PROGRAM:

```python
# Import necessary libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

# Load your dataset (replace 'data.csv' with your actual data file)
df = pd.read_csv('country_vaccinations.csv')

# Display the first few rows of the dataset\
print("\n\nPerforming exploratory data analysis")
print(df.head())

# Summary statistics
print("\n\nStatistical analysis")
summary_stats = df.describe()
print(summary_stats)

# Check for missing values
missing_values = df.isnull().sum()
print(missing_values)

# Data visualization
# Example: Create a histogram of a numerical column
print("\n\nVisualization")
plt.figure(figsize=(8, 6))
sns.histplot(data=df, x='country', bins=20, kde=True)
```

```python
plt.title('Covid Analysis')

plt.xlabel('Values')

plt.ylabel('Frequency')

plt.show()


# Example: Create a pair plot to visualize relationships between numerical variables

sns.pairplot(data=df)

plt.show()


# Example: Create a correlation heatmap

correlation_matrix = df.corr()

plt.figure(figsize=(10, 8))

sns.heatmap(correlation_matrix, annot=True, cmap='coolwarm')

plt.title('Correlation Heatmap')

plt.show()
```

OUTPUT:

Performing exploratory data analysis

```
        country iso_code        date  total_vaccinations  people_vaccinated  \
0  Afghanistan      AFG  2021-02-22                 0.0                0.0
1  Afghanistan      AFG  2021-02-23                 NaN                NaN
2  Afghanistan      AFG  2021-02-24                 NaN                NaN
3  Afghanistan      AFG  2021-02-25                 NaN                NaN
4  Afghanistan      AFG  2021-02-26                 NaN                NaN

   people_fully_vaccinated  daily_vaccinations_raw  daily_vaccinations  \
0                      NaN                     NaN                 NaN
1                      NaN                     NaN              1367.0
2                      NaN                     NaN              1367.0
3                      NaN                     NaN              1367.0
4                      NaN                     NaN              1367.0
```

```
   total_vaccinations_per_hundred  people_vaccinated_per_hundred  \
0                             0.0                            0.0
1                             NaN                            NaN
2                             NaN                            NaN
3                             NaN                            NaN
4                             NaN                            NaN

   people_fully_vaccinated_per_hundred  daily_vaccinations_per_million  \
0                                  NaN                             NaN
1                                  NaN                            34.0
2                                  NaN                            34.0
3                                  NaN                            34.0
4                                  NaN                            34.0

                                     vaccines  \
0  Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...
1  Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...
2  Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...
3  Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...
4  Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...

                 source_name              source_website
0  World Health Organization  https://covid19.who.int/
1  World Health Organization  https://covid19.who.int/
2  World Health Organization  https://covid19.who.int/
3  World Health Organization  https://covid19.who.int/
4  World Health Organization  https://covid19.who.int/
```

Statistical analysis

```
       total_vaccinations  people_vaccinated  people_fully_vaccinated  \
count        4.360700e+04       4.129400e+04             3.880200e+04
mean         4.592964e+07       1.770508e+07             1.413830e+07
std          2.246004e+08       7.078731e+07             5.713920e+07
min          0.000000e+00       0.000000e+00             1.000000e+00
25%          5.264100e+05       3.494642e+05             2.439622e+05
50%          3.590096e+06       2.187310e+06             1.722140e+06
75%          1.701230e+07       9.152520e+06             7.559870e+06
max          3.263129e+09       1.275541e+09             1.240777e+09

       daily_vaccinations_raw  daily_vaccinations  \
count            3.536200e+04        8.621300e+04
mean             2.705996e+05        1.313055e+05
```

```
std                       1.212427e+06            7.682388e+05
min                       0.000000e+00            0.000000e+00
25%                       4.668000e+03            9.000000e+02
50%                       2.530900e+04            7.343000e+03
75%                       1.234925e+05            4.409800e+04
max                       2.474100e+07            2.242429e+07


          total_vaccinations_per_hundred  people_vaccinated_per_hundred  \
count                    43607.000000                      41294.000000
mean                        80.188543                         40.927317
std                         67.913577                         29.290759
min                          0.000000                          0.000000
25%                         16.050000                         11.370000
50%                         67.520000                         41.435000
75%                        132.735000                         67.910000
max                        345.370000                        124.760000


          people_fully_vaccinated_per_hundred  daily_vaccinations_per_million
count                      38802.000000                      86213.000000
mean                          35.523243                       3257.049157
std                           28.376252                       3934.312440
min                            0.000000                          0.000000
25%                            7.020000                        636.000000
50%                           31.750000                       2050.000000
75%                           62.080000                       4682.000000
max                          122.370000                     117497.000000
country                                          0
iso_code                                         0
date                                             0
total_vaccinations                           42905
people_vaccinated                            45218
people_fully_vaccinated                      47710
daily_vaccinations_raw                       51150
daily_vaccinations                             299
total_vaccinations_per_hundred               42905
people_vaccinated_per_hundred                45218
people_fully_vaccinated_per_hundred          47710
daily_vaccinations_per_million                 299
vaccines                                         0
source_name                                      0
source_website                                   0
dtype: int64
```

Visualization

Correlation Heatmap