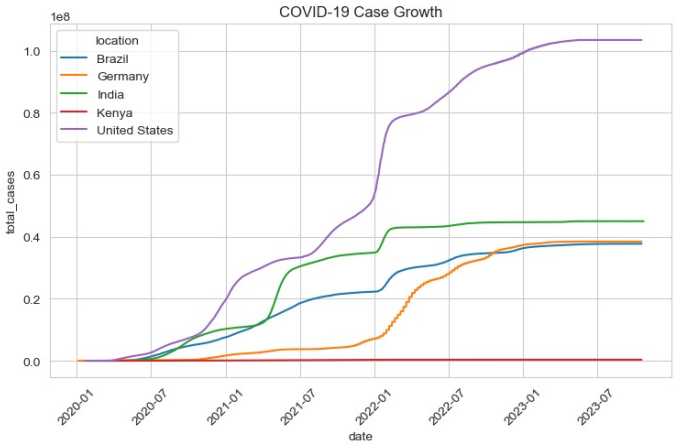
In [2]:
```
import covid19main
```

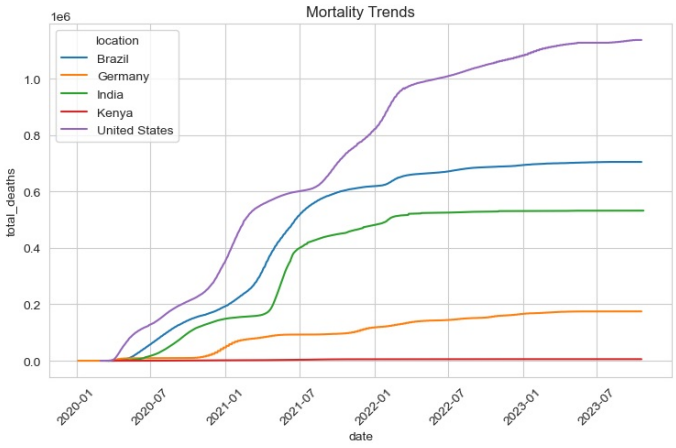
```
=== Dataset Structure ===
Shape (rows, columns): (350085, 67)

=== Column Check ===
Columns: ['iso_code', 'continent', 'location', 'date', 'total_cases', 'new_cases', 'new_cases_smoothed', 'total_
deaths', 'new_deaths', 'new_deaths_smoothed', 'total_cases_per_million', 'new_cases_per_million', 'new_cases_smo
othed_per_million', 'total_deaths_per_million', 'new_deaths_per_million', 'new_deaths_smoothed_per_million', 're
production_rate', 'icu_patients', 'icu_patients_per_million', 'hosp_patients', 'hosp_patients_per_million', 'wee
kly_icu_admissions', 'weekly_icu_admissions_per_million', 'weekly_hosp_admissions', 'weekly_hosp_admissions_per_
million', 'total_tests', 'new_tests', 'total_tests_per_thousand', 'new_tests_per_thousand', 'new_tests_smoothed'
, 'new_tests_smoothed_per_thousand', 'positive_rate', 'tests_per_case', 'tests_units', 'total_vaccinations', 'pe
ople_vaccinated', 'people_fully_vaccinated', 'total_boosters', 'new_vaccinations', 'new_vaccinations_smoothed',
'total_vaccinations_per_hundred', 'people_vaccinated_per_hundred', 'people_fully_vaccinated_per_hundred', 'total
_boosters_per_hundred', 'new_vaccinations_smoothed_per_million', 'new_people_vaccinated_smoothed', 'new_people_v
accinated_smoothed_per_hundred', 'stringency_index', 'population_density', 'median_age', 'aged_65_older', 'aged_
70_older', 'gdp_per_capita', 'extreme_poverty', 'cardiovasc_death_rate', 'diabetes_prevalence', 'female_smokers'
, 'male_smokers', 'handwashing_facilities', 'hospital_beds_per_thousand', 'life_expectancy', 'human_development_
index', 'population', 'excess_mortality_cumulative_absolute', 'excess_mortality_cumulative', 'excess_mortality',
'excess_mortality_cumulative_per_million']

=== Data Preview ===
```

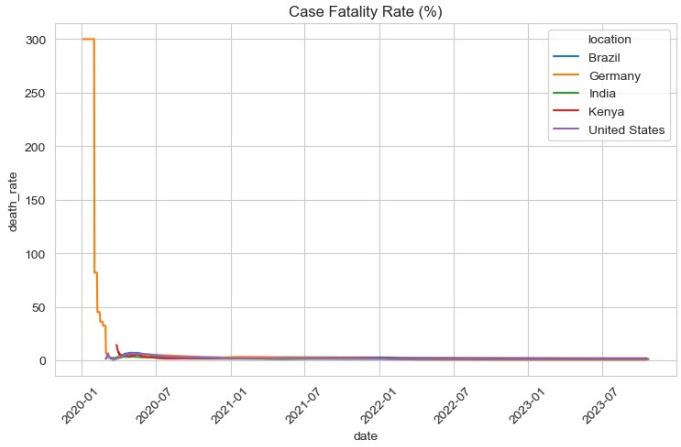
	iso_code	continent	location	date	total_cases	new_cases	new_cases_smoothed	total_deaths	new_deaths	new_deaths_sm
0	AFG	Asia	Afghanistan	2020-01-03	NaN	0.0	NaN	NaN	0.0	
1	AFG	Asia	Afghanistan	2020-01-04	NaN	0.0	NaN	NaN	0.0	
2	AFG	Asia	Afghanistan	2020-01-05	NaN	0.0	NaN	NaN	0.0	

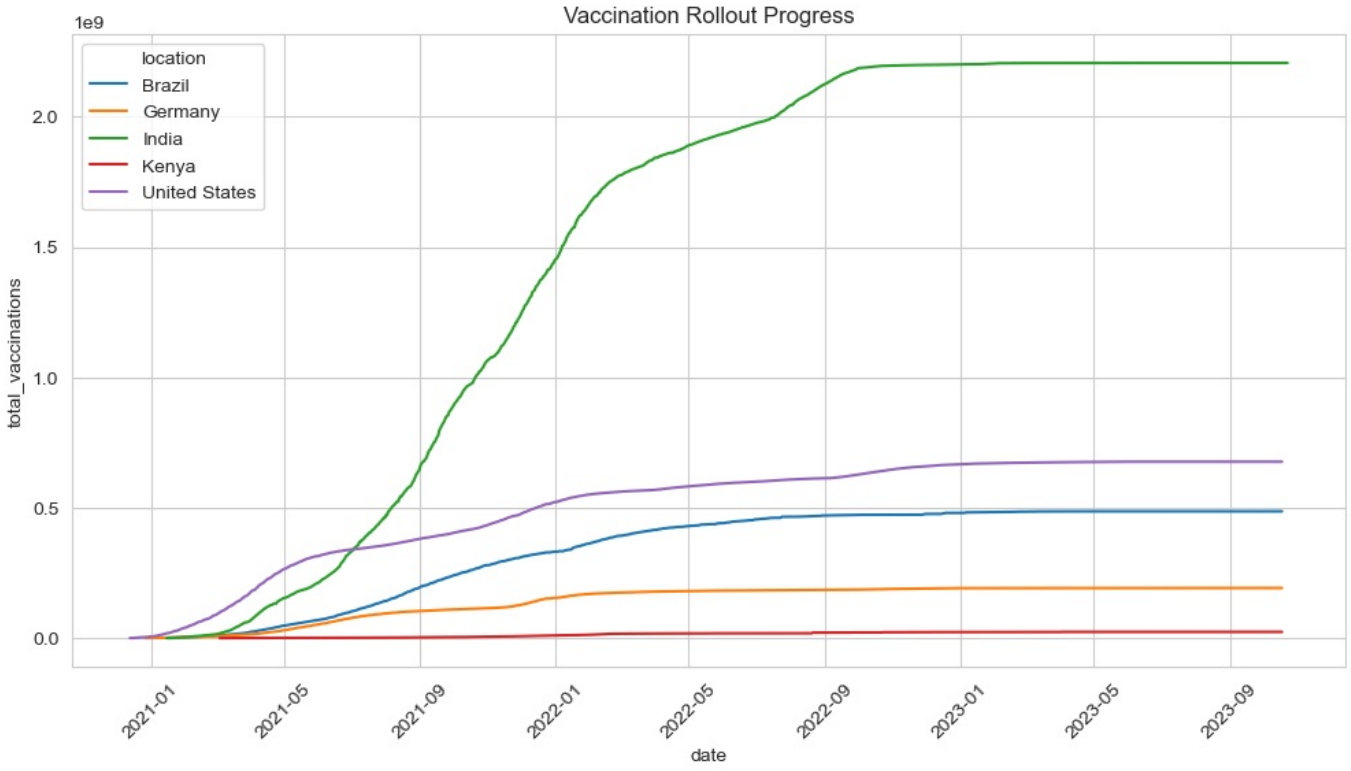
3 rows × 67 columns

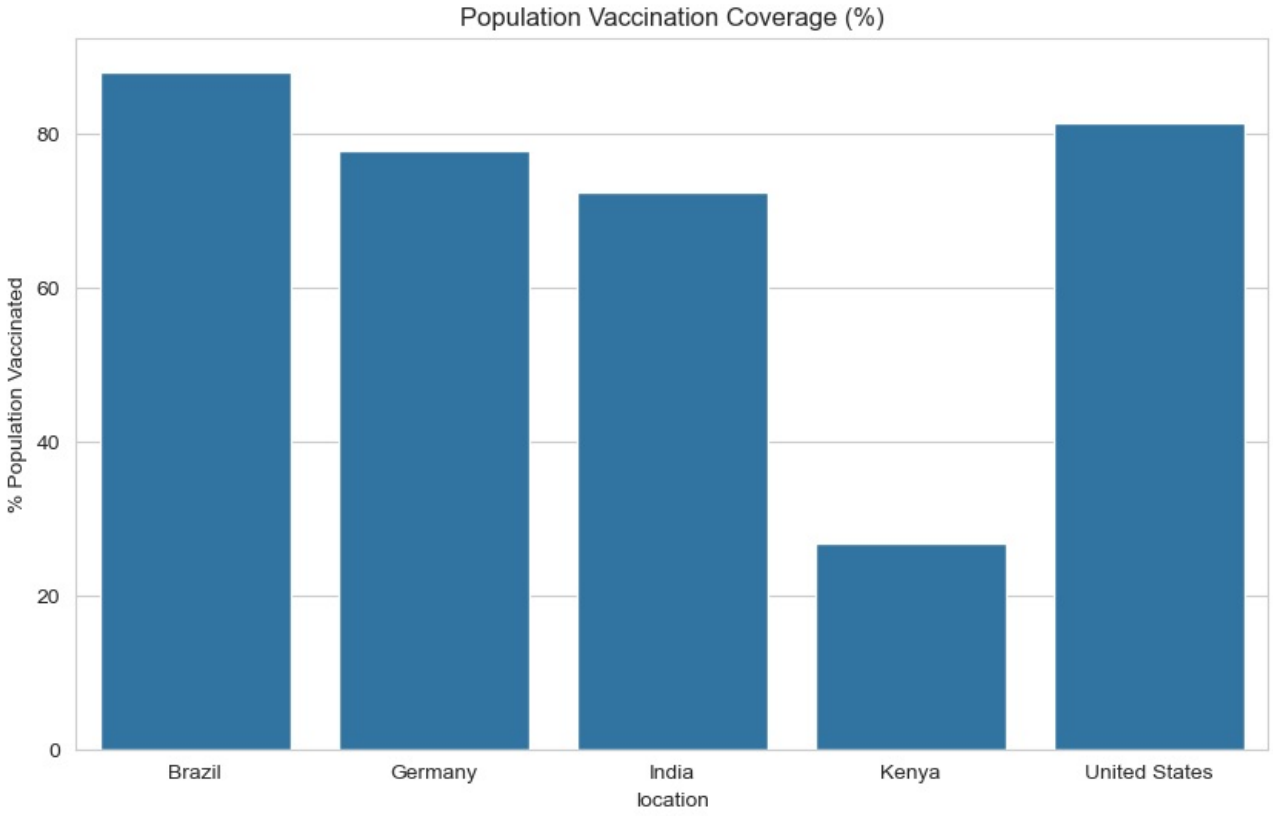
```
=== Missing Values Analysis ===
Null values per column:
iso_code                                     0
continent                                16665
location                                     0
date                                         0
total_cases                              37997
                                         ...
population                                   0
excess_mortality_cumulative_absolute    337901
excess_mortality_cumulative             337901
excess_mortality                        337901
excess_mortality_cumulative_per_million 337901
Length: 67, dtype: int64

=== Handling Missing Values ===
Remaining rows after cleaning: 6759
C:\Users\hp\covid19main.py:69: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#retu
rning-a-view-versus-a-copy
  df_clean['death_rate'] = (df_clean['total_deaths'] / df_clean['total_cases']) * 100
```


COVID-19 Case Growth
1e8
location
Brazil
Germany
India
Kenya
United States
total_cases
1.0
0.8
0.6
0.4
0.2
0.0
2020-01
2020-07
2021-01
2021-07
2022-01
2022-07
2023-01
2023-07
date


Mortality Trends
1e6
location
Brazil
Germany
India
Kenya
United States
total_deaths
1.0
0.8
0.6
0.4
0.2
0.0
2020-01
2020-07
2021-01
2021-07
2022-01
2022-07
2023-01
2023-07
date


Case Fatality Rate (%)
location
Brazil
Germany
India
Kenya
United States
death_rate
300
250
200
150
100
50
0
2020-01
2020-07
2021-01
2021-07
2022-01
2022-07
2023-01
2023-07
date


Vaccination Rollout Progress
1e9
location
Brazil
Germany
India
Kenya
United States
2.0
1.5
1.0
0.5
0.0
total_vaccinations
2021-01
2021-05
2021-09
2022-01
2022-05
2022-09
2023-01
2023-05
2023-09
date


Population Vaccination Coverage (%)
% Population Vaccinated
0
20
40
60
80
Brazil
Germany
India
Kenya
United States
location

```
=== Analysis Complete ===
```

In [ ]:

In [ ]:

In [ ]:

In [ ]: