COVID VACCINE DATA

Import Libraries

In [27]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from matplotlib import style
import warnings
warnings.filterwarnings('ignore')
```

Read the File

In [28]:
```
cov=pd.read_csv(r"C:\Users\SHEREENA\Downloads\covid_vaccine_statewise.csv")
cov
```

Out[28]:

	Updated On	State	Total Doses Administered	Total Sessions Conducted	Total Sites	First Dose Administered	Second Dose Administered	Male(Indi Vacc
0	16/01/2021	India	48276.0	3455.0	2957.0	48276.0	0.0	2
1	17/01/2021	India	58604.0	8532.0	4954.0	58604.0	0.0	2
2	18/01/2021	India	99449.0	13611.0	6583.0	99449.0	0.0	4
3	19/01/2021	India	195525.0	17855.0	7951.0	195525.0	0.0	8
4	20/01/2021	India	251280.0	25472.0	10504.0	251280.0	0.0	9
...	...	...	...	...	...	...	...	
6694	11/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	
6695	12/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	
6696	13/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	
6697	14/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	
6698	15/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	

6699 rows × 18 columns

Check how many rows and columns

In [29]:
```
cov.shape
```

Out[29]:
```
(6699, 18)
```

Check Datatypes of attributes

In [30]:
```
cov.dtypes
```

Out[30]:
```
Updated On                              object
State                                   object
Total Doses Administered               float64
Total Sessions Conducted               float64
Total Sites                            float64
First Dose Administered                float64
Second Dose Administered               float64
Male(Individuals Vaccinated)           float64
Female(Individuals Vaccinated)         float64
Transgender(Individuals Vaccinated)    float64
Total Covaxin Administered             float64
Total CoviShield Administered          float64
Total Sputnik V Administered           float64
AEFI                                   float64
18-45 years (Age)                      float64
45-60 years (Age)                      float64
60+ years (Age)                        float64
Total Individuals Vaccinated           float64
dtype: object
```

check indexes

In [31]:
```
cov.index
```

Out[31]:
```
RangeIndex(start=0, stop=6699, step=1)
```

check datatype is empty or not

In [32]:
```
cov.empty
```

Out[32]:
```
False
```

To check is there any missing value

In [33]:
```
cov.isna()
```

Out[33]:

	Updated On	State	Total Doses Administered	Total Sessions Conducted	Total Sites	First Dose Administered	Second Dose Administered	Male(Individuals Vaccinated
0	False	False	False	False	False	False	False	Fals
1	False	False	False	False	False	False	False	Fals
2	False	False	False	False	False	False	False	Fals
3	False	False	False	False	False	False	False	Fals
4	False	False	False	False	False	False	False	Fals
...	...	...	...	...	...	...	...	.
6694	False	False	True	True	True	True	True	Tru
6695	False	False	True	True	True	True	True	Tru
6696	False	False	True	True	True	True	True	Tru
6697	False	False	True	True	True	True	True	Tru
6698	False	False	True	True	True	True	True	Tru

6699 rows × 18 columns

In [34]:
```
cov.isnull()
```

Out[34]:

	Updated On	State	Total Doses Administered	Total Sessions Conducted	Total Sites	First Dose Administered	Second Dose Administered	Male(Individuals Vaccinated
0	False	False	False	False	False	False	False	Fals
1	False	False	False	False	False	False	False	Fals
2	False	False	False	False	False	False	False	Fals
3	False	False	False	False	False	False	False	Fals
4	False	False	False	False	False	False	False	Fals
...	...	...	...	...	...	...	...	.
6694	False	False	True	True	True	True	True	Tru
6695	False	False	True	True	True	True	True	Tru
6696	False	False	True	True	True	True	True	Tru
6697	False	False	True	True	True	True	True	Tru
6698	False	False	True	True	True	True	True	Tru

6699 rows × 18 columns

sum of missing value

In [35]:
```
cov.isna().sum()
```

Out[35]:
```
Updated On                                0
State                                     0
Total Doses Administered                335
Total Sessions Conducted                336
Total Sites                             336
First Dose Administered                 336
Second Dose Administered                336
Male(Individuals Vaccinated)            336
Female(Individuals Vaccinated)          336
Transgender(Individuals Vaccinated)     336
Total Covaxin Administered              336
Total CoviShield Administered           336
Total Sputnik V Administered           4962
AEFI                                   2519
18-45 years (Age)                      2522
45-60 years (Age)                      2521
60+ years (Age)                        2521
Total Individuals Vaccinated            336
dtype: int64
```

check number of dimensions

In [36]:
```
cov.ndim
```

Out[36]:
```
2
```

size of dataset

In [37]:
```
cov.size
```

Out[37]:
```
120582
```

print the column names

In [38]:
```
cov.columns
```

Out[38]:
```
Index(['Updated On', 'State', 'Total Doses Administered',
       'Total Sessions Conducted', 'Total Sites ', 'First Dose Administered',
       'Second Dose Administered', 'Male(Individuals Vaccinated)',
       'Female(Individuals Vaccinated)', 'Transgender(Individuals Vaccinated)',
       'Total Covaxin Administered', 'Total CoviShield Administered',
       'Total Sputnik V Administered', 'AEFI', '18-45 years (Age)',
       '45-60 years (Age)', '60+ years (Age)', 'Total Individuals Vaccinated'],
      dtype='object')
```

Print top 25 rows

In [39]:
```
cov.head(25)
```

Out[39]:

	Updated On	State	Total Doses Administered	Total Sessions Conducted	Total Sites	First Dose Administered	Second Dose Administered	Male(Individu Vaccinat
0	16/01/2021	India	48276.0	3455.0	2957.0	48276.0	0.0	2375
1	17/01/2021	India	58604.0	8532.0	4954.0	58604.0	0.0	2734
2	18/01/2021	India	99449.0	13611.0	6583.0	99449.0	0.0	4136
3	19/01/2021	India	195525.0	17855.0	7951.0	195525.0	0.0	8190
4	20/01/2021	India	251280.0	25472.0	10504.0	251280.0	0.0	981
5	21/01/2021	India	365965.0	32226.0	12600.0	365965.0	0.0	13278
6	22/01/2021	India	549381.0	36988.0	14115.0	549381.0	0.0	19389
7	23/01/2021	India	759008.0	43076.0	15605.0	759008.0	0.0	26785
8	24/01/2021	India	835058.0	49851.0	18111.0	835058.0	0.0	29628
9	25/01/2021	India	1277104.0	55151.0	19682.0	1277104.0	0.0	44413
10	26/01/2021	India	1293784.0	60821.0	21467.0	1293784.0	0.0	44911
11	27/01/2021	India	1726490.0	69495.0	23737.0	1726490.0	0.0	58608
12	28/01/2021	India	2295491.0	78523.0	25610.0	2295491.0	0.0	77122
13	29/01/2021	India	2814803.0	83664.0	26219.0	2814803.0	0.0	93906
14	30/01/2021	India	3067736.0	87822.0	26643.0	3067736.0	0.0	102238
15	31/01/2021	India	3127107.0	91593.0	27011.0	3127107.0	0.0	106130
16	01/02/2021	India	3350265.0	97432.0	27751.0	3350265.0	0.0	115234
17	02/02/2021	India	3527971.0	106461.0	29522.0	3527971.0	0.0	121850
18	03/02/2021	India	3825835.0	116568.0	31167.0	3825835.0	0.0	132427
19	04/02/2021	India	4314304.0	126714.0	32505.0	4314304.0	0.0	150452
20	05/02/2021	India	4765924.0	137110.0	33947.0	4765924.0	0.0	171046
21	06/02/2021	India	5111827.0	145121.0	34814.0	5111827.0	0.0	189670
22	07/02/2021	India	5168099.0	153231.0	35778.0	5168099.0	0.0	192894
23	08/02/2021	India	5615499.0	164116.0	36740.0	5615499.0	0.0	221102
24	09/02/2021	India	6002474.0	175556.0	38131.0	6002474.0	0.0	245832

Print bottom 25 rows

In [40]:
```
cov.tail(25)
```

Out[40]:

	Updated On	State	Total Doses Administered	Total Sessions Conducted	Total Sites	First Dose Administered	Second Dose Administered	Male(Indivi Vacci
6674	21/06/2021	West Bengal	19349842.0	1144223.0	2645.0	14997560.0	4352282.0	8436
6675	22/06/2021	West Bengal	19667535.0	1019996.0	2390.0	15251854.0	4415681.0	8573
6676	23/06/2021	West Bengal	20022881.0	1065896.0	2511.0	15536230.0	4486651.0	8729
6677	24/06/2021	West Bengal	20352923.0	1073696.0	2260.0	15798841.0	4554082.0	887
6678	25/06/2021	West Bengal	20739972.0	1225381.0	2744.0	16098954.0	4641018.0	11656
6679	26/06/2021	West Bengal	21043842.0	1073314.0	2192.0	16320306.0	4723536.0	11815
6680	27/06/2021	West Bengal	21128717.0	392769.0	735.0	16382560.0	4746157.0	11858
6681	28/06/2021	West Bengal	21427071.0	1013931.0	2003.0	16563389.0	4863682.0	12005
6682	29/06/2021	West Bengal	21711965.0	1010959.0	2126.0	16729378.0	4982587.0	12146
6683	30/06/2021	West Bengal	21889622.0	790786.0	1544.0	16833029.0	5056593.0	12236
6684	01/07/2021	West Bengal	22009840.0	589607.0	1066.0	16900071.0	5109769.0	12296
6685	02/07/2021	West Bengal	22319689.0	957980.0	2205.0	17019095.0	5300594.0	1245
6686	03/07/2021	West Bengal	22591117.0	884093.0	1893.0	17135494.0	5455623.0	12587
6687	04/07/2021	West Bengal	22660276.0	308516.0	619.0	17165989.0	5494287.0	1262
6688	05/07/2021	West Bengal	22960000.0	832804.0	2065.0	17285927.0	5674073.0	12772
6689	06/07/2021	West Bengal	23205213.0	741696.0	1820.0	17382673.0	5822540.0	12896
6690	07/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	
6691	08/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	
6692	09/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	
6693	10/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	
6694	11/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	

	Updated On	State	Total Doses Administered	Total Sessions Conducted	Total Sites	First Dose Administered	Second Dose Administered	Male(Indivi Vacci
6695	12/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	
6696	13/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	
6697	14/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	
6698	15/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	

check the duplicate value

In [41]:
```
cov.duplicated()
```

Out[41]:
```
0       False
1       False
2       False
3       False
4       False
        ...
6694    False
6695    False
6696    False
6697    False
6698    False
Length: 6699, dtype: bool
```

sum of duplicate values

In [42]:
```
cov.duplicated().sum()
```

Out[42]:
```
0
```

number of unique values in dataset

In [43]:
```
cov.nunique()
```

Out[43]:
```
Updated On                                183
State                                      37
Total Doses Administered                 6128
Total Sessions Conducted                 5300
Total Sites                              2745
First Dose Administered                  6116
Second Dose Administered                 5031
Male(Individuals Vaccinated)             6079
Female(Individuals Vaccinated)           6061
Transgender(Individuals Vaccinated)      1650
Total Covaxin Administered               3493
Total CoviShield Administered            6123
Total Sputnik V Administered              374
AEFI                                     1308
18-45 years (Age)                        4138
45-60 years (Age)                        4143
60+ years (Age)                          4125
Total Individuals Vaccinated             6117
dtype: int64
```

Print unique state Names

In [44]:
```
cov['State'].unique()
```

Out[44]:
```
array(['India', 'Andaman and Nicobar Islands', 'Andhra Pradesh',
       'Arunachal Pradesh', 'Assam', 'Bihar', 'Chandigarh',
       'Chhattisgarh', 'Dadra and Nagar Haveli and Daman and Diu',
       'Delhi', 'Goa', 'Gujarat', 'Haryana', 'Himachal Pradesh',
       'Jammu and Kashmir', 'Jharkhand', 'Karnataka', 'Kerala', 'Ladakh',
       'Lakshadweep', 'Madhya Pradesh', 'Maharashtra', 'Manipur',
       'Meghalaya', 'Mizoram', 'Nagaland', 'Odisha', 'Puducherry',
       'Punjab', 'Rajasthan', 'Sikkim', 'Tamil Nadu', 'Telangana',
       'Tripura', 'Uttar Pradesh', 'Uttarakhand', 'West Bengal'],
      dtype=object)
```

count of state names

In [45]:
```
cov['State'].value_counts()
```

Out[45]:
```
India                                       183
Tamil Nadu                                  181
Andhra Pradesh                              181
Delhi                                       181
Assam                                       181
Chhattisgarh                                181
Gujarat                                     181
Tripura                                     181
Goa                                         181
Nagaland                                    181
Haryana                                     181
Jammu and Kashmir                           181
Jharkhand                                   181
Meghalaya                                   181
Lakshadweep                                 181
West Bengal                                 181
Uttarakhand                                 181
Maharashtra                                 181
Odisha                                      181
Rajasthan                                   181
Mizoram                                     181
Karnataka                                   181
Madhya Pradesh                              181
Sikkim                                      181
Kerala                                      181
Telangana                                   181
Punjab                                      181
Puducherry                                  181
Himachal Pradesh                            181
Dadra and Nagar Haveli and Daman and Diu    181
Manipur                                     181
Andaman and Nicobar Islands                 181
Chandigarh                                  181
Arunachal Pradesh                           181
Bihar                                       181
Ladakh                                      181
Uttar Pradesh                               181
Name: State, dtype: int64
```

In [46]:
```
cov['State'].value_counts().sum()
```

Out[46]:
```
6699
```

Grouping the Total Doses Administered by state wise

In [47]:
```
cov.groupby(['State']).agg({'Total Doses Administered':'sum'})
```

Out[47]:

State	Total Doses Administered
Andaman and Nicobar Islands	1.132899e+07
Andhra Pradesh	9.121768e+08
Arunachal Pradesh	3.391547e+07
Assam	3.834303e+08
Bihar	9.818519e+08
Chandigarh	3.102322e+07
Chhattisgarh	6.149884e+08
Dadra and Nagar Haveli and Daman and Diu	1.826012e+07
Delhi	4.840444e+08
Goa	5.005137e+07
Gujarat	1.665840e+09
Haryana	5.361376e+08
Himachal Pradesh	2.248165e+08
India	2.041013e+10
Jammu and Kashmir	2.975928e+08
Jharkhand	4.255083e+08
Karnataka	1.322772e+09
Kerala	9.340502e+08
Ladakh	1.477171e+07
Lakshadweep	3.261957e+06
Madhya Pradesh	1.149552e+09
Maharashtra	2.093453e+09
Manipur	4.042049e+07
Meghalaya	4.144567e+07
Mizoram	3.149050e+07
Nagaland	2.769339e+07
Odisha	7.608878e+08
Puducherry	2.711404e+07
Punjab	4.141822e+08
Rajasthan	1.663653e+09
Sikkim	2.589709e+07
Tamil Nadu	8.649422e+08
Telangana	6.067202e+08

State	Total Doses Administered
Tripura	1.574179e+08
Uttar Pradesh	1.836649e+09
Uttarakhand	2.737700e+08
West Bengal	1.443061e+09

Grouping total vaccinated male,female,transgender by state wise

In [49]:
```
mft=cov.groupby(['State']).agg({'Male(Individuals Vaccinated)':'sum','Female(Indi
mft
```

Out[49]:

State	Male(Individuals Vaccinated)	Female(Individuals Vaccinated)	Transgender(Individuals Vaccinated)
Andaman and Nicobar Islands	5.525173e+06	4.679222e+06	833.0
Andhra Pradesh	3.689568e+08	3.843719e+08	105485.0
Arunachal Pradesh	1.569034e+07	1.254679e+07	10122.0
Assam	1.773011e+08	1.490944e+08	47937.0
Bihar	4.573342e+08	3.999799e+08	149622.0
Chandigarh	1.495975e+07	1.114546e+07	2878.0
Chhattisgarh	2.617032e+08	2.741347e+08	56297.0
Dadra and Nagar Haveli and Daman and Diu	1.044664e+07	6.055162e+06	2499.0
Delhi	2.348809e+08	1.657357e+08	77476.0
Goa	2.234062e+07	2.097980e+07	3374.0
Gujarat	7.461534e+08	6.419976e+08	179530.0
Haryana	2.542858e+08	2.169802e+08	75428.0
Himachal Pradesh	9.690011e+07	9.921915e+07	33655.0
India	9.291514e+09	8.171807e+09	2658451.0
Jammu and Kashmir	1.553159e+08	1.032721e+08	47984.0
Jharkhand	1.978544e+08	1.741437e+08	49251.0
Karnataka	5.673437e+08	5.752650e+08	171030.0
Kerala	3.673414e+08	4.238293e+08	109347.0
Ladakh	6.649151e+06	5.529159e+06	1205.0
Lakshadweep	1.577941e+06	1.205559e+06	228.0
Madhya Pradesh	5.593301e+08	4.615890e+08	152358.0
Maharashtra	9.667709e+08	8.279762e+08	244948.0
Manipur	1.997597e+07	1.475414e+07	6529.0
Meghalaya	1.862497e+07	1.704297e+07	3836.0
Mizoram	1.410720e+07	1.341196e+07	2494.0
Nagaland	1.406640e+07	9.559207e+06	2244.0
Odisha	3.456433e+08	3.090832e+08	103474.0
Puducherry	1.221480e+07	1.164955e+07	3481.0
Punjab	2.080791e+08	1.572214e+08	40208.0
Rajasthan	7.528403e+08	6.865284e+08	215752.0

State	Male(Individuals Vaccinated)	Female(Individuals Vaccinated)	Transgender(Individuals Vaccinated)
Sikkim	1.176734e+07	1.006253e+07	4618.0
Tamil Nadu	3.892480e+08	3.445301e+08	94276.0
Telangana	2.735843e+08	2.528687e+08	99670.0
Tripura	6.459707e+07	5.981436e+07	16375.0
Uttar Pradesh	9.009545e+08	6.804871e+08	339310.0
Uttarakhand	1.175900e+08	1.101302e+08	47764.0
West Bengal	6.564255e+08	5.321289e+08	155639.0

Grouping total covaxin,covisheild,sputnic Administered by state wise

In [50]:
```
vax_names=cov.groupby(['State']).agg({'Total Covaxin Administered':'sum','Total C
vax_names
```

Out[50]:

State	Total Covaxin Administered	Total CoviShield Administered	Total Sputnik V Administered
Andaman and Nicobar Islands	0.000000e+00	1.129601e+07	0.0
Andhra Pradesh	1.559990e+08	7.533635e+08	230688.0
Arunachal Pradesh	1.820000e+03	3.377869e+07	0.0
Assam	6.895391e+07	3.139260e+08	1317.0
Bihar	7.797252e+07	9.020493e+08	5114.0
Chandigarh	2.008900e+04	3.096927e+07	0.0
Chhattisgarh	2.013752e+07	5.936969e+08	3131.0
Dadra and Nagar Haveli and Daman and Diu	2.160000e+02	1.824432e+07	0.0
Delhi	1.397756e+08	3.434315e+08	57494.0
Goa	6.250540e+05	4.936153e+07	0.0
Gujarat	1.909448e+08	1.471653e+09	2681.0
Haryana	7.295971e+07	4.621091e+08	51705.0
Himachal Pradesh	2.571300e+04	2.242866e+08	41158.0
India	2.204448e+09	1.816089e+10	1794542.0
Jammu and Kashmir	4.041629e+06	2.932617e+08	0.0
Jharkhand	5.334877e+07	3.715581e+08	9048.0
Karnataka	1.360809e+08	1.182851e+09	90348.0
Kerala	6.454150e+07	8.674961e+08	9387.0
Ladakh	9.100000e+02	1.474946e+07	0.0
Lakshadweep	7.500000e+01	3.259807e+06	0.0
Madhya Pradesh	1.331479e+08	1.013957e+09	1105.0
Maharashtra	2.400737e+08	1.850468e+09	89117.0
Manipur	7.430000e+02	4.036941e+07	0.0
Meghalaya	2.275000e+03	4.137562e+07	0.0
Mizoram	1.370000e+02	3.138080e+07	0.0
Nagaland	3.736000e+03	2.759849e+07	0.0
Odisha	7.324264e+07	6.853092e+08	2392.0
Puducherry	7.808000e+03	2.708034e+07	0.0
Punjab	3.676986e+07	3.768308e+08	14674.0
Rajasthan	1.289668e+08	1.531127e+09	16726.0
Sikkim	3.239000e+03	2.585629e+07	0.0

State	Total Covaxin Administered	Total CoviShield Administered	Total Sputnik V Administered
Tamil Nadu	1.319445e+08	7.322733e+08	26505.0
Telangana	9.680354e+07	5.065061e+08	1049033.0
Tripura	1.187646e+06	1.558404e+08	0.0
Uttar Pradesh	2.071196e+08	1.623685e+09	8385.0
Uttarakhand	7.614733e+06	2.656567e+08	0.0
West Bengal	1.616063e+08	1.278798e+09	84534.0

print statistical information

In [51]:
```
cov.describe().all
```

Out[51]:
```
<bound method NDFrame._add_numeric_operations.<locals>.all of        Total Do
ses Administered  Total Sessions Conducted  Total Sites   \
count              6.364000e+03              6.363000e+03   6363.000000
mean               6.413310e+06              3.957716e+05   2360.343549
std                2.615880e+07              1.656387e+06   7508.979436
min                0.000000e+00              0.000000e+00      0.000000
25%                9.749425e+04              4.498000e+03     70.500000
50%                5.369145e+05              2.588400e+04    616.000000
75%                4.872305e+06              2.613895e+05   1790.000000
max                3.561929e+08              3.501031e+07  73933.000000

       First Dose Administered  Second Dose Administered  \
count             6.363000e+03              6.363000e+03
mean              5.254151e+06              1.160167e+06
std               2.132565e+07              4.882363e+06
min               7.000000e+00              0.000000e+00
25%               8.277550e+04              6.405500e+03
50%               4.589680e+05              7.715800e+04
75%               4.119336e+06              7.264175e+05
max               2.901329e+08              6.606008e+07

       Male(Individuals Vaccinated)  Female(Individuals Vaccinated)  \
count                  6.363000e+03                     6.363000e+03
mean                   2.919990e+06                     2.568098e+06
std                    1.225694e+07                     1.064744e+07
min                    0.000000e+00                     2.000000e+00
25%                    4.299600e+04                     3.760850e+04
50%                    2.581390e+05                     2.392390e+05
75%                    2.203892e+06                     1.961909e+06
max                    1.911604e+08                     1.649711e+08

       Transgender(Individuals Vaccinated)  Total Covaxin Administered  \
count                          6363.000000                6.363000e+03
mean                            835.393368                6.928136e+05
std                            3737.993697                2.991176e+06
min                               0.000000                0.000000e+00
25%                               4.000000                0.000000e+00
50%                              69.000000                4.760000e+03
75%                             562.000000                4.669140e+05
max                           61451.000000                4.401880e+07

       Total CoviShield Administered  Total Sputnik V Administered  \
count                   6.363000e+03                   1737.000000
mean                    5.707424e+06                   2066.254462
std                     2.319046e+07                   9614.132634
min                     7.000000e+00                      0.000000
25%                     9.561450e+04                      0.000000
50%                     4.989140e+05                      0.000000
75%                     4.258910e+06                     79.000000
max                     3.120454e+08                 128733.000000

               AEFI  18-45 years (Age)  45-60 years (Age)  60+ years (Age)  \
count   4180.000000       4.177000e+03       4.178000e+03     4.178000e+03
mean    1073.564833       1.955834e+06       3.275439e+06     2.887759e+06
```

```
std     3246.612821       8.448696e+06       1.095290e+07     9.204842e+06
min        0.000000       1.059000e+03       1.136000e+03     5.580000e+02
25%       94.000000       6.454900e+04       1.017950e+05     6.404975e+04
50%      283.000000       3.382580e+05       9.198940e+05     8.211470e+05
75%      716.000000       1.068349e+06       2.727498e+06     2.533357e+06
max    23960.000000       1.361586e+08       1.229163e+08     9.711800e+07

       Total Individuals Vaccinated
count                  6.363000e+03
mean                   5.265380e+06
std                    2.132828e+07
min                    7.000000e+00
25%                    8.277550e+04
50%                    4.705490e+05
75%                    4.119336e+06
max                    2.901329e+08  >
```

correlation

In [52]:
```
cov.corr()
```

Out[52]:

	Total Doses Administered	Total Sessions Conducted	Total Sites	First Dose Administered	Second Dose Administered	Male(Indiv Vacci
Total Doses Administered	1.000000	0.927323	0.730636	0.999588	0.992115	0.9
Total Sessions Conducted	0.927323	1.000000	0.759688	0.932778	0.894516	0.9
Total Sites	0.730636	0.759688	1.000000	0.737251	0.694669	0.7
First Dose Administered	0.999588	0.932778	0.737251	1.000000	0.988110	0.9
Second Dose Administered	0.992115	0.894516	0.694669	0.988110	1.000000	0.9
Male(Individuals Vaccinated)	0.993924	0.931649	0.706150	0.994774	0.980585	1.0
Female(Individuals Vaccinated)	0.994730	0.931999	0.717165	0.995654	0.981063	0.9
Transgender(Individuals Vaccinated)	0.982723	0.921153	0.653534	0.983397	0.970262	0.9
Total Covaxin Administered	0.992649	0.918302	0.679149	0.991730	0.987052	0.9
Total CoviShield Administered	0.999864	0.927548	0.734515	0.999516	0.991701	0.9
Total Sputnik V Administered	0.734299	0.725360	0.590722	0.740018	0.706388	0.7
AEFI	0.922787	0.877127	0.929516	0.924693	0.905428	0.8
18-45 years (Age)	0.912234	0.876475	0.593668	0.914114	0.895092	0.9
45-60 years (Age)	0.996996	0.920312	0.827465	0.996890	0.987699	0.9
60+ years (Age)	0.987369	0.922061	0.876703	0.988552	0.972535	0.9
Total Individuals Vaccinated	0.999570	0.933189	0.737892	0.999966	0.988158	0.9

Date details

In [53]:
```
cov['Updated On'].value_counts()
```

Out[53]:
```
21/05/2021    37
27/06/2021    37
12/03/2021    37
31/05/2021    37
31/01/2021    37
              ..
30/05/2021    37
24/04/2021    37
22/02/2021    37
16/07/2021     1
17/07/2021     1
Name: Updated On, Length: 183, dtype: int64
```

List of states

In [54]:
```
cov.State.unique()
```

Out[54]:
```
array(['India', 'Andaman and Nicobar Islands', 'Andhra Pradesh',
       'Arunachal Pradesh', 'Assam', 'Bihar', 'Chandigarh',
       'Chhattisgarh', 'Dadra and Nagar Haveli and Daman and Diu',
       'Delhi', 'Goa', 'Gujarat', 'Haryana', 'Himachal Pradesh',
       'Jammu and Kashmir', 'Jharkhand', 'Karnataka', 'Kerala', 'Ladakh',
       'Lakshadweep', 'Madhya Pradesh', 'Maharashtra', 'Manipur',
       'Meghalaya', 'Mizoram', 'Nagaland', 'Odisha', 'Puducherry',
       'Punjab', 'Rajasthan', 'Sikkim', 'Tamil Nadu', 'Telangana',
       'Tripura', 'Uttar Pradesh', 'Uttarakhand', 'West Bengal'],
      dtype=object)
```

Information of India

In [55]:
```
data_india=cov[cov['State']=='India']
data_india
```

Out[55]:

	Updated On	State	Total Doses Administered	Total Sessions Conducted	Total Sites	First Dose Administered	Second Dose Administered	Male(Indivic Vaccina
0	16/01/2021	India	48276.0	3455.0	2957.0	48276.0	0.0	237
1	17/01/2021	India	58604.0	8532.0	4954.0	58604.0	0.0	273
2	18/01/2021	India	99449.0	13611.0	6583.0	99449.0	0.0	413
3	19/01/2021	India	195525.0	17855.0	7951.0	195525.0	0.0	819
4	20/01/2021	India	251280.0	25472.0	10504.0	251280.0	0.0	98
...	...	...	...	...	...	...	...	
178	13/07/2021	India	NaN	NaN	NaN	NaN	NaN	
179	14/07/2021	India	NaN	NaN	NaN	NaN	NaN	
180	15/07/2021	India	NaN	NaN	NaN	NaN	NaN	
181	16/07/2021	India	NaN	NaN	NaN	NaN	NaN	
182	17/07/2021	India	NaN	NaN	NaN	NaN	NaN	

183 rows × 18 columns

Sum of total dose administered in India

In [56]:
```
totaldose=data_india["Total Doses Administered"].sum().round()
totaldose
```

Out[56]: 20410132525.0

Sum of total sessions conducted in India

In [57]:
```
totalsesion=data_india["Total Sessions Conducted"].sum().round()
totalsesion
```

Out[57]: 1259151058.0

Sum of first dose administered in India

In [58]:
```
dose1=data_india['First Dose Administered'].sum().round()
dose1
```

Out[58]: 16719051744.0

Sum of second dose administered in India

In [59]:
```
dose2=data_india['Second Dose Administered'].sum().round()
dose2
```

Out[59]: 3691080781.0

Sum of 1st dose and 2nd dose administered in India

In [60]:
```
dose3=dose1+dose2
dose3
```

Out[60]: 20410132525.0

Check total doses administered in India is given

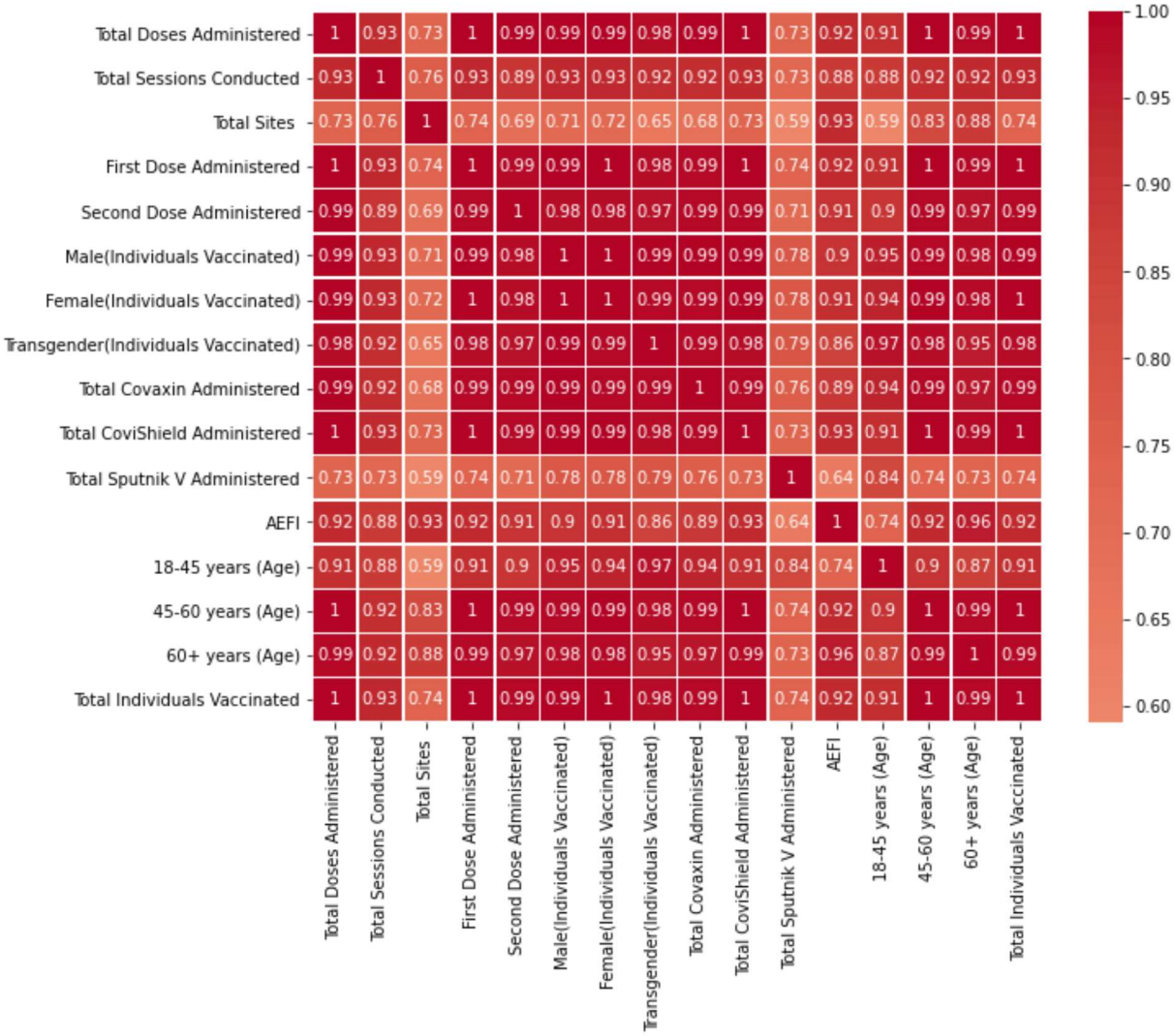
In [61]:
```
if dose3==totaldose:
    print(True)
else:
    print(False)
```

```
True
```

Found total doses administered in India are given to individuals as 1st and 2nd doses.

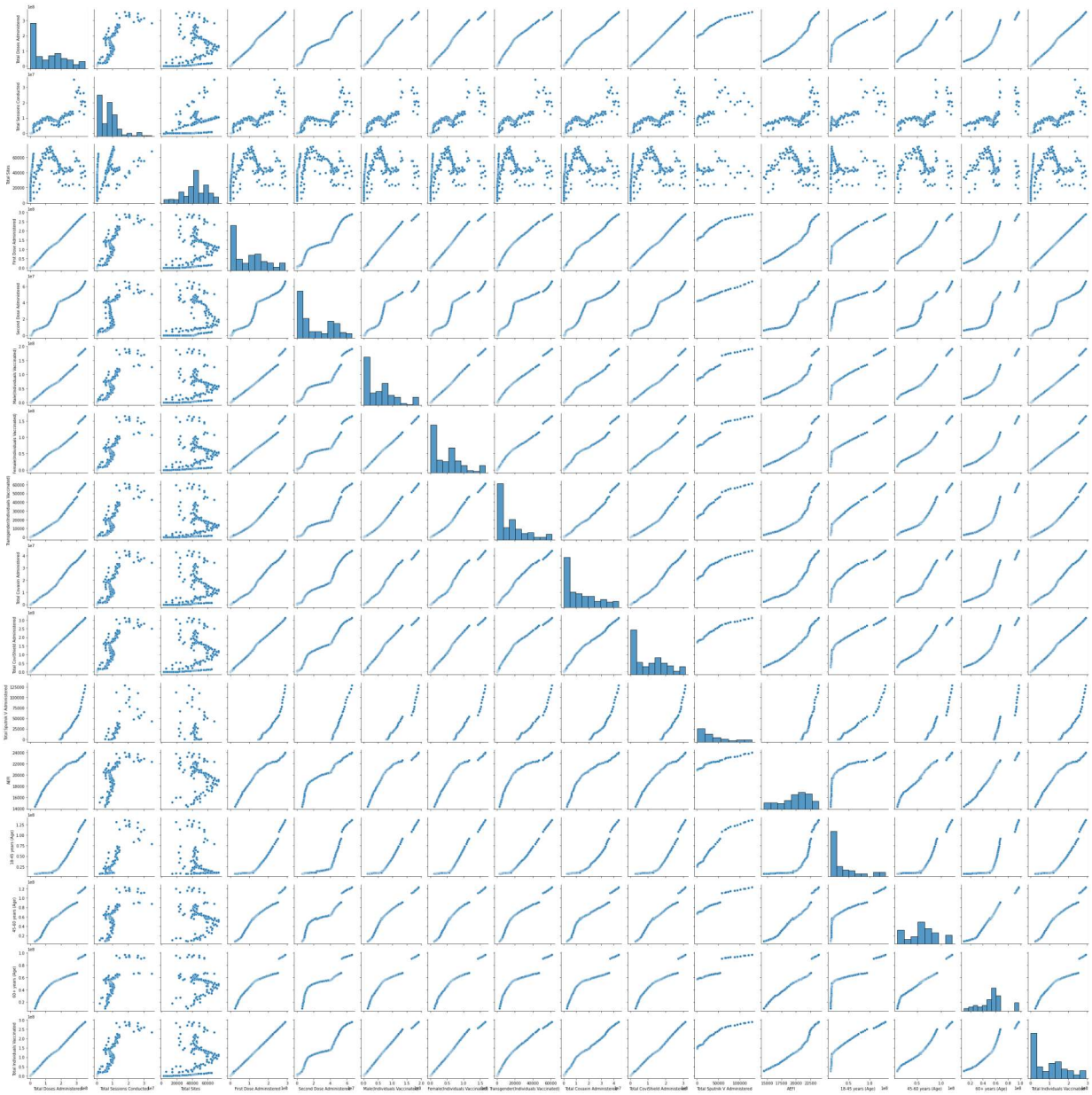
HEATMAP

In [62]:
```
plt.figure(figsize=(10,8))
sns.heatmap(cov.corr(), annot=True,linewidth=.5,center=0,cmap='coolwarm')
plt.show()
```



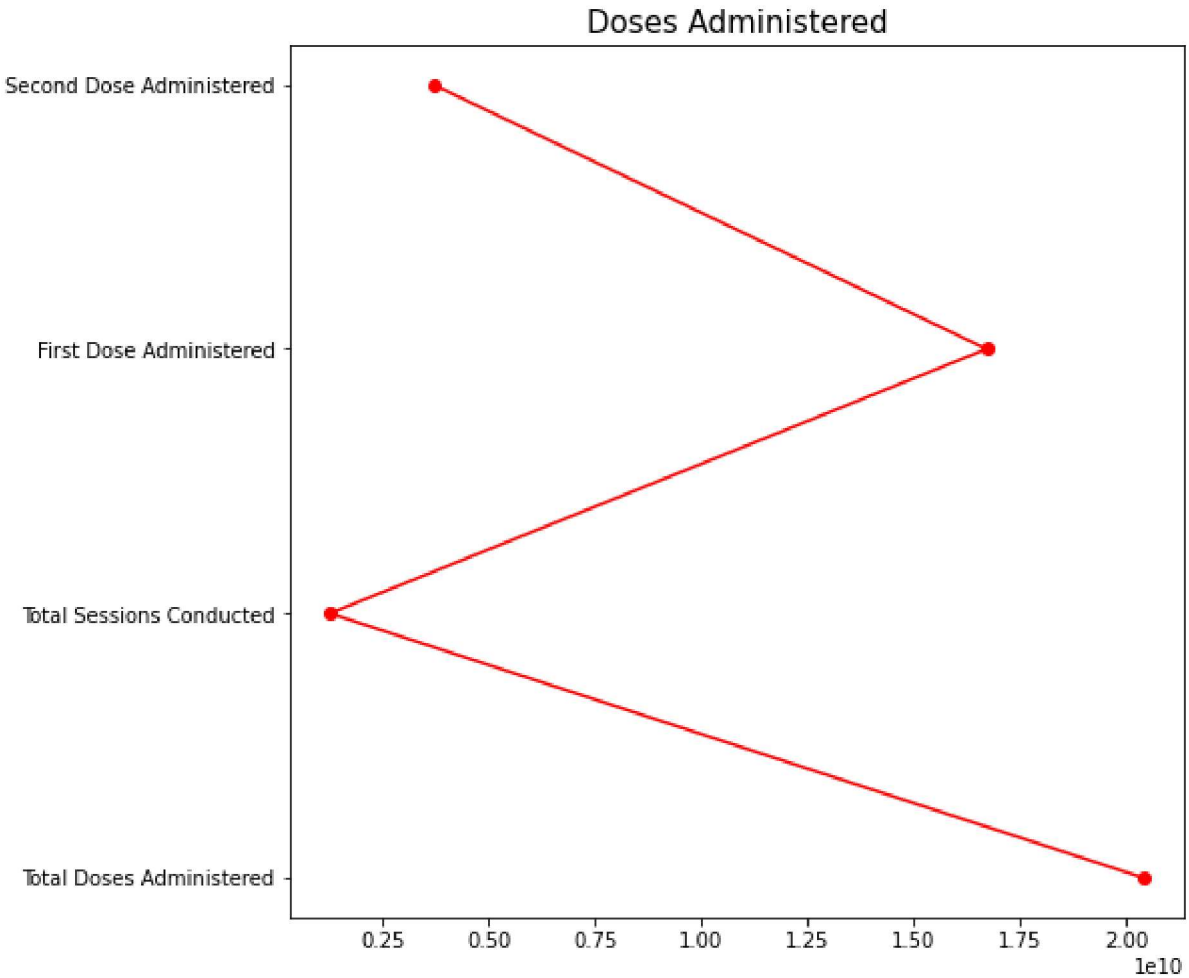
Pairplot

In [63]:
```
sns.pairplot(data_india)
plt.show()
```



Plot a graph for Dose Administered

In [65]:
```
total=[totaldose,totalsesion,dose1,dose2]
totalnm=["Total Doses Administered","Total Sessions Conducted","First Dose Admini
plt.figure(figsize=(8,8))
plt.plot(total,totalnm,marker='o',color='r')
plt.title("Doses Administered",fontsize=15)
plt.show()
```



In the above plot,we can understand that the first dose administered is very large compared to second dose.

Maximum number of males vaccinated per day

In [66]:
```
d=data_india.sort_values(by="Male(Individuals Vaccinated)",ascending=False)
d.head()
```

Out[66]:

	Updated On	State	Total Doses Administered	Total Sessions Conducted	Total Sites	First Dose Administered	Second Dose Administered	Male(Indivic Vaccin
171	06/07/2021	India	356192949.0	17691841.0	35607.0	290132865.0	66060084.0	191160
170	05/07/2021	India	352412289.0	20486897.0	42139.0	287588808.0	64823481.0	189175
169	04/07/2021	India	347766247.0	12321517.0	19122.0	284750483.0	63015764.0	186748
168	03/07/2021	India	346054022.0	26140934.0	48778.0	283527017.0	62527005.0	185856
167	02/07/2021	India	339447068.0	20812325.0	40091.0	279132514.0	60314554.0	182375

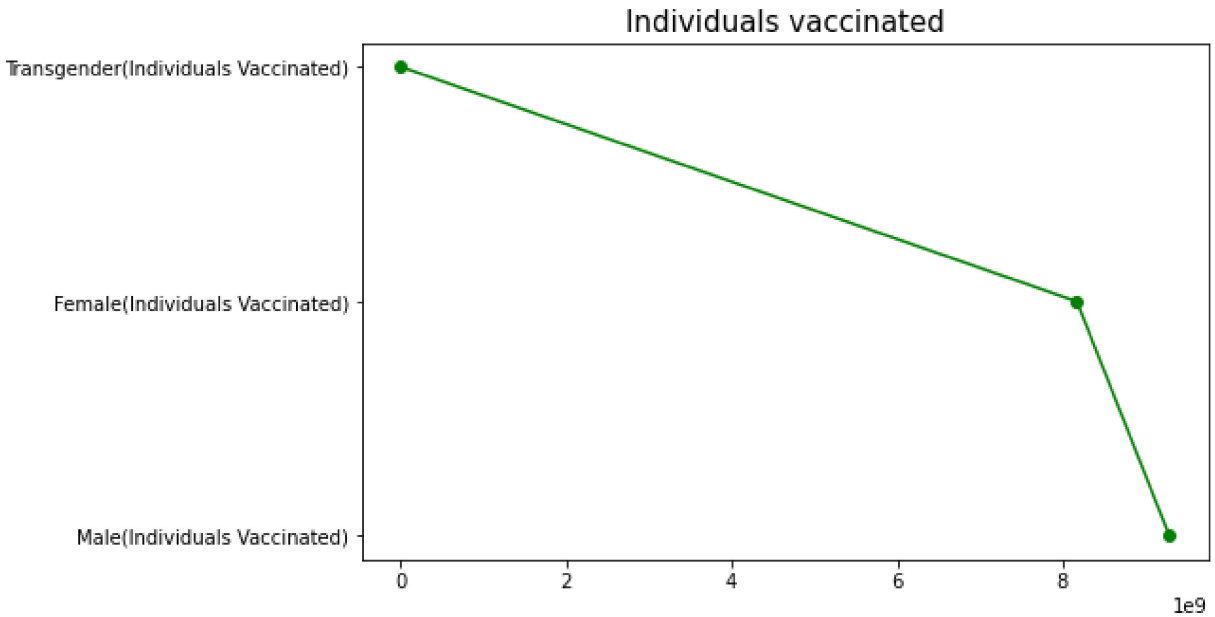
Count of male individuals vaccinated

In [67]:
```
d1=data_india["Male(Individuals Vaccinated)"].value_counts()
d1
```

Out[67]:
```
6008960.0      2
174328759.0    1
81901.0        1
69899266.0     1
1218507.0      1
              ..
180022023.0    1
75461311.0     1
1324273.0      1
83084097.0     1
53575244.0     1
Name: Male(Individuals Vaccinated), Length: 171, dtype: int64
```

Sum of individual vaccinated

In [68]:
```
male=data_india["Male(Individuals Vaccinated)"].sum().round()
female=data_india["Female(Individuals Vaccinated)"].sum().round()
transgender=data_india["Transgender(Individuals Vaccinated)"].sum().round()
vacinated=[male,female,transgender]
vacinatedcatgry=["Male(Individuals Vaccinated)","Female(Individuals Vaccinated)",
plt.figure(figsize=(8,5))
plt.plot(vacinated,vacinatedcatgry,marker='o',color='g')
plt.title("Individuals vaccinated",fontsize=15)
plt.show()
```



The above graph shows,male individuals are vaccinated more

Sum of the vaccine administered

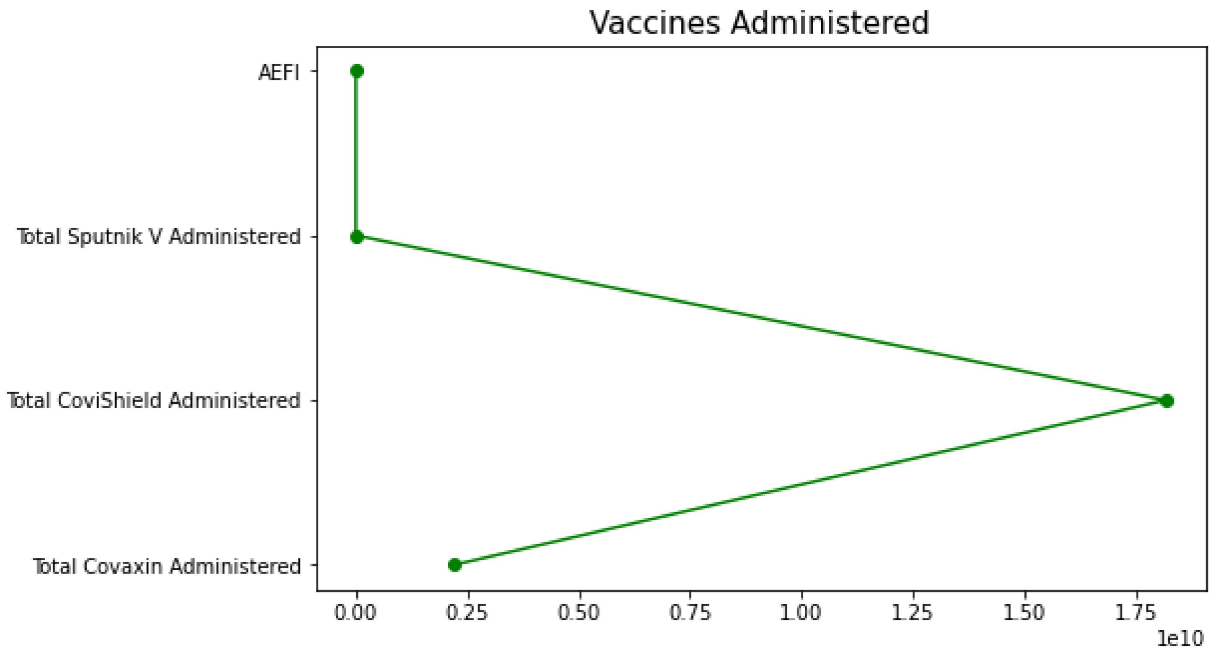
In [70]:
```
yearwise=data_india.groupby(["Updated On"]).agg({"Total Covaxin Administered":"su
yearwise
```

Out[70]:

Updated On	Total Covaxin Administered	Total CoviShield Administered	Total Sputnik V Administered	AEFI
01/02/2021	69372.0	3280893.0	0.0	0.0
01/03/2021	1244273.0	9897378.0	0.0	0.0
01/04/2021	6164245.0	60197476.0	0.0	16355.0
01/05/2021	14369918.0	139256407.0	0.0	19850.0
01/06/2021	23905095.0	190396381.0	13046.0	21302.0
...	...	...	...	...
30/05/2021	22948962.0	185950671.0	8090.0	21166.0
30/06/2021	40307832.0	290158311.0	87480.0	23217.0
31/01/2021	58890.0	3068217.0	0.0	0.0
31/03/2021	5979191.0	57956398.0	0.0	16261.0
31/05/2021	23442881.0	188324712.0	10898.0	21260.0

183 rows × 4 columns

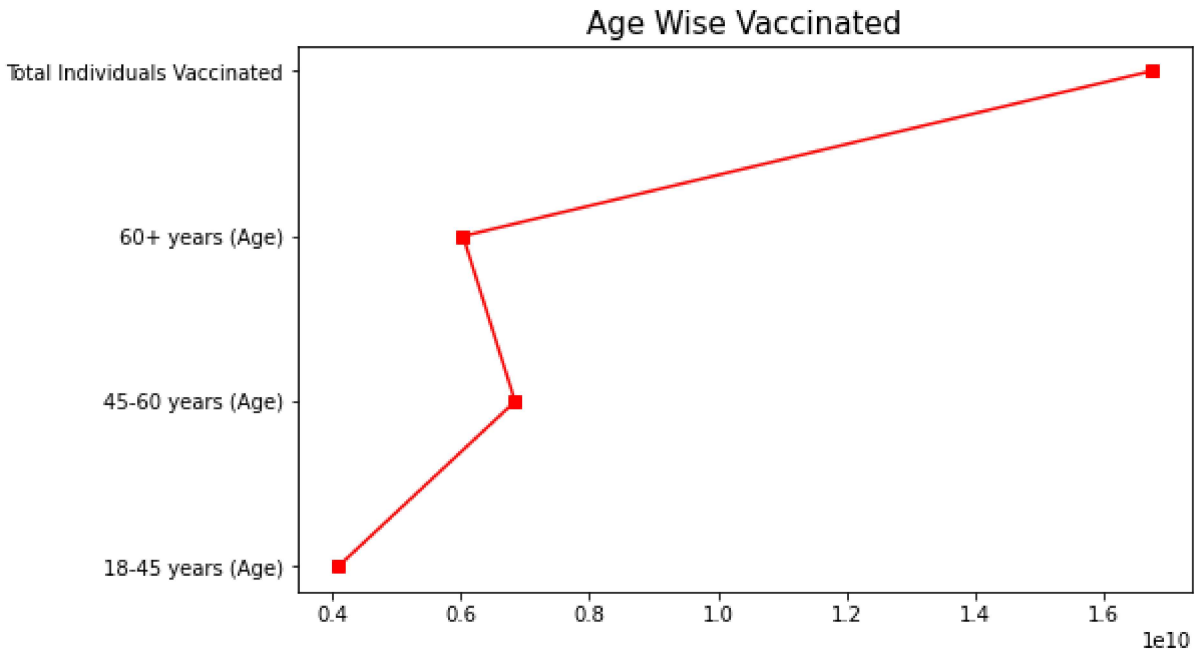
In [71]:
```
covaxin=data_india["Total Covaxin Administered"].sum().round()
covishield=data_india["Total CoviShield Administered"].sum().round()
sputnik=data_india["Total Sputnik V Administered"].sum().round()
AEFI=data_india["AEFI"].sum().round()
vaccines=[covaxin,covishield,sputnik,AEFI]
vacinscatgry=["Total Covaxin Administered","Total CoviShield Administered","Total
plt.figure(figsize=(8,5))
plt.plot(vaccines,vacinscatgry,marker='o',color='g')
plt.title("Vaccines Administered",fontsize=15)
plt.show()
```



Here,we can see CoviShield is given more,then Covaxin is in the second position,Sputnik is in the last position

Sum of age wise vaccinated

In [72]:
```
age18_45=data_india["18-45 years (Age)"].sum().round()
age45_60=data_india["45-60 years (Age)"].sum().round()
age60_abv=data_india["60+ years (Age)"].sum().round()
totalvacintd=data_india["Total Individuals Vaccinated"].sum().round()
ages=[age18_45,age45_60,age60_abv,totalvacintd]
agecatgry=["18-45 years (Age)","45-60 years (Age)","60+ years (Age)","Total Indiv
plt.figure(figsize=(8,5))
plt.plot(ages,agecatgry,marker='s',color='r')
plt.title("Age Wise Vaccinated",fontsize=15)
plt.show()
```



Here,we can see age beween 45 and 60 are vaccinated more.Then age above 60 are in the second position.Age between 18 and 45 are vaccinated least.

Total Individuals Vaccinated

In [73]:
```
totalvacintd=data_india["Total Individuals Vaccinated"].sum().round()
totalvacintd
```

Out[73]:
```
16754776975.0
```

In [75]:
```
n=cov.groupby("State")["Total Individuals Vaccinated"].sum().sort_values(ascendir
n
```

Out[75]:
```
State
India                                          1.675478e+10
Maharashtra                                    1.717369e+09
Uttar Pradesh                                  1.526352e+09
Rajasthan                                      1.390911e+09
Gujarat                                        1.320173e+09
West Bengal                                    1.126840e+09
Karnataka                                      1.096856e+09
Madhya Pradesh                                 9.897258e+08
Bihar                                          8.300049e+08
Kerala                                         7.514010e+08
Andhra Pradesh                                 7.160343e+08
Tamil Nadu                                     7.026099e+08
Odisha                                         6.288063e+08
Chhattisgarh                                   5.171143e+08
Telangana                                      5.073186e+08
Haryana                                        4.539568e+08
Delhi                                          3.788822e+08
Jharkhand                                      3.590463e+08
Punjab                                         3.525689e+08
Assam                                          3.115107e+08
Jammu and Kashmir                              2.502486e+08
Uttarakhand                                    2.177793e+08
Himachal Pradesh                               1.895485e+08
Tripura                                        1.172596e+08
Goa                                            4.188184e+07
Meghalaya                                      3.470133e+07
Manipur                                        3.383899e+07
Arunachal Pradesh                              2.720782e+07
Mizoram                                        2.683888e+07
Chandigarh                                     2.503250e+07
Puducherry                                     2.303566e+07
Nagaland                                       2.289102e+07
Sikkim                                         2.092544e+07
Dadra and Nagar Haveli and Daman and Diu       1.600918e+07
Ladakh                                         1.152828e+07
Andaman and Nicobar Islands                    9.942734e+06
Lakshadweep                                    2.686210e+06
Name: Total Individuals Vaccinated, dtype: float64
```

Informations of States in India

In [76]:
```
data_state=cov[183:]
data_state
```

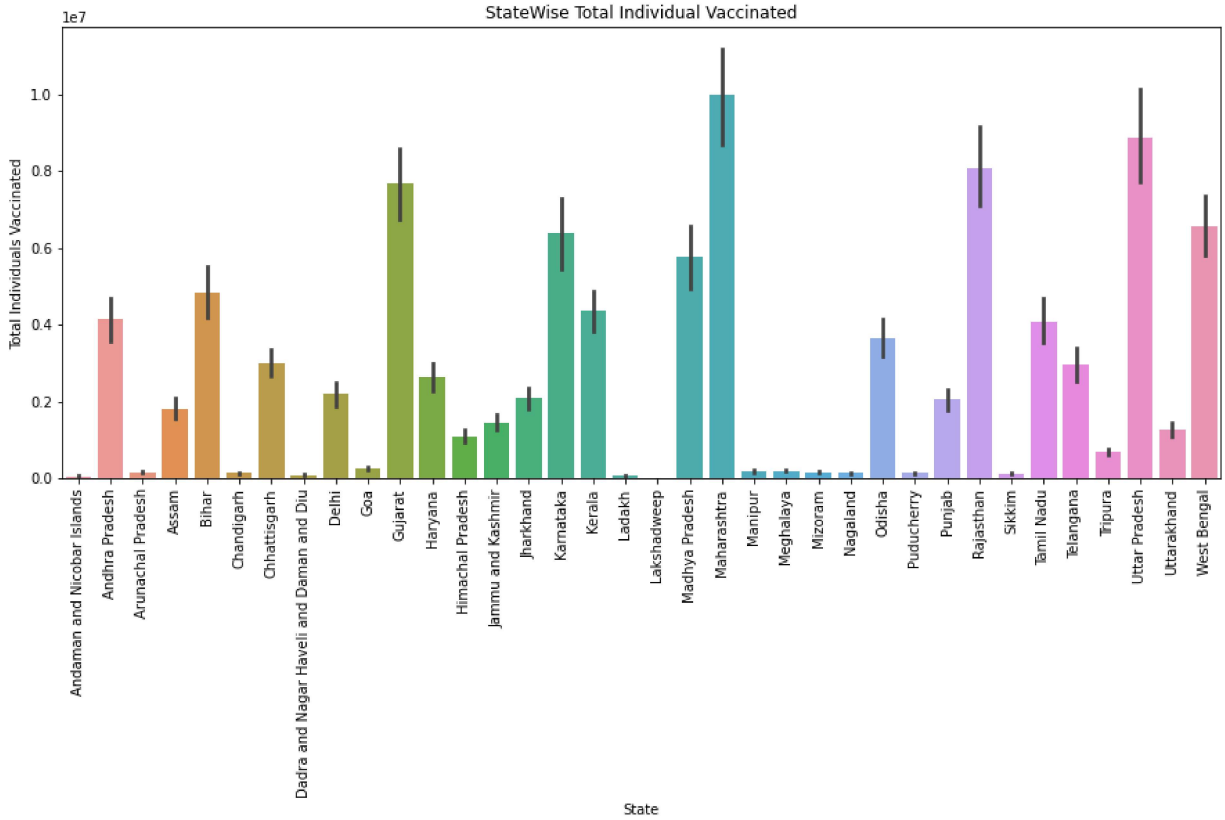
Out[76]:

	Updated On	State	Total Doses Administered	Total Sessions Conducted	Total Sites	First Dose Administered	Second Dose Administered	Male(Indi Vacc
183	16/01/2021	Andaman and Nicobar Islands	23.0	2.0	2.0	23.0	0.0	
184	17/01/2021	Andaman and Nicobar Islands	23.0	2.0	2.0	23.0	0.0	
185	18/01/2021	Andaman and Nicobar Islands	42.0	9.0	2.0	42.0	0.0	
186	19/01/2021	Andaman and Nicobar Islands	89.0	12.0	2.0	89.0	0.0	
187	20/01/2021	Andaman and Nicobar Islands	124.0	16.0	3.0	124.0	0.0	
...	...	...	...	...	...	...	...	
6694	11/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	
6695	12/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	
6696	13/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	
6697	14/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	
6698	15/07/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	

6516 rows × 18 columns

State Wise total individual vaccinated.

In [77]:
```
fig=plt.figure(figsize=(15,6))
sns.barplot(x="State",y="Total Individuals Vaccinated",data=data_state)
plt.title("StateWise Total Individual Vaccinated")
plt.xticks(rotation=90)
plt.show()
```



Top Vaccinated States in India

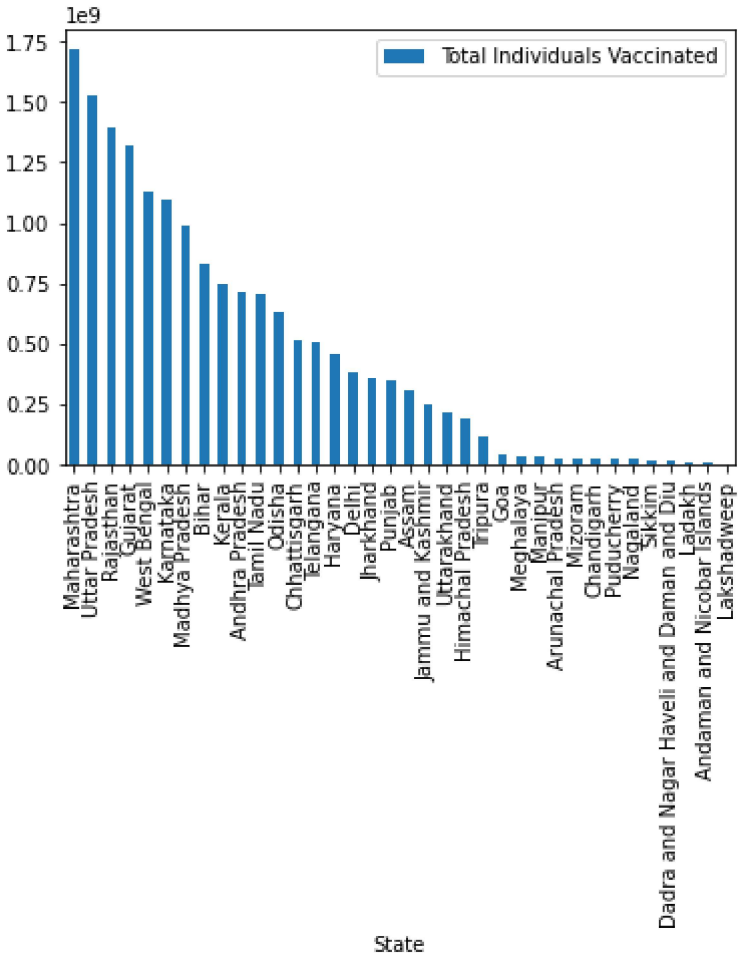
In [78]:
```
top_vaccintd = data_state.groupby('State')['Total Individuals Vaccinated'].sum().
top_vaccintd
```

Out[78]:

State	Total Individuals Vaccinated
Maharashtra	1.717369e+09
Uttar Pradesh	1.526352e+09
Rajasthan	1.390911e+09
Gujarat	1.320173e+09
West Bengal	1.126840e+09
Karnataka	1.096856e+09
Madhya Pradesh	9.897258e+08
Bihar	8.300049e+08
Kerala	7.514010e+08
Andhra Pradesh	7.160343e+08
Tamil Nadu	7.026099e+08
Odisha	6.288063e+08
Chhattisgarh	5.171143e+08
Telangana	5.073186e+08
Haryana	4.539568e+08
Delhi	3.788822e+08
Jharkhand	3.590463e+08
Punjab	3.525689e+08
Assam	3.115107e+08
Jammu and Kashmir	2.502486e+08
Uttarakhand	2.177793e+08
Himachal Pradesh	1.895485e+08
Tripura	1.172596e+08
Goa	4.188184e+07
Meghalaya	3.470133e+07
Manipur	3.383899e+07
Arunachal Pradesh	2.720782e+07
Mizoram	2.683888e+07
Chandigarh	2.503250e+07
Puducherry	2.303566e+07
Nagaland	2.289102e+07
Sikkim	2.092544e+07

State	Total Individuals Vaccinated
Dadra and Nagar Haveli and Daman and Diu	1.600918e+07
Ladakh	1.152828e+07
Andaman and Nicobar Islands	9.942734e+06
Lakshadweep	2.686210e+06

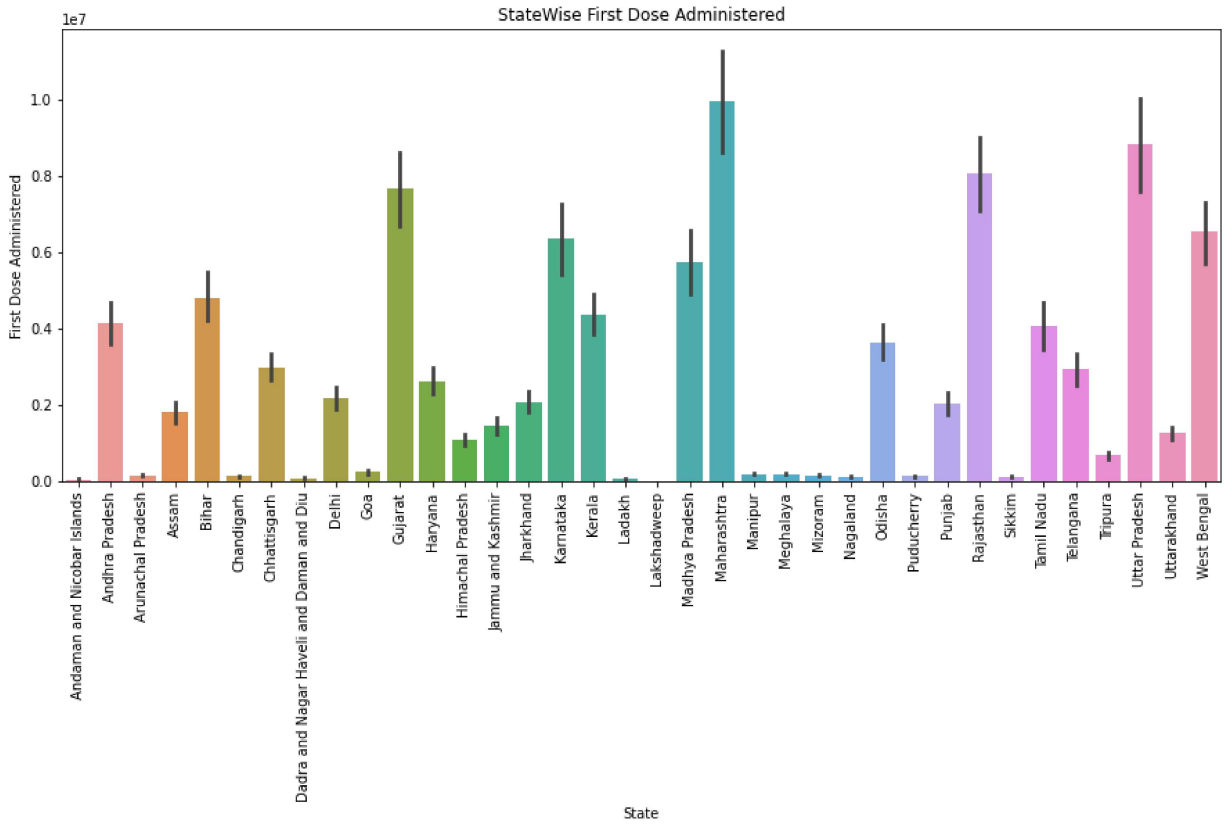
In [79]:
```
top_vaccintd.plot.bar()
#top_vaccintd.plot(figsize=(10,6))
plt.show()
```



From the above,we can see Maharashtra is the most vaccinated State in India.And Uttarpradesh is in the second positiion.Lakshadweep is in the last position.

State Wise First Dose Administered

In [80]:
```
fig=plt.figure(figsize=(15,6))
sns.barplot(x="State",y="First Dose Administered",data=data_state)
plt.title("StateWise First Dose Administered")
plt.xticks(rotation=90)
plt.show()
```



Top first dose administered in India

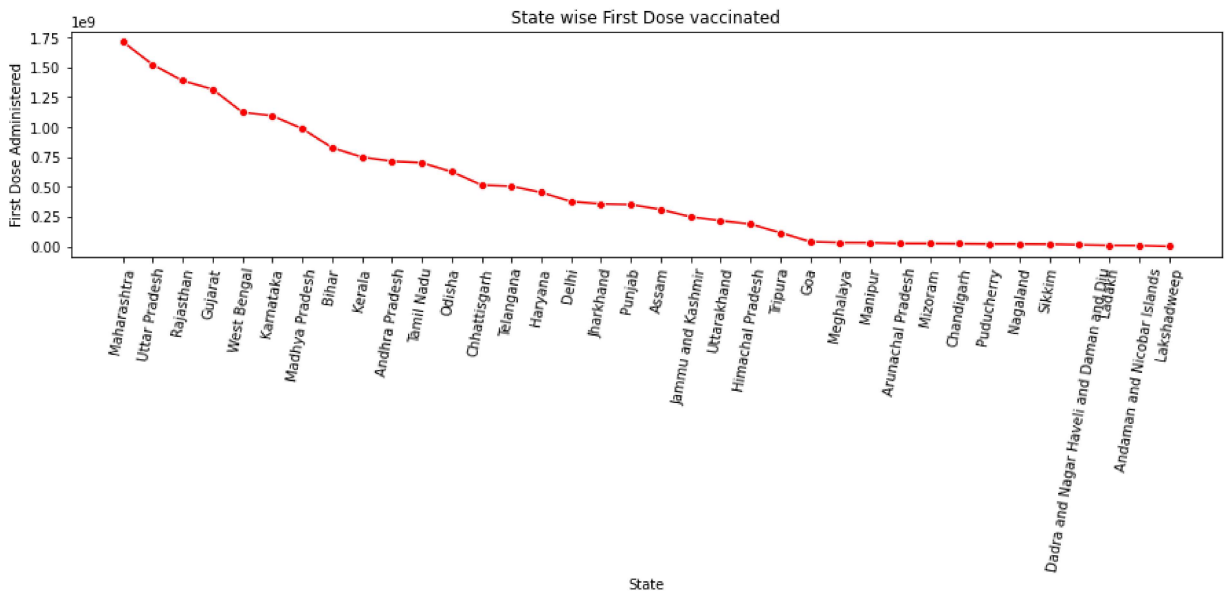
In [81]:
```
top_Firstdose = data_state.groupby('State')['First Dose Administered'].sum().to_f
top_Firstdose
```

Out[81]:

State	First Dose Administered
Maharashtra	1.714725e+09
Uttar Pradesh	1.522214e+09
Rajasthan	1.387978e+09
Gujarat	1.316838e+09
West Bengal	1.124473e+09
Karnataka	1.094669e+09
Madhya Pradesh	9.875981e+08
Bihar	8.281081e+08
Kerala	7.495534e+08
Andhra Pradesh	7.144311e+08
Tamil Nadu	7.018573e+08
Odisha	6.270536e+08
Chhattisgarh	5.158810e+08
Telangana	5.059189e+08
Haryana	4.532638e+08
Delhi	3.781172e+08
Jharkhand	3.581771e+08
Punjab	3.521430e+08
Assam	3.109564e+08
Jammu and Kashmir	2.499180e+08
Uttarakhand	2.172234e+08
Himachal Pradesh	1.891329e+08
Tripura	1.169524e+08
Goa	4.180848e+07
Meghalaya	3.463284e+07
Manipur	3.377552e+07
Arunachal Pradesh	2.712398e+07
Mizoram	2.676894e+07
Chandigarh	2.499616e+07
Puducherry	2.301172e+07
Nagaland	2.283200e+07
Sikkim	2.087506e+07

State	First Dose Administered
Dadra and Nagar Haveli and Daman and Diu	1.598855e+07
Ladakh	1.150925e+07
Andaman and Nicobar Islands	9.924497e+06
Lakshadweep	2.681814e+06

In [82]:
```
plt.figure(figsize=(15,3))
sns.lineplot(x='State',y='First Dose Administered',data=top_Firstdose,marker="o",
plt.xticks(rotation=80)

#plt.plot(State,First Dose Admininistered,marker='o',color='g')
plt.title('State wise First Dose vaccinated')
plt.show()
```



From the above,we can see the state which is top position in first dose vaccinated is Maharashtra.And Uttarpradesh is in the second positiion.Lakshadweep is in the last position.

Statewise male individual vaccinated

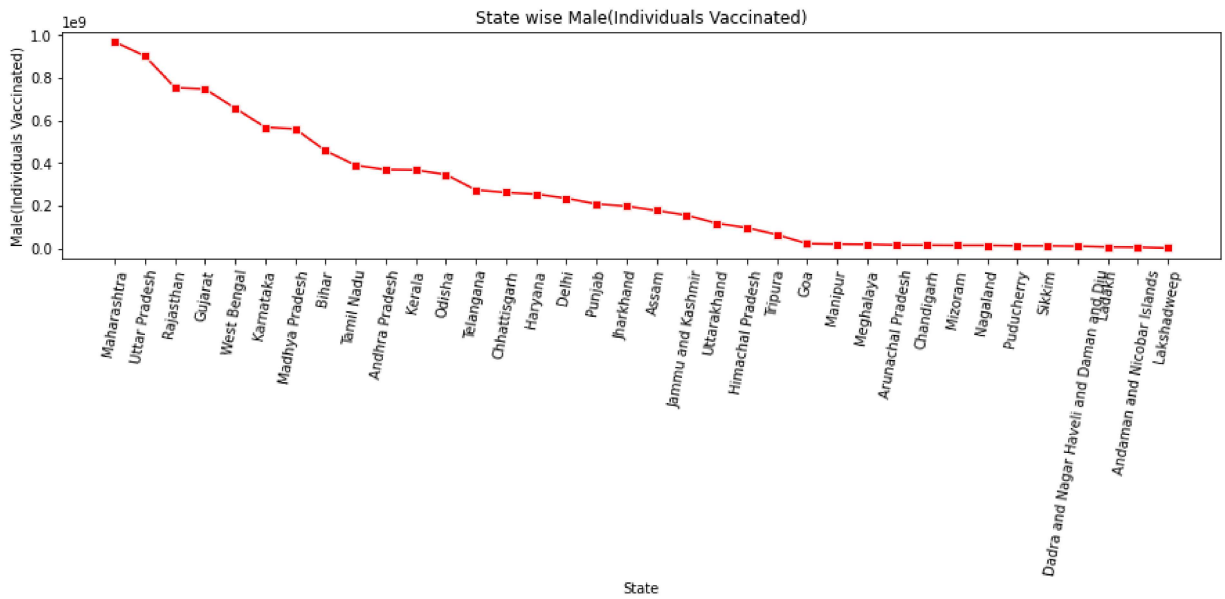
In [83]:
```
top_vac = data_state.groupby('State')['Male(Individuals Vaccinated)'].sum().to_fr
top_vac
```

Out[83]:

State	Male(Individuals Vaccinated)
Maharashtra	966770949.0
Uttar Pradesh	900954451.0
Rajasthan	752840347.0
Gujarat	746153392.0
West Bengal	656425536.0
Karnataka	567343701.0
Madhya Pradesh	559330137.0
Bihar	457334240.0
Tamil Nadu	389248013.0
Andhra Pradesh	368956824.0
Kerala	367341380.0
Odisha	345643319.0
Telangana	273584279.0
Chhattisgarh	261703202.0
Haryana	254285829.0
Delhi	234880916.0
Punjab	208079122.0
Jharkhand	197854426.0
Assam	177301094.0
Jammu and Kashmir	155315862.0
Uttarakhand	117590037.0
Himachal Pradesh	96900109.0
Tripura	64597066.0
Goa	22340619.0
Manipur	19975968.0
Meghalaya	18624970.0
Arunachal Pradesh	15690340.0
Chandigarh	14959749.0
Mizoram	14107205.0
Nagaland	14066403.0
Puducherry	12214797.0
Sikkim	11767345.0

State	Male(Individuals Vaccinated)
Dadra and Nagar Haveli and Daman and Diu	10446644.0
Ladakh	6649151.0
Andaman and Nicobar Islands	5525173.0
Lakshadweep	1577941.0

In [84]:
```
plt.figure(figsize=(15,3))
sns.lineplot(x='State',y='Male(Individuals Vaccinated)',data=top_vac,marker="s",c
plt.xticks(rotation=80)

plt.title('State wise Male(Individuals Vaccinated)')
plt.show()
```



Here,we can see the state which is top position in male individual vaccinated is Maharashtra.Second position is for UttarPradesh.Lakshadweep is in last position.

State wise female individual vaccinated

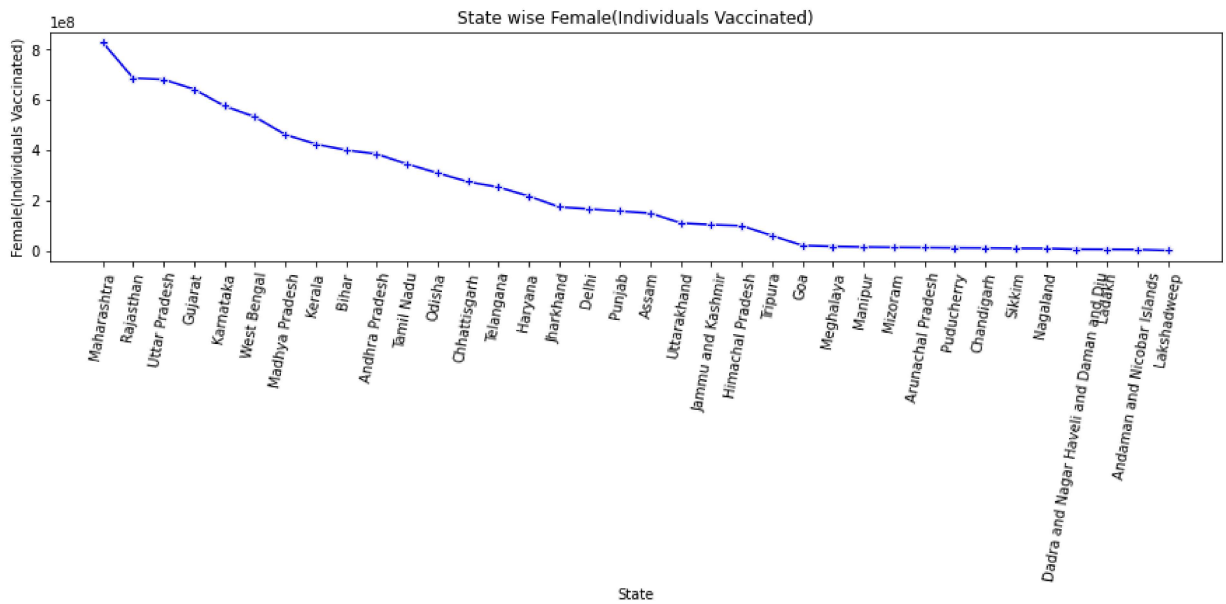
In [85]:
```
top_Female = data_state.groupby('State')['Female(Individuals Vaccinated)'].sum().
top_Female
```

Out[85]:

State	Female(Individuals Vaccinated)
Maharashtra	827976235.0
Rajasthan	686528394.0
Uttar Pradesh	680487056.0
Gujarat	641997586.0
Karnataka	575265047.0
West Bengal	532128855.0
Madhya Pradesh	461589018.0
Kerala	423829307.0
Bihar	399979888.0
Andhra Pradesh	384371948.0
Tamil Nadu	344530055.0
Odisha	309083171.0
Chhattisgarh	274134666.0
Telangana	252868696.0
Haryana	216980174.0
Jharkhand	174143682.0
Delhi	165735672.0
Punjab	157221402.0
Assam	149094370.0
Uttarakhand	110130186.0
Jammu and Kashmir	103272091.0
Himachal Pradesh	99219151.0
Tripura	59814364.0
Goa	20979805.0
Meghalaya	17042973.0
Manipur	14754142.0
Mizoram	13411957.0
Arunachal Pradesh	12546790.0
Puducherry	11649550.0
Chandigarh	11145458.0
Sikkim	10062533.0
Nagaland	9559207.0

State	Female(Individuals Vaccinated)
Dadra and Nagar Haveli and Daman and Diu	6055162.0
Ladakh	5529159.0
Andaman and Nicobar Islands	4679222.0
Lakshadweep	1205559.0

In [86]:
```
plt.figure(figsize=(15,3))
sns.lineplot(x='State',y='Female(Individuals Vaccinated)',data=top_Female,marker=
plt.xticks(rotation=80)

plt.title('State wise Female(Individuals Vaccinated)')
plt.show()
```



Here,we can see the state which is top position in female individual vaccinated is Maharashtra.Second position is for Rajasthan.Lakshadweep is in last position.

State wise transgender individual vaccinated

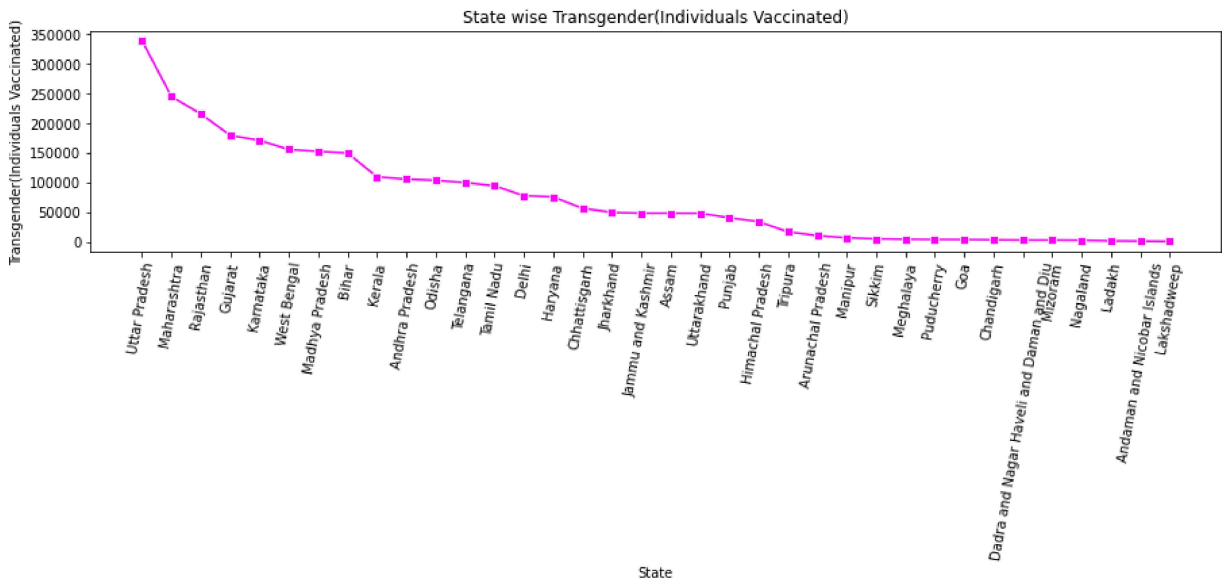
In [87]:
```
top_Transgender = data_state.groupby('State')['Transgender(Individuals Vaccinated
top_Transgender
```

Out[87]:

State	Transgender(Individuals Vaccinated)
Uttar Pradesh	339310.0
Maharashtra	244948.0
Rajasthan	215752.0
Gujarat	179530.0
Karnataka	171030.0
West Bengal	155639.0
Madhya Pradesh	152358.0
Bihar	149622.0
Kerala	109347.0
Andhra Pradesh	105485.0
Odisha	103474.0
Telangana	99670.0
Tamil Nadu	94276.0
Delhi	77476.0
Haryana	75428.0
Chhattisgarh	56297.0
Jharkhand	49251.0
Jammu and Kashmir	47984.0
Assam	47937.0
Uttarakhand	47764.0
Punjab	40208.0
Himachal Pradesh	33655.0
Tripura	16375.0
Arunachal Pradesh	10122.0
Manipur	6529.0
Sikkim	4618.0
Meghalaya	3836.0
Puducherry	3481.0
Goa	3374.0
Chandigarh	2878.0
Dadra and Nagar Haveli and Daman and Diu	2499.0
Mizoram	2494.0

State	Transgender(Individuals Vaccinated)
Nagaland	2244.0
Ladakh	1205.0
Andaman and Nicobar Islands	833.0
Lakshadweep	228.0

In [88]:
```
plt.figure(figsize=(15,3))
sns.lineplot(x='State',y='Transgender(Individuals Vaccinated)',data=top_Transgenc
plt.xticks(rotation=80)

plt.title('State wise Transgender(Individuals Vaccinated)')
plt.show()
```



Here,we can see the state which is top position in Transgender individual vaccinated is Uttar Pradesh.Second position is for Maharashtra.Lakshadweep is in last position.

Get all individual vaccinated

In [89]:
```
top_vac['Male(Individuals Vaccinated)'] = top_vac
top_vac['Female(Individuals Vaccinated)'] = top_Female
top_vac['Transgender(Individuals Vaccinated)'] = top_Transgender

top_vac
```

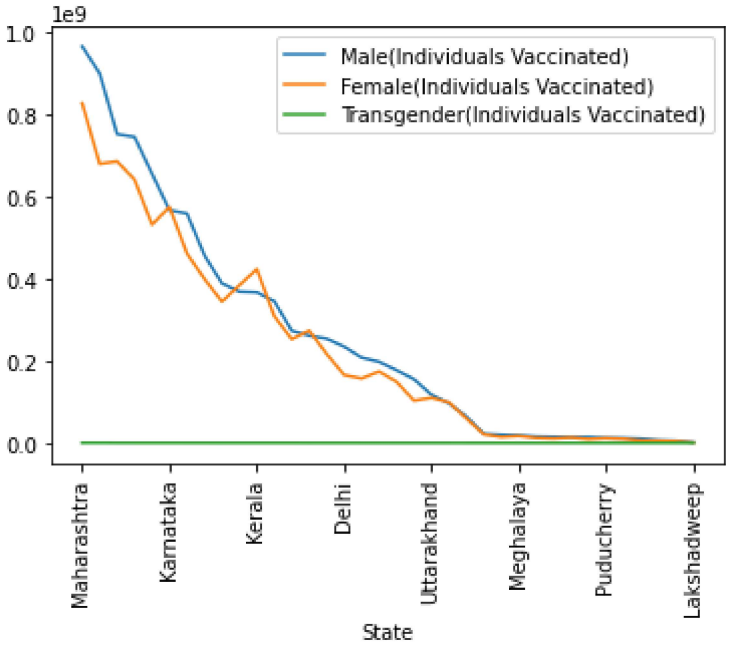
Out[89]:

State	Male(Individuals Vaccinated)	Female(Individuals Vaccinated)	Transgender(Individuals Vaccinated)
Maharashtra	966770949.0	827976235.0	244948.0
Uttar Pradesh	900954451.0	680487056.0	339310.0
Rajasthan	752840347.0	686528394.0	215752.0
Gujarat	746153392.0	641997586.0	179530.0
West Bengal	656425536.0	532128855.0	155639.0
Karnataka	567343701.0	575265047.0	171030.0
Madhya Pradesh	559330137.0	461589018.0	152358.0
Bihar	457334240.0	399979888.0	149622.0
Tamil Nadu	389248013.0	344530055.0	94276.0
Andhra Pradesh	368956824.0	384371948.0	105485.0
Kerala	367341380.0	423829307.0	109347.0
Odisha	345643319.0	309083171.0	103474.0
Telangana	273584279.0	252868696.0	99670.0
Chhattisgarh	261703202.0	274134666.0	56297.0
Haryana	254285829.0	216980174.0	75428.0
Delhi	234880916.0	165735672.0	77476.0
Punjab	208079122.0	157221402.0	40208.0
Jharkhand	197854426.0	174143682.0	49251.0
Assam	177301094.0	149094370.0	47937.0
Jammu and Kashmir	155315862.0	103272091.0	47984.0
Uttarakhand	117590037.0	110130186.0	47764.0
Himachal Pradesh	96900109.0	99219151.0	33655.0
Tripura	64597066.0	59814364.0	16375.0
Goa	22340619.0	20979805.0	3374.0
Manipur	19975968.0	14754142.0	6529.0
Meghalaya	18624970.0	17042973.0	3836.0
Arunachal Pradesh	15690340.0	12546790.0	10122.0
Chandigarh	14959749.0	11145458.0	2878.0
Mizoram	14107205.0	13411957.0	2494.0
Nagaland	14066403.0	9559207.0	2244.0

State	Male(Individuals Vaccinated)	Female(Individuals Vaccinated)	Transgender(Individuals Vaccinated)
Puducherry	12214797.0	11649550.0	3481.0
Sikkim	11767345.0	10062533.0	4618.0
Dadra and Nagar Haveli and Daman and Diu	10446644.0	6055162.0	2499.0
Ladakh	6649151.0	5529159.0	1205.0
Andaman and Nicobar Islands	5525173.0	4679222.0	833.0
Lakshadweep	1577941.0	1205559.0	228.0

Here,we can see the state which is top position in transgender individual vaccinated is UttaaPradesh.Second position is for Maharashtra.Lakshadweep is in last position.

In [90]:
```
top_vac.plot.line()
plt.xticks(rotation=90)
plt.show()
```



Above graph clearly shows male individuals are vaccinated more.

Total of Covaxin Administered

In [92]:

```
top_Covaxin = data_state.groupby('State')['Total Covaxin Administered'].sum().to_
top_Covaxin
```

Out[92]:

State	Total Covaxin Administered
Maharashtra	240073678.0
Uttar Pradesh	207119612.0
Gujarat	190944782.0
West Bengal	161606268.0
Andhra Pradesh	155998977.0
Delhi	139775575.0
Karnataka	136080860.0
Madhya Pradesh	133147945.0
Tamil Nadu	131944496.0
Rajasthan	128966784.0
Telangana	96803545.0
Bihar	77972516.0
Odisha	73242639.0
Haryana	72959714.0
Assam	68953907.0
Kerala	64541503.0
Jharkhand	53348766.0
Punjab	36769861.0
Chhattisgarh	20137520.0
Uttarakhand	7614733.0
Jammu and Kashmir	4041629.0
Tripura	1187646.0
Goa	625054.0
Himachal Pradesh	25713.0
Chandigarh	20089.0
Puducherry	7808.0
Nagaland	3736.0
Sikkim	3239.0
Meghalaya	2275.0
Arunachal Pradesh	1820.0
Ladakh	910.0

State	Total Covaxin Administered
Manipur	743.0
Dadra and Nagar Haveli and Daman and Diu	216.0
Mizoram	137.0
Lakshadweep	75.0
Andaman and Nicobar Islands	0.0

The state which is top position in total Covaxine administered is Maharashtra.Uttar Pradesh is in second position .Andaman and Nicobar Islands didn't take the Covaxine.

Total of CoviShield Administered

In [93]:
```
top_CoviShield = data_state.groupby('State')['Total CoviShield Administered'].sum
top_CoviShield
```

Out[93]:

State	Total CoviShield Administered
Maharashtra	1.850468e+09
Uttar Pradesh	1.623685e+09
Rajasthan	1.531127e+09
Gujarat	1.471653e+09
West Bengal	1.278798e+09
Karnataka	1.182851e+09
Madhya Pradesh	1.013957e+09
Bihar	9.020493e+08
Kerala	8.674961e+08
Andhra Pradesh	7.533635e+08
Tamil Nadu	7.322733e+08
Odisha	6.853092e+08
Chhattisgarh	5.936969e+08
Telangana	5.065061e+08
Haryana	4.621091e+08
Punjab	3.768308e+08
Jharkhand	3.715581e+08
Delhi	3.434315e+08
Assam	3.139260e+08
Jammu and Kashmir	2.932617e+08
Uttarakhand	2.656567e+08
Himachal Pradesh	2.242866e+08
Tripura	1.558404e+08
Goa	4.936153e+07
Meghalaya	4.137562e+07
Manipur	4.036941e+07
Arunachal Pradesh	3.377869e+07
Mizoram	3.138080e+07
Chandigarh	3.096927e+07
Nagaland	2.759849e+07
Puducherry	2.708034e+07
Sikkim	2.585629e+07

State	Total CoviShield Administered
Dadra and Nagar Haveli and Daman and Diu	1.824432e+07
Ladakh	1.474946e+07
Andaman and Nicobar Islands	1.129601e+07
Lakshadweep	3.259807e+06

The state which is top position in total CovaiShield administered is Maharashtra.Uttar Pradesh is in second position .Andhra Pradesh is in the last position.

Total of Sputnik V Administered

In [94]:
```
top_Sputnik = data_state.groupby('State')['Total Sputnik V Administered'].sum().t
top_Sputnik
```

Out[94]:

State	Total Sputnik V Administered
Telangana	1049033.0
Andhra Pradesh	230688.0
Karnataka	90348.0
Maharashtra	89117.0
West Bengal	84534.0
Delhi	57494.0
Haryana	51705.0
Himachal Pradesh	41158.0
Tamil Nadu	26505.0
Rajasthan	16726.0
Punjab	14674.0
Kerala	9387.0
Jharkhand	9048.0
Uttar Pradesh	8385.0
Bihar	5114.0
Chhattisgarh	3131.0
Gujarat	2681.0
Odisha	2392.0
Assam	1317.0
Madhya Pradesh	1105.0
Tripura	0.0
Sikkim	0.0
Uttarakhand	0.0
Puducherry	0.0
Andaman and Nicobar Islands	0.0
Nagaland	0.0
Mizoram	0.0
Meghalaya	0.0
Manipur	0.0
Ladakh	0.0
Jammu and Kashmir	0.0
Goa	0.0

State	Total Sputnik V Administered
Dadra and Nagar Haveli and Daman and Diu	0.0
Chandigarh	0.0
Arunachal Pradesh	0.0
Lakshadweep	0.0

The state which is top position in total Sputnik administered is Telengana.Andhra Pradesh is in second position .Some of the states didn't take Sputnik.

Total of AEFI Administred

In [95]:
```
top_AEFI = data_state.groupby('State')['AEFI'].sum().to_frame(name = "AEFI").sort
top_AEFI
```

Out[95]:

State	AEFI
Maharashtra	399546.0
Karnataka	281218.0
Kerala	258080.0
Uttar Pradesh	130546.0
West Bengal	115142.0
Gujarat	108130.0
Delhi	95583.0
Haryana	93147.0
Himachal Pradesh	72007.0
Mizoram	71420.0
Goa	61980.0
Chhattisgarh	60357.0
Jharkhand	59903.0
Madhya Pradesh	55575.0
Rajasthan	47261.0
Telangana	40702.0
Andhra Pradesh	35334.0
Uttarakhand	31652.0
Arunachal Pradesh	29693.0
Meghalaya	28594.0
Sikkim	24502.0
Odisha	22910.0
Bihar	20422.0
Assam	18921.0
Punjab	13375.0
Tamil Nadu	12948.0
Jammu and Kashmir	11869.0
Chandigarh	11540.0
Dadra and Nagar Haveli and Daman and Diu	9716.0
Manipur	8221.0
Tripura	6758.0
Nagaland	4051.0
Puducherry	1873.0

State	AEFI
Ladakh	309.0
Andaman and Nicobar Islands	212.0
Lakshadweep	20.0

The state which is top position in total AEFI vccine administered is Maharashtra.Karnataka is in second position .Lakshadweep is in last position.

Get all vaccines administered

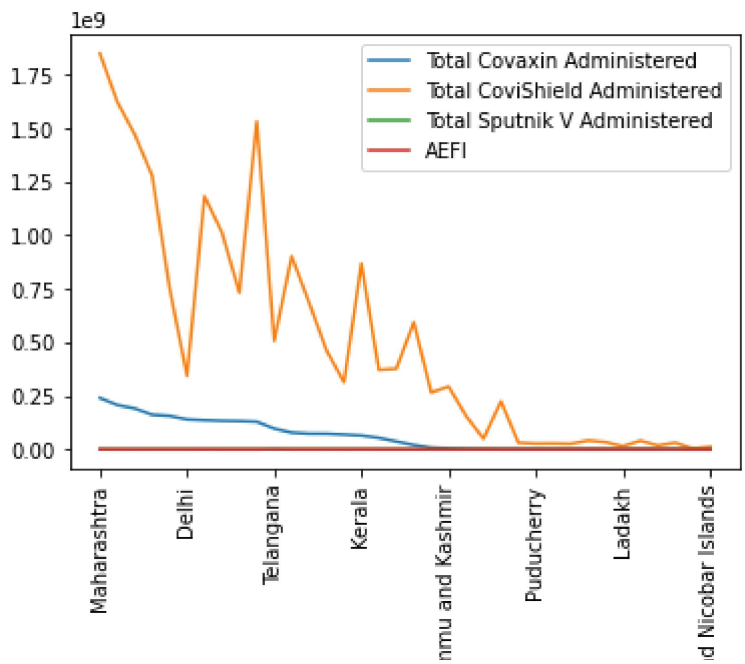
In [96]:
```
top_Covaxin["Total Covaxin Administered"]=top_Covaxin
top_Covaxin["Total CoviShield Administered"]=top_CoviShield
top_Covaxin["Total Sputnik V Administered"]=top_Sputnik
top_Covaxin["AEFI"]=top_AEFI

top_Covaxin
```

Out[96]:

State	Total Covaxin Administered	Total CoviShield Administered	Total Sputnik V Administered	AEFI
Maharashtra	240073678.0	1.850468e+09	89117.0	399546.0
Uttar Pradesh	207119612.0	1.623685e+09	8385.0	130546.0
Gujarat	190944782.0	1.471653e+09	2681.0	108130.0
West Bengal	161606268.0	1.278798e+09	84534.0	115142.0
Andhra Pradesh	155998977.0	7.533635e+08	230688.0	35334.0
Delhi	139775575.0	3.434315e+08	57494.0	95583.0
Karnataka	136080860.0	1.182851e+09	90348.0	281218.0
Madhya Pradesh	133147945.0	1.013957e+09	1105.0	55575.0
Tamil Nadu	131944496.0	7.322733e+08	26505.0	12948.0
Rajasthan	128966784.0	1.531127e+09	16726.0	47261.0
Telangana	96803545.0	5.065061e+08	1049033.0	40702.0
Bihar	77972516.0	9.020493e+08	5114.0	20422.0
Odisha	73242639.0	6.853092e+08	2392.0	22910.0
Haryana	72959714.0	4.621091e+08	51705.0	93147.0
Assam	68953907.0	3.139260e+08	1317.0	18921.0
Kerala	64541503.0	8.674961e+08	9387.0	258080.0
Jharkhand	53348766.0	3.715581e+08	9048.0	59903.0
Punjab	36769861.0	3.768308e+08	14674.0	13375.0
Chhattisgarh	20137520.0	5.936969e+08	3131.0	60357.0
Uttarakhand	7614733.0	2.656567e+08	0.0	31652.0
Jammu and Kashmir	4041629.0	2.932617e+08	0.0	11869.0
Tripura	1187646.0	1.558404e+08	0.0	6758.0
Goa	625054.0	4.936153e+07	0.0	61980.0
Himachal Pradesh	25713.0	2.242866e+08	41158.0	72007.0
Chandigarh	20089.0	3.096927e+07	0.0	11540.0
Puducherry	7808.0	2.708034e+07	0.0	1873.0
Nagaland	3736.0	2.759849e+07	0.0	4051.0
Sikkim	3239.0	2.585629e+07	0.0	24502.0
Meghalaya	2275.0	4.137562e+07	0.0	28594.0
Arunachal Pradesh	1820.0	3.377869e+07	0.0	29693.0

State	Total Covaxin Administered	Total CoviShield Administered	Total Sputnik V Administered	AEFI
Ladakh	910.0	1.474946e+07	0.0	309.0
Manipur	743.0	4.036941e+07	0.0	8221.0
Dadra and Nagar Haveli and Daman and Diu	216.0	1.824432e+07	0.0	9716.0
Mizoram	137.0	3.138080e+07	0.0	71420.0
Lakshadweep	75.0	3.259807e+06	0.0	20.0
Andaman and Nicobar Islands	0.0	1.129601e+07	0.0	212.0

In [97]:
```
top_Covaxin.plot.line()
plt.xticks(rotation=90)
plt.show()
```



Above graph clearly shows CoviShield is given more.

Vaccination of individuals having age b/w 18-45

In [98]:
```
top_age= data_state.groupby('State')['18-45 years (Age)'].sum().to_frame(name = '
top_age
```

Out[98]:

State	18-45 years (Age)
Uttar Pradesh	388930529.0
Maharashtra	366429893.0
Gujarat	352028464.0
Madhya Pradesh	300681489.0
Rajasthan	289754292.0
Karnataka	264855867.0
West Bengal	240959203.0
Tamil Nadu	232419371.0
Bihar	227218424.0
Andhra Pradesh	148205485.0
Telangana	134349989.0
Delhi	134225914.0
Haryana	131183002.0
Odisha	121312023.0
Kerala	120515820.0
Assam	100508019.0
Jharkhand	98604042.0
Punjab	84647786.0
Chhattisgarh	69179948.0
Uttarakhand	55125751.0
Jammu and Kashmir	50372796.0
Himachal Pradesh	34533799.0
Tripura	25533297.0
Manipur	14084338.0
Meghalaya	13841293.0
Goa	12854907.0
Arunachal Pradesh	11489674.0
Nagaland	9981919.0
Mizoram	8705646.0
Dadra and Nagar Haveli and Daman and Diu	8658141.0
Puducherry	8490703.0
Chandigarh	8220460.0

State	18-45 years (Age)
Sikkim	6704222.0
Ladakh	4593900.0
Andaman and Nicobar Islands	2014683.0
Lakshadweep	920758.0

Uttar Pradesh is in the first position in vaccination of individuals whose age between 18-45.Maharashtra is in the second position.Lakshadweep is in the last position.

Vaccination of individuals having age b/w 45-60

In [99]:
```
top_age45_60= data_state.groupby('State')['45-60 years (Age)'].sum().to_frame(nar
top_age45_60
```

Out[99]:

State	45-60 years (Age)
Maharashtra	726275092.0
Uttar Pradesh	627197047.0
Gujarat	531225645.0
Rajasthan	524262218.0
West Bengal	473836754.0
Karnataka	448678577.0
Madhya Pradesh	368875587.0
Andhra Pradesh	342124710.0
Bihar	283446744.0
Tamil Nadu	280412533.0
Kerala	279139023.0
Chhattisgarh	274437633.0
Odisha	256122511.0
Telangana	226173954.0
Haryana	159267718.0
Delhi	150736576.0
Punjab	150609001.0
Assam	139567832.0
Jharkhand	135734439.0
Jammu and Kashmir	118317323.0
Uttarakhand	85352754.0
Himachal Pradesh	83839534.0
Tripura	60968720.0
Goa	15317999.0
Meghalaya	14041529.0
Manipur	12742154.0
Arunachal Pradesh	11219008.0
Mizoram	10696152.0
Chandigarh	9912532.0
Sikkim	8601567.0
Puducherry	8539020.0
Nagaland	8211700.0

State	45-60 years (Age)
Andaman and Nicobar Islands	5234554.0
Dadra and Nagar Haveli and Daman and Diu	5178549.0
Ladakh	3762192.0
Lakshadweep	1133189.0

Maharashtra is in the first position in vaccination of individuals whose age between 45-60.Uttar Pradesh is in the second position.Lakshadweep is in the last position.

Vaccination of individuals having age above 60

In [100]:

```
top_age60abv= data_state.groupby('State')['60+ years (Age)'].sum().to_frame(name
top_age60abv
```

Out[100]:

State	60+ years (Age)
Maharashtra	655284665.0
Rajasthan	579614632.0
Uttar Pradesh	512970272.0
Gujarat	461780586.0
West Bengal	434432057.0
Karnataka	402411322.0
Kerala	368215283.0
Madhya Pradesh	322144964.0
Bihar	321602879.0
Odisha	256564139.0
Andhra Pradesh	241617471.0
Tamil Nadu	204337426.0
Chhattisgarh	176202916.0
Haryana	170413451.0
Telangana	153311943.0
Jharkhand	126206954.0
Punjab	123483591.0
Delhi	102577661.0
Jammu and Kashmir	81704936.0
Uttarakhand	80855319.0
Assam	77136275.0
Himachal Pradesh	73479250.0
Tripura	34326767.0
Goa	14146061.0
Chandigarh	7268211.0
Mizoram	7152857.0
Meghalaya	6461820.0
Puducherry	6387111.0
Manipur	6239030.0
Sikkim	5797497.0
Nagaland	4503554.0

State	60+ years (Age)
Arunachal Pradesh	4468580.0
Ladakh	3397665.0
Andaman and Nicobar Islands	2696998.0
Dadra and Nagar Haveli and Daman and Diu	2145576.0
Lakshadweep	650179.0

Maharashtra is in the first position in vaccination of individuals whose age above 60.Rajasthan is in the second position.Lakshadweep is in the last position.

Get all ages vaccinated

In [101]:
```
top_age["18-45 years (Age)"]=top_age
top_age["45-60 years (Age)"]=top_age45_60
top_age["60+ years (Age)"]=top_age60abv
top_age
```

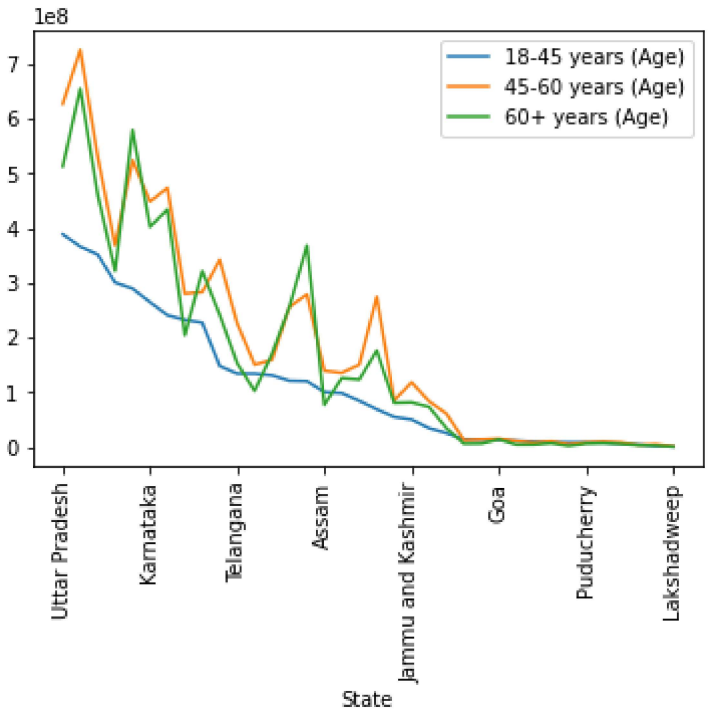
Out[101]:

State	18-45 years (Age)	45-60 years (Age)	60+ years (Age)
Uttar Pradesh	388930529.0	627197047.0	512970272.0
Maharashtra	366429893.0	726275092.0	655284665.0
Gujarat	352028464.0	531225645.0	461780586.0
Madhya Pradesh	300681489.0	368875587.0	322144964.0
Rajasthan	289754292.0	524262218.0	579614632.0
Karnataka	264855867.0	448678577.0	402411322.0
West Bengal	240959203.0	473836754.0	434432057.0
Tamil Nadu	232419371.0	280412533.0	204337426.0
Bihar	227218424.0	283446744.0	321602879.0
Andhra Pradesh	148205485.0	342124710.0	241617471.0
Telangana	134349989.0	226173954.0	153311943.0
Delhi	134225914.0	150736576.0	102577661.0
Haryana	131183002.0	159267718.0	170413451.0
Odisha	121312023.0	256122511.0	256564139.0
Kerala	120515820.0	279139023.0	368215283.0
Assam	100508019.0	139567832.0	77136275.0
Jharkhand	98604042.0	135734439.0	126206954.0
Punjab	84647786.0	150609001.0	123483591.0
Chhattisgarh	69179948.0	274437633.0	176202916.0
Uttarakhand	55125751.0	85352754.0	80855319.0
Jammu and Kashmir	50372796.0	118317323.0	81704936.0
Himachal Pradesh	34533799.0	83839534.0	73479250.0
Tripura	25533297.0	60968720.0	34326767.0
Manipur	14084338.0	12742154.0	6239030.0
Meghalaya	13841293.0	14041529.0	6461820.0
Goa	12854907.0	15317999.0	14146061.0
Arunachal Pradesh	11489674.0	11219008.0	4468580.0
Nagaland	9981919.0	8211700.0	4503554.0
Mizoram	8705646.0	10696152.0	7152857.0
Dadra and Nagar Haveli and Daman and Diu	8658141.0	5178549.0	2145576.0
Puducherry	8490703.0	8539020.0	6387111.0

State	18-45 years (Age)	45-60 years (Age)	60+ years (Age)
Chandigarh	8220460.0	9912532.0	7268211.0
Sikkim	6704222.0	8601567.0	5797497.0
Ladakh	4593900.0	3762192.0	3397665.0
Andaman and Nicobar Islands	2014683.0	5234554.0	2696998.0
Lakshadweep	920758.0	1133189.0	650179.0

In [102]:

```
top_age.plot.line()
plt.xticks(rotation=90)
plt.show()
```



Above graph clearly shows individuals having age between 45-60 are vaccinated more

Information of kerala

In [104]:

```
data_kerala=cov[cov["State"]=="Kerala"]
data_kerala
```

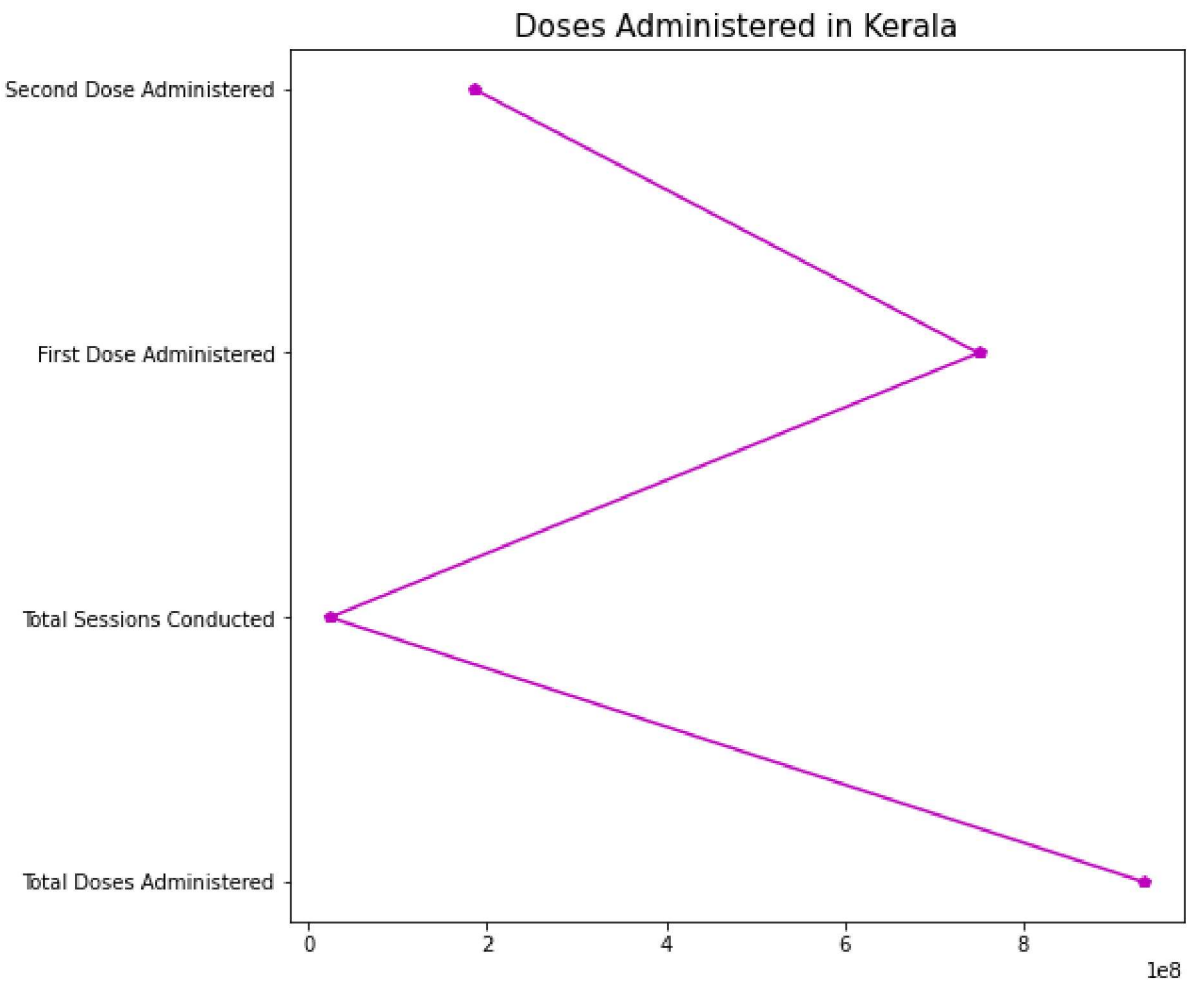
Out[104]:

	Updated On	State	Total Doses Administered	Total Sessions Conducted	Total Sites	First Dose Administered	Second Dose Administered	Male(Individ Vaccina
3079	16/01/2021	Kerala	1681.0	147.0	134.0	1681.0	0.0	5
3080	17/01/2021	Kerala	1836.0	317.0	156.0	1836.0	0.0	6
3081	18/01/2021	Kerala	2566.0	488.0	180.0	2566.0	0.0	7
3082	19/01/2021	Kerala	5355.0	544.0	185.0	5355.0	0.0	15
3083	20/01/2021	Kerala	5398.0	716.0	216.0	5398.0	0.0	15
...	...	...	...	...	...	...	...	
3255	11/07/2021	Kerala	NaN	NaN	NaN	NaN	NaN	
3256	12/07/2021	Kerala	NaN	NaN	NaN	NaN	NaN	
3257	13/07/2021	Kerala	NaN	NaN	NaN	NaN	NaN	
3258	14/07/2021	Kerala	NaN	NaN	NaN	NaN	NaN	
3259	15/07/2021	Kerala	NaN	NaN	NaN	NaN	NaN	

181 rows × 18 columns

Doses Administered in Kerala

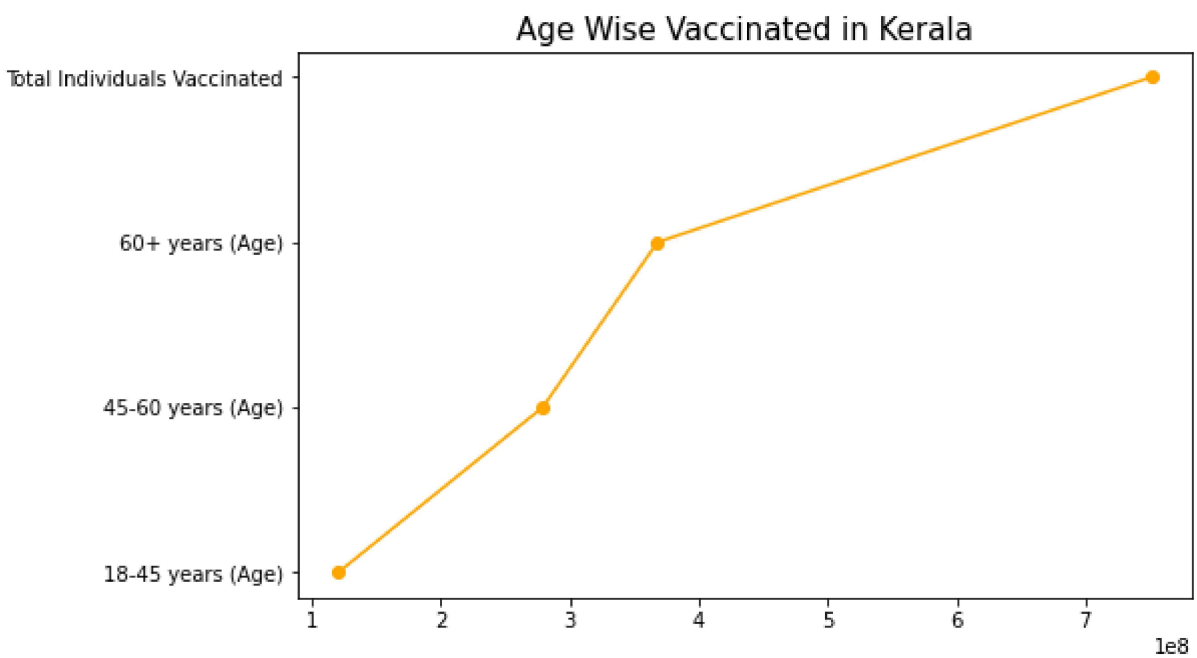
In [105]:
```
totaldosek=data_kerala["Total Doses Administered"].sum().round()
totaldosek
totalsesionk=data_kerala["Total Sessions Conducted"].sum().round()
totalsesionk
dose1k=data_kerala['First Dose Administered'].sum().round()
dose1k
dose2k=data_kerala['Second Dose Administered'].sum().round()
dose2k
totalk=[totaldosek,totalsesionk,dose1k,dose2k]
totalnmk=["Total Doses Administered","Total Sessions Conducted","First Dose Admir
plt.figure(figsize=(8,8))
plt.plot(totalk,totalnmk,marker='p',color='m')
plt.title("Doses Administered in Kerala",fontsize=15)
plt.show()
```



First dose given in kerala is very large compared to Second Dose.

Age wise vaccinated in kerala

In [106]:
```
kage18_45=data_kerala["18-45 years (Age)"].sum().round()
kage45_60=data_kerala["45-60 years (Age)"].sum().round()
kage60_abv=data_kerala["60+ years (Age)"].sum().round()
ktotalvacintd=data_kerala["Total Individuals Vaccinated"].sum().round()
kages=[kage18_45,kage45_60,kage60_abv,ktotalvacintd]
kagecatgry=["18-45 years (Age)","45-60 years (Age)","60+ years (Age)","Total Indi
plt.figure(figsize=(8,5))
plt.plot(kages,kagecatgry,marker='o',color='orange')
plt.title("Age Wise Vaccinated in Kerala",fontsize=15)
plt.show()
```



Here,we can see above 60 years age are vaccinated more.Then age between 45 and 60 are in the next position.Age between 18-45 are vaccinated leastly.

Sum of total individuals vaccinated in kerala

In [107]:
```
ktotalvacintd=data_kerala["Total Individuals Vaccinated"].sum().round()
ktotalvacintd
```

Out[107]: 751401019.0

CONCLUSION

In my analysis of vaccination details in India, found male individuals are vaccinated more.And Covishield is given more.And age between 45 and 60 are found to be vaccinated more.Most vaccinated state is Maharashtra and least vaccinated state is Lakshedweep.Top position in first dose and second dose administered is Maharashtra.More number of male and female individual are vaccinated in Maharashtra.Transgender individual vaccinated more in UttarPradesh.More number of Covaxin,Covishield and AEFI is taken by Maharashtra.Sputnik vaccine is take more by Telengana.Individuals having age between 18 to 45 are vaccinated,found to be more in Uttar pradesh.And individuals having age between 45 to 60,and above 60 are vaccinated,found to be more in maharashtra.Also extract some details in Kerala state.In Kerala above 60 years age are vaccinated more than others.

THANK YOU