# covid

March 14, 2024

[1]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

[4]:
```
dt = pd.read_csv("covid_vaccine_statewise.csv")
```

[10]:
```
print("top five rows")
dt.head()
```

```
top five rows
```

[10]:

| | Updated On | State | Total Doses Administered | Sessions | Sites | \ |
|---|---|---|---|---|---|---|
| 0 | 16/01/2021 | India | 48276.0 | 3455.0 | 2957.0 | |
| 1 | 17/01/2021 | India | 58604.0 | 8532.0 | 4954.0 | |
| 2 | 18/01/2021 | India | 99449.0 | 13611.0 | 6583.0 | |
| 3 | 19/01/2021 | India | 195525.0 | 17855.0 | 7951.0 | |
| 4 | 20/01/2021 | India | 251280.0 | 25472.0 | 10504.0 | |

| | First Dose Administered | Second Dose Administered | \ |
|---|---|---|---|
| 0 | 48276.0 | 0.0 | |
| 1 | 58604.0 | 0.0 | |
| 2 | 99449.0 | 0.0 | |
| 3 | 195525.0 | 0.0 | |
| 4 | 251280.0 | 0.0 | |

| | Male (Doses Administered) | Female (Doses Administered) | \ |
|---|---|---|---|
| 0 | NaN | NaN | |
| 1 | NaN | NaN | |
| 2 | NaN | NaN | |
| 3 | NaN | NaN | |
| 4 | NaN | NaN | |

| | Transgender (Doses Administered) | … | 18-44 Years (Doses Administered) | \ |
|---|---|---|---|---|
| 0 | NaN | … | NaN | |
| 1 | NaN | … | NaN | |
| 2 | NaN | … | NaN | |
| 3 | NaN | … | NaN | |

```
4                                NaN  …                                NaN

   45-60 Years (Doses Administered)  60+ Years (Doses Administered)  \
0                               NaN                             NaN
1                               NaN                             NaN
2                               NaN                             NaN
3                               NaN                             NaN
4                               NaN                             NaN

   18-44 Years(Individuals Vaccinated)  45-60 Years(Individuals Vaccinated)  \
0                                  NaN                                  NaN
1                                  NaN                                  NaN
2                                  NaN                                  NaN
3                                  NaN                                  NaN
4                                  NaN                                  NaN

   60+ Years(Individuals Vaccinated)  Male(Individuals Vaccinated)  \
0                                NaN                       23757.0
1                                NaN                       27348.0
2                                NaN                       41361.0
3                                NaN                       81901.0
4                                NaN                       98111.0

   Female(Individuals Vaccinated)  Transgender(Individuals Vaccinated)  \
0                         24517.0                                  2.0
1                         31252.0                                  4.0
2                         58083.0                                  5.0
3                        113613.0                                 11.0
4                        153145.0                                 24.0

   Total Individuals Vaccinated
0                       48276.0
1                       58604.0
2                       99449.0
3                      195525.0
4                      251280.0

[5 rows x 24 columns]
```

[11]:
```
print("last five rows")
dt.tail()
```

```
last five rows
```

[11]:
```
      Updated On        State  Total Doses Administered  Sessions   Sites   \
7840  11/08/2021  West Bengal                       NaN       NaN      NaN
7841  12/08/2021  West Bengal                       NaN       NaN      NaN
```

```
7842  13/08/2021  West Bengal                        NaN       NaN      NaN
7843  14/08/2021  West Bengal                        NaN       NaN      NaN
7844  15/08/2021  West Bengal                        NaN       NaN      NaN

      First Dose Administered  Second Dose Administered  \
7840                      NaN                       NaN
7841                      NaN                       NaN
7842                      NaN                       NaN
7843                      NaN                       NaN
7844                      NaN                       NaN

      Male (Doses Administered)  Female (Doses Administered)  \
7840                        NaN                          NaN
7841                        NaN                          NaN
7842                        NaN                          NaN
7843                        NaN                          NaN
7844                        NaN                          NaN

      Transgender (Doses Administered)  …  18-44 Years (Doses Administered)  \
7840                               NaN  …                                NaN
7841                               NaN  …                                NaN
7842                               NaN  …                                NaN
7843                               NaN  …                                NaN
7844                               NaN  …                                NaN

      45-60 Years (Doses Administered)  60+ Years (Doses Administered)  \
7840                               NaN                             NaN
7841                               NaN                             NaN
7842                               NaN                             NaN
7843                               NaN                             NaN
7844                               NaN                             NaN

      18-44 Years(Individuals Vaccinated)  \
7840                                  NaN
7841                                  NaN
7842                                  NaN
7843                                  NaN
7844                                  NaN

      45-60 Years(Individuals Vaccinated)  60+ Years(Individuals Vaccinated)  \
7840                                  NaN                                NaN
7841                                  NaN                                NaN
7842                                  NaN                                NaN
7843                                  NaN                                NaN
7844                                  NaN                                NaN

      Male(Individuals Vaccinated)  Female(Individuals Vaccinated)  \
```

```
7840                              NaN                              NaN
7841                              NaN                              NaN
7842                              NaN                              NaN
7843                              NaN                              NaN
7844                              NaN                              NaN

      Transgender(Individuals Vaccinated)  Total Individuals Vaccinated
7840                                  NaN                           NaN
7841                                  NaN                           NaN
7842                                  NaN                           NaN
7843                                  NaN                           NaN
7844                                  NaN                           NaN

[5 rows x 24 columns]
```

[12]:
```
print("Dataset Description:")
dt.info()
```

```
Dataset Description:
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 7845 entries, 0 to 7844
Data columns (total 24 columns):
 #   Column                                Non-Null Count  Dtype
---  ------                                --------------  -----
 0   Updated On                            7845 non-null   object
 1   State                                 7845 non-null   object
 2   Total Doses Administered              7621 non-null   float64
 3   Sessions                              7621 non-null   float64
 4    Sites                                7621 non-null   float64
 5   First Dose Administered               7621 non-null   float64
 6   Second Dose Administered              7621 non-null   float64
 7   Male (Doses Administered)             7461 non-null   float64
 8   Female (Doses Administered)           7461 non-null   float64
 9   Transgender (Doses Administered)      7461 non-null   float64
 10   Covaxin (Doses Administered)         7621 non-null   float64
 11  CoviShield (Doses Administered)       7621 non-null   float64
 12  Sputnik V (Doses Administered)        2995 non-null   float64
 13  AEFI                                  5438 non-null   float64
 14  18-44 Years (Doses Administered)      1702 non-null   float64
 15  45-60 Years (Doses Administered)      1702 non-null   float64
 16  60+ Years (Doses Administered)        1702 non-null   float64
 17  18-44 Years(Individuals Vaccinated)   3733 non-null   float64
 18  45-60 Years(Individuals Vaccinated)   3734 non-null   float64
 19  60+ Years(Individuals Vaccinated)     3734 non-null   float64
 20  Male(Individuals Vaccinated)          160 non-null    float64
 21  Female(Individuals Vaccinated)        160 non-null    float64
 22  Transgender(Individuals Vaccinated)   160 non-null    float64
```

```
 23  Total Individuals Vaccinated         5919 non-null   float64
dtypes: float64(22), object(2)
memory usage: 1.4+ MB
```

[13]:
```
dt.describe()
```

[13]:

| | Total Doses Administered | Sessions | Sites |
|---|---|---|---|
| count | 7.621000e+03 | 7.621000e+03 | 7621.000000 |
| mean | 9.188171e+06 | 4.792358e+05 | 2282.872064 |
| std | 3.746180e+07 | 1.911511e+06 | 7275.973730 |
| min | 7.000000e+00 | 0.000000e+00 | 0.000000 |
| 25% | 1.356570e+05 | 6.004000e+03 | 69.000000 |
| 50% | 8.182020e+05 | 4.547000e+04 | 597.000000 |
| 75% | 6.625243e+06 | 3.428690e+05 | 1708.000000 |
| max | 5.132284e+08 | 3.501031e+07 | 73933.000000 |

| | First Dose Administered | Second Dose Administered |
|---|---|---|
| count | 7.621000e+03 | 7.621000e+03 |
| mean | 7.414415e+06 | 1.773755e+06 |
| std | 2.995209e+07 | 7.570382e+06 |
| min | 7.000000e+00 | 0.000000e+00 |
| 25% | 1.166320e+05 | 1.283100e+04 |
| 50% | 6.614590e+05 | 1.388180e+05 |
| 75% | 5.387805e+06 | 1.166434e+06 |
| max | 4.001504e+08 | 1.130780e+08 |

| | Male (Doses Administered) | Female (Doses Administered) |
|---|---|---|
| count | 7.461000e+03 | 7.461000e+03 |
| mean | 3.620156e+06 | 3.168416e+06 |
| std | 1.737938e+07 | 1.515310e+07 |
| min | 0.000000e+00 | 2.000000e+00 |
| 25% | 5.655500e+04 | 5.210700e+04 |
| 50% | 3.897850e+05 | 3.342380e+05 |
| 75% | 2.735777e+06 | 2.561513e+06 |
| max | 2.701636e+08 | 2.395186e+08 |

| | Transgender (Doses Administered) | Covaxin (Doses Administered) |
|---|---|---|
| count | 7461.000000 | 7.621000e+03 |
| mean | 1162.978019 | 1.044669e+06 |
| std | 5931.353995 | 4.452259e+06 |
| min | 0.000000 | 0.000000e+00 |
| 25% | 8.000000 | 0.000000e+00 |
| 50% | 113.000000 | 1.185100e+04 |
| 75% | 800.000000 | 7.579300e+05 |
| max | 98275.000000 | 6.236742e+07 |

| | CoviShield (Doses Administered) | … | 18-44 Years (Doses Administered) |
|---|---|---|---|

```
       Total Doses Administered  ...  Total Individuals Vaccinated
count                  7.621000e+03  ...                  1.702000e+03
mean                   8.126553e+06  ...                  8.773958e+06
std                    3.298414e+07  ...                  2.660829e+07
min                    7.000000e+00  ...                  2.662400e+04
25%                    1.331340e+05  ...                  4.344842e+05
50%                    7.567360e+05  ...                  3.095970e+06
75%                    6.007817e+06  ...                  7.366241e+06
max                    4.468251e+08  ...                  2.243304e+08

       45-60 Years (Doses Administered)  60+ Years (Doses Administered)  \
count                      1.702000e+03                    1.702000e+03
mean                       7.442161e+06                    5.641605e+06
std                        2.225999e+07                    1.681650e+07
min                        1.681500e+04                    9.994000e+03
25%                        2.326275e+05                    1.285605e+05
50%                        2.695938e+06                    1.805696e+06
75%                        6.969726e+06                    5.294763e+06
max                        1.667575e+08                    1.186927e+08

       18-44 Years(Individuals Vaccinated)  \
count                         3.733000e+03
mean                          1.395895e+06
std                           5.501454e+06
min                           1.059000e+03
25%                           5.655400e+04
50%                           2.947270e+05
75%                           9.105160e+05
max                           9.224315e+07

       45-60 Years(Individuals Vaccinated)  60+ Years(Individuals Vaccinated)  \
count                         3.734000e+03                       3.734000e+03
mean                          2.916515e+06                       2.627444e+06
std                           9.567607e+06                       8.192225e+06
min                           1.136000e+03                       5.580000e+02
25%                           9.248225e+04                       5.615975e+04
50%                           8.330395e+05                       7.887425e+05
75%                           2.499280e+06                       2.337874e+06
max                           9.096888e+07                       6.731098e+07

       Male(Individuals Vaccinated)  Female(Individuals Vaccinated)  \
count                  1.600000e+02                    1.600000e+02
mean                   4.461687e+07                    3.951018e+07
std                    3.950749e+07                    3.417684e+07
min                    2.375700e+04                    2.451700e+04
25%                    5.739350e+06                    5.023407e+06
50%                    3.716590e+07                    3.365402e+07
75%                    7.441663e+07                    6.685368e+07
```

```
max                    1.349420e+08                    1.156684e+08

       Transgender(Individuals Vaccinated)  Total Individuals Vaccinated
count                           160.000000                  5.919000e+03
mean                          12370.543750                  4.547842e+06
std                           12485.026753                  1.834182e+07
min                               2.000000                  7.000000e+00
25%                            1278.750000                  7.427550e+04
50%                            8007.500000                  4.022880e+05
75%                           19851.000000                  3.501562e+06
max                           46462.000000                  2.506569e+08

[8 rows x 22 columns]
```

[15]:
```
first_dose_statewise = dt.groupby("State")["First Dose Administered"].sum().
  ↪reset_index()
print("\nNumber of persons state-wise vaccinated for the first dose in India:")
print(first_dose_statewise)
```

```
Number of persons state-wise vaccinated for the first dose in India:
                                        State  First Dose Administered
0                 Andaman and Nicobar Islands              1.642585e+07
1                               Andhra Pradesh              1.232861e+09
2                            Arunachal Pradesh              4.900498e+07
3                                        Assam              5.856002e+08
4                                        Bihar              1.470503e+09
5                                   Chandigarh              4.470310e+07
6                                 Chhattisgarh              7.960029e+08
7   Dadra and Nagar Haveli and Daman and Diu               3.359506e+07
8                                        Delhi              6.243395e+08
9                                          Goa              7.599137e+07
10                                     Gujarat              2.131646e+09
11                                     Haryana              7.557984e+08
12                              Himachal Pradesh            3.162940e+08
13                                       India              2.826214e+10
14                              Jammu and Kashmir           4.101018e+08
15                                     Jharkhand              6.036737e+08
16                                     Karnataka              1.873330e+09
17                                        Kerala              1.193845e+09
18                                        Ladakh              1.780925e+07
19                                   Lakshadweep              4.363655e+06
20                                 Madhya Pradesh             1.796605e+09
21                                    Maharashtra             2.784364e+09
22                                        Manipur             6.740957e+07
23                                      Meghalaya             6.261597e+07
24                                        Mizoram             4.787308e+07
```

| | | |
|---|---|---|
| 25 | Nagaland | 4.241077e+07 |
| 26 | Odisha | 1.032633e+09 |
| 27 | Puducherry | 4.134686e+07 |
| 28 | Punjab | 5.843466e+08 |
| 29 | Rajasthan | 2.201044e+09 |
| 30 | Sikkim | 3.698093e+07 |
| 31 | Tamil Nadu | 1.288533e+09 |
| 32 | Telangana | 8.803206e+08 |
| 33 | Tripura | 1.926897e+08 |
| 34 | Uttar Pradesh | 2.788411e+09 |
| 35 | Uttarakhand | 3.631914e+08 |
| 36 | West Bengal | 1.796450e+09 |

[17]:
```
second_dose_statewise = dt.groupby("State")["Second Dose Administered"].sum().
 ↪reset_index()
print("\nNumber of persons state-wise vaccinated for the second dose in India:")
print(second_dose_statewise)
```

```
Number of persons state-wise vaccinated for the second dose in India:
```

| | State | Second Dose Administered |
|---|---|---|
| 0 | Andaman and Nicobar Islands | 4.118554e+06 |
| 1 | Andhra Pradesh | 3.588176e+08 |
| 2 | Arunachal Pradesh | 1.193232e+07 |
| 3 | Assam | 1.307888e+08 |
| 4 | Bihar | 2.707906e+08 |
| 5 | Chandigarh | 1.159374e+07 |
| 6 | Chhattisgarh | 1.721204e+08 |
| 7 | Dadra and Nagar Haveli and Daman and Diu | 4.594416e+06 |
| 8 | Delhi | 1.882189e+08 |
| 9 | Goa | 1.619817e+07 |
| 10 | Gujarat | 6.004184e+08 |
| 11 | Haryana | 1.586561e+08 |
| 12 | Himachal Pradesh | 7.383858e+07 |
| 13 | India | 6.759621e+09 |
| 14 | Jammu and Kashmir | 8.595165e+07 |
| 15 | Jharkhand | 1.221211e+08 |
| 16 | Karnataka | 4.271872e+08 |
| 17 | Kerala | 3.640488e+08 |
| 18 | Ladakh | 5.453762e+06 |
| 19 | Lakshadweep | 1.056446e+06 |
| 20 | Madhya Pradesh | 3.169330e+08 |
| 21 | Maharashtra | 7.128811e+08 |
| 22 | Manipur | 1.185815e+07 |
| 23 | Meghalaya | 1.216663e+07 |
| 24 | Mizoram | 9.998418e+06 |
| 25 | Nagaland | 9.204637e+06 |
| 26 | Odisha | 2.513028e+08 |

| | | |
|---|---|---|
| 27 | Puducherry | 8.608859e+06 |
| 28 | Punjab | 1.211210e+08 |
| 29 | Rajasthan | 4.917030e+08 |
| 30 | Sikkim | 9.723640e+06 |
| 31 | Tamil Nadu | 2.906706e+08 |
| 32 | Telangana | 1.981529e+08 |
| 33 | Tripura | 6.527014e+07 |
| 34 | Uttar Pradesh | 5.544351e+08 |
| 35 | Uttarakhand | 1.000850e+08 |
| 36 | West Bengal | 5.861469e+08 |

[19]:
```
males_vaccinated = dt["Male (Doses Administered)"].sum()
print("\nNumber of Males vaccinated:", males_vaccinated)
```

```
Number of Males vaccinated: 27009983996.0
```

[ ]:
```

```