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

In [2]:
```
data = pd.read_csv('covid_19_india.csv')
data
```

Out[2]:

	Sno	Date	Time	State/UnionTerritory	ConfirmedIndianNational	ConfirmedForeignNational	Cured	Deaths	Confirmed
0	1	2020-01-30	6:00 PM	Kerala	1	0	0	0	1
1	2	2020-01-31	6:00 PM	Kerala	1	0	0	0	1
2	3	2020-02-01	6:00 PM	Kerala	2	0	0	0	2
3	4	2020-02-02	6:00 PM	Kerala	3	0	0	0	3
4	5	2020-02-03	6:00 PM	Kerala	3	0	0	0	3
...	...	...	...	...	...	...	...	...	...
16845	16846	2021-07-07	8:00 AM	Telangana	-	-	613124	3703	628282
16846	16847	2021-07-07	8:00 AM	Tripura	-	-	63964	701	68612
16847	16848	2021-07-07	8:00 AM	Uttarakhand	-	-	332006	7338	340882
16848	16849	2021-07-07	8:00 AM	Uttar Pradesh	-	-	1682130	22656	1706818
16849	16850	2021-07-07	8:00 AM	West Bengal	-	-	1472132	17834	1507241

16850 rows × 9 columns

In [ ]:

In [3]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 16850 entries, 0 to 16849
Data columns (total 9 columns):
 #   Column                    Non-Null Count  Dtype 
---  ------                    --------------  ----- 
 0   Sno                       16850 non-null  int64 
 1   Date                      16850 non-null  object
 2   Time                      16850 non-null  object
 3   State/UnionTerritory      16850 non-null  object
 4   ConfirmedIndianNational   16850 non-null  object
 5   ConfirmedForeignNational  16850 non-null  object
 6   Cured                     16850 non-null  int64 
 7   Deaths                    16850 non-null  int64 
 8   Confirmed                 16850 non-null  int64 
dtypes: int64(4), object(5)
memory usage: 1.2+ MB
```

In [4]:
```
data.isnull().sum()
```

Out[4]:
```
Sno                         0
Date                        0
Time                        0
State/UnionTerritory        0
ConfirmedIndianNational     0
ConfirmedForeignNational    0
Cured                       0
Deaths                      0
Confirmed                   0
dtype: int64
```

In [5]:
```
data.describe()
```

Out[5]:

	Sno	Cured	Deaths	Confirmed
count	16850.000000	1.685000e+04	16850.000000	1.685000e+04
mean	8425.500000	2.360353e+05	3485.222552	2.583667e+05
std	4864.320353	5.225438e+05	9330.541749	5.672808e+05
min	1.000000	0.000000e+00	0.000000	0.000000e+00
25%	4213.250000	2.658500e+03	22.000000	3.644750e+03
50%	8425.500000	2.889500e+04	453.000000	3.336150e+04
75%	12637.750000	2.537510e+05	3071.250000	2.666530e+05
max	16850.000000	5.872268e+06	123531.000000	6.113335e+06

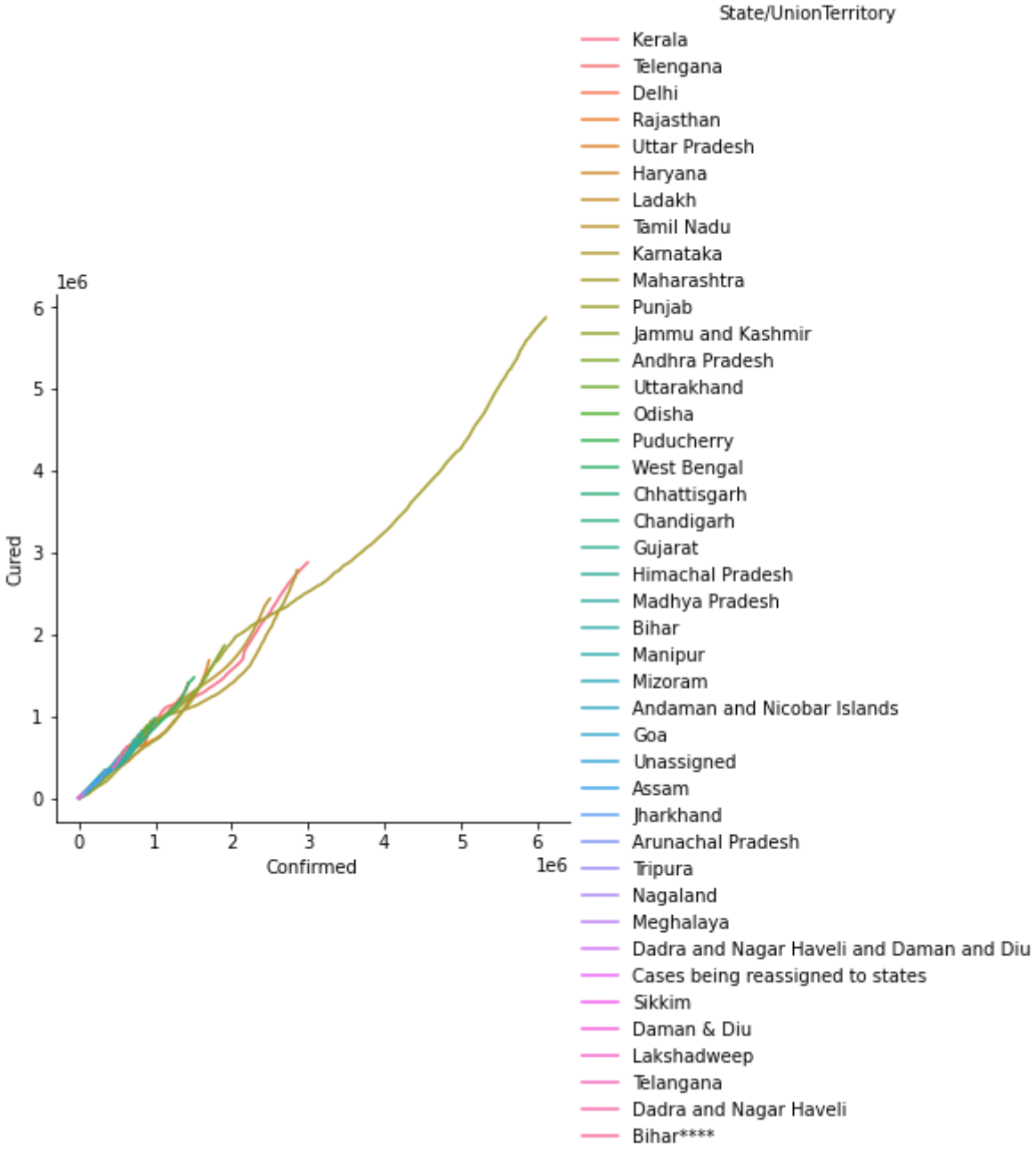
In [ ]:
```
```

In [6]:
```
data.columns
```

Out[6]:
```
Index(['Sno', 'Date', 'Time', 'State/UnionTerritory',
       'ConfirmedIndianNational', 'ConfirmedForeignNational', 'Cured',
       'Deaths', 'Confirmed'],
      dtype='object')
```

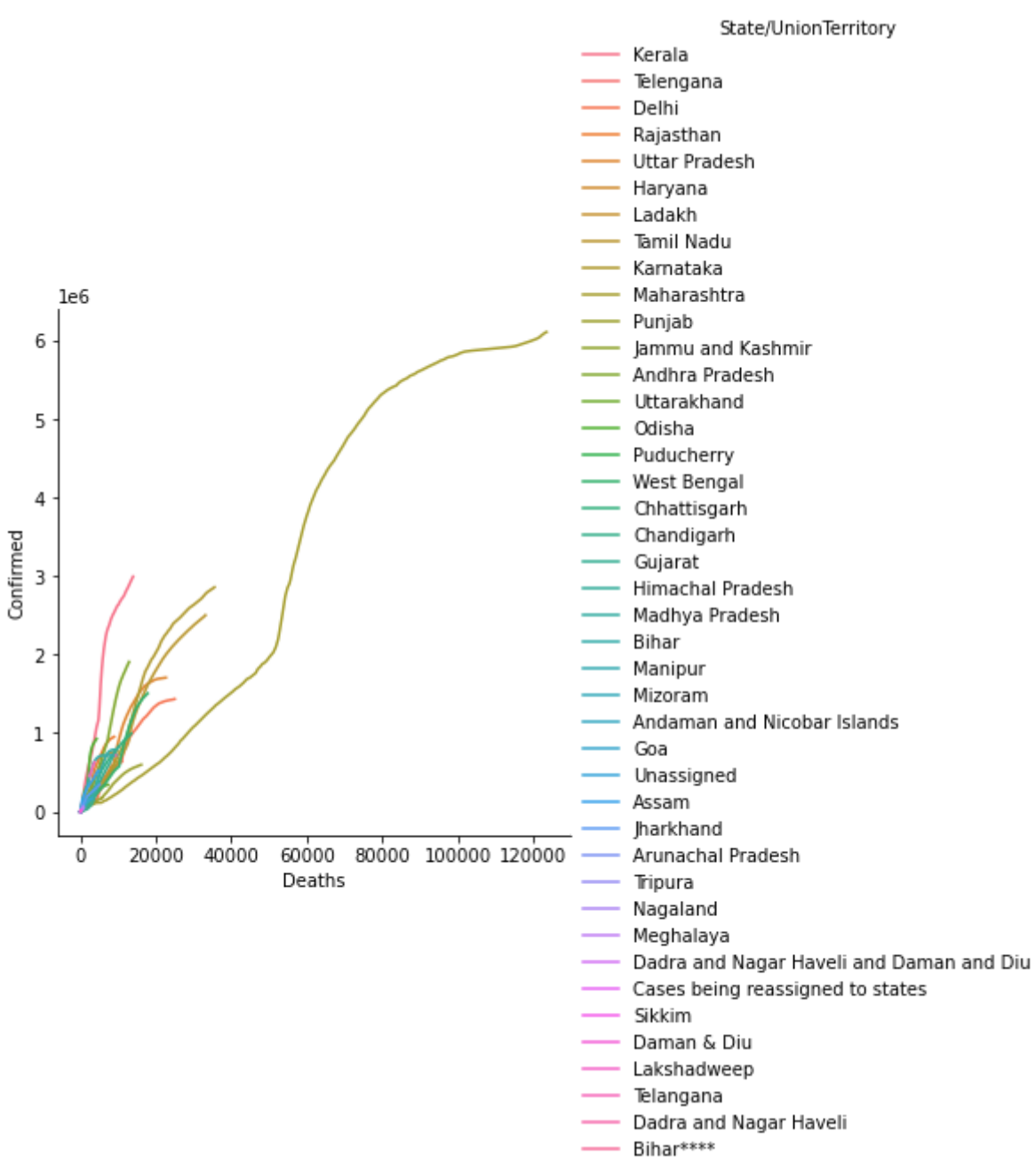
In [16]:
```
fig=plt.figure(figsize=(10,10))
sns.relplot(x='Confirmed',y='Cured',hue=data['State/UnionTerritory'],data=data,kind='line')
plt.show()
```

```
<Figure size 720x720 with 0 Axes>
```


1e6
6
5
4
3
2
1
0
Cured
0
1
2
3
4
5
6
1e6
Confirmed
State/UnionTerritory
Kerala
Telengana
Delhi
Rajasthan
Uttar Pradesh
Haryana
Ladakh
Tamil Nadu
Karnataka
Maharashtra
Punjab
Jammu and Kashmir
Andhra Pradesh
Uttarakhand
Odisha
Puducherry
West Bengal
Chhattisgarh
Chandigarh
Gujarat
Himachal Pradesh
Madhya Pradesh
Bihar
Manipur
Mizoram
Andaman and Nicobar Islands
Goa
Unassigned
Assam
Jharkhand
Arunachal Pradesh
Tripura
Nagaland
Meghalaya
Dadra and Nagar Haveli and Daman and Diu
Cases being reassigned to states
Sikkim
Daman & Diu
Lakshadweep
Telangana
Dadra and Nagar Haveli
Bihar****

In [18]:
```
sns.relplot(y='Confirmed',x='Deaths',hue=data['State/UnionTerritory'],data=data,kind='line')
```

Out[18]:
```
<seaborn.axisgrid.FacetGrid at 0x182d037f430>
```


1e6
6
5
4
3
2
1
0
Confirmed
0
20000
40000
60000
80000
100000
120000
Deaths
State/UnionTerritory
Kerala
Telengana
Delhi
Rajasthan
Uttar Pradesh
Haryana
Ladakh
Tamil Nadu
Karnataka
Maharashtra
Punjab
Jammu and Kashmir
Andhra Pradesh
Uttarakhand
Odisha
Puducherry
West Bengal
Chhattisgarh
Chandigarh
Gujarat
Himachal Pradesh
Madhya Pradesh
Bihar
Manipur
Mizoram
Andaman and Nicobar Islands
Goa
Unassigned
Assam
Jharkhand
Arunachal Pradesh
Tripura
Nagaland
Meghalaya
Dadra and Nagar Haveli and Daman and Diu
Cases being reassigned to states
Sikkim
Daman & Diu
Lakshadweep
Telangana
Dadra and Nagar Haveli
Bihar****

In [ ]:

In [19]:
```
covid19=data.copy()
covid19
```

Out[19]:

	Sno	Date	Time	State/UnionTerritory	ConfirmedIndianNational	ConfirmedForeignNational	Cured	Deaths	Confirmed
0	1	2020-01-30	6:00 PM	Kerala	1	0	0	0	1
1	2	2020-01-31	6:00 PM	Kerala	1	0	0	0	1
2	3	2020-02-01	6:00 PM	Kerala	2	0	0	0	2
3	4	2020-02-02	6:00 PM	Kerala	3	0	0	0	3
4	5	2020-02-03	6:00 PM	Kerala	3	0	0	0	3
...	...	...	...	...	...	...	...	...	...
16845	16846	2021-07-07	8:00 AM	Telangana	-	-	613124	3703	628282
16846	16847	2021-07-07	8:00 AM	Tripura	-	-	63964	701	68612
16847	16848	2021-07-07	8:00 AM	Uttarakhand	-	-	332006	7338	340882
16848	16849	2021-07-07	8:00 AM	Uttar Pradesh	-	-	1682130	22656	1706818
16849	16850	2021-07-07	8:00 AM	West Bengal	-	-	1472132	17834	1507241

16850 rows × 9 columns

In [20]:
```
covid19['Active'] = covid19['Confirmed'] - (covid19['Cured'] + covid19['Deaths'])
covid19
```

Out[20]:

	Sno	Date	Time	State/UnionTerritory	ConfirmedIndianNational	ConfirmedForeignNational	Cured	Deaths	Confirmed	Active
0	1	2020-01-30	6:00 PM	Kerala	1	0	0	0	1	1
1	2	2020-01-31	6:00 PM	Kerala	1	0	0	0	1	1
2	3	2020-02-01	6:00 PM	Kerala	2	0	0	0	2	2
3	4	2020-02-02	6:00 PM	Kerala	3	0	0	0	3	3
4	5	2020-02-03	6:00 PM	Kerala	3	0	0	0	3	3
...	...	...	...	...	...	...	...	...	...	...
16845	16846	2021-07-07	8:00 AM	Telangana	-	-	613124	3703	628282	11455
16846	16847	2021-07-07	8:00 AM	Tripura	-	-	63964	701	68612	3947
16847	16848	2021-07-07	8:00 AM	Uttarakhand	-	-	332006	7338	340882	1538
16848	16849	2021-07-07	8:00 AM	Uttar Pradesh	-	-	1682130	22656	1706818	2032
16849	16850	2021-07-07	8:00 AM	West Bengal	-	-	1472132	17834	1507241	17275

16850 rows × 10 columns

In [21]:
```
covid19.drop(columns = ['Sno','ConfirmedIndianNational','ConfirmedForeignNational'], inplace=True)
```

In [22]:
```
covid19['State/UnionTerritory'].unique()
```

Out[22]:
```
array(['Kerala', 'Telengana', 'Delhi', 'Rajasthan', 'Uttar Pradesh',
       'Haryana', 'Ladakh', 'Tamil Nadu', 'Karnataka', 'Maharashtra',
       'Punjab', 'Jammu and Kashmir', 'Andhra Pradesh', 'Uttarakhand',
       'Odisha', 'Puducherry', 'West Bengal', 'Chhattisgarh',
       'Chandigarh', 'Gujarat', 'Himachal Pradesh', 'Madhya Pradesh',
       'Bihar', 'Manipur', 'Mizoram', 'Andaman and Nicobar Islands',
       'Goa', 'Unassigned', 'Assam', 'Jharkhand', 'Arunachal Pradesh',
       'Tripura', 'Nagaland', 'Meghalaya',
       'Dadra and Nagar Haveli and Daman and Diu',
       'Cases being reassigned to states', 'Sikkim', 'Daman & Diu',
       'Lakshadweep', 'Telangana', 'Dadra and Nagar Haveli', 'Bihar****'],
      dtype=object)
```

Data Cleansing

In [23]:
```
covid19.loc[covid19['State/UnionTerritory']=='Bihar****','State/UnionTerritory']='Bihar'
```

In [24]:
```
covid19.loc[covid19['State/UnionTerritory']=='Daman & Diu','State/UnionTerritory']='Dadra and Nagar Haveli and Daman and
```

In [25]:
```
covid19.loc[covid19['State/UnionTerritory']=='Dadra and Nagar Haveli','State/UnionTerritory']='Dadra and Nagar Haveli an
```

In [26]:
```
covid19.loc[covid19['State/UnionTerritory']=='Telengana','State/UnionTerritory']='Telangana'
```

In [27]:
```
covid19.groupby('State/UnionTerritory').sum()
```

Out[27]:

State/UnionTerritory	Cured	Deaths	Confirmed	Active
Andaman and Nicobar Islands	1589935	22624	1675248	62689
Andhra Pradesh	303427899	2475816	324146783	18243068
Arunachal Pradesh	5150519	19303	5598324	428502
Assam	74011348	459575	80418492	5947569
Bihar	101533848	775163	108312449	6003438
Cases being reassigned to states	0	0	345565	345565
Chandigarh	7980284	119356	8691806	592166
Chhattisgarh	117163544	1591126	128751782	9997112
Dadra and Nagar Haveli and Daman and Diu	1491338	882	1587570	95350
Delhi	224062704	4066907	236972842	8843231
Goa	20224042	338359	22280065	1717664
Gujarat	103995131	1866811	114557615	8695673
Haryana	100010131	1166573	107408371	6231667
Himachal Pradesh	20682770	371931	23052151	1997450
Jammu and Kashmir	42295048	686680	46899925	3918197
Jharkhand	46083978	569298	49971564	3318288
Karnataka	345648926	4819018	387597335	37129391
Kerala	311127643	1327754	344319045	31863648
Ladakh	3059045	38578	3344131	246508
Lakshadweep	471712	2178	561459	87569
Madhya Pradesh	100169697	1427780	108712983	7115506
Maharashtra	813788907	19314532	908892470	75789031
Manipur	8420223	122089	9440912	898600

State/UnionTerritory	Cured	Deaths	Confirmed	Active
Meghalaya	4606548	66293	5221064	548223
Mizoram	1534630	5073	1822190	282487
Nagaland	3628619	39420	4089547	421508
Odisha	117984789	600149	126408397	7823459
Puducherry	14376916	249683	15858688	1232089
Punjab	71108712	2216735	78999515	5674068
Rajasthan	117312772	1159823	128998101	10525506
Sikkim	1983899	41530	2315519	290090
Tamil Nadu	317067499	4731627	342829697	21030571
Telangana	100211245	617882	108152726	7323599
Tripura	10479169	124444	11397656	794043
Unassigned	0	0	161	161
Uttar Pradesh	232529439	3347656	252843682	16966587
Uttarakhand	36684388	728512	41179396	3766496
West Bengal	195296839	3214840	209822848	11311169

India Covid-19 Statewise Data with Visualization

In [28]:
```
allstates=covid19["State/UnionTerritory"].value_counts()
allstates
```

Out[28]:
```
Kerala                                    525
Delhi                                     493
Telangana                                 493
Rajasthan                                 492
Uttar Pradesh                             491
Haryana                                   491
Ladakh                                    488
Tamil Nadu                                488
Punjab                                    486
Jammu and Kashmir                         486
Maharashtra                               486
Karnataka                                 486
Andhra Pradesh                            483
Uttarakhand                               480
Odisha                                    479
Puducherry                                477
West Bengal                               477
Chhattisgarh                              476
Chandigarh                                476
Gujarat                                   475
Himachal Pradesh                          474
Madhya Pradesh                            474
Bihar                                     473
Manipur                                   471
Mizoram                                   470
Andaman and Nicobar Islands               469
Goa                                       469
Assam                                     463
Jharkhand                                 463
Arunachal Pradesh                         461
Tripura                                   457
Meghalaya                                 450
Dadra and Nagar Haveli and Daman and Diu  429
Nagaland                                  417
Sikkim                                    410
Lakshadweep                               209
Cases being reassigned to states           60
```

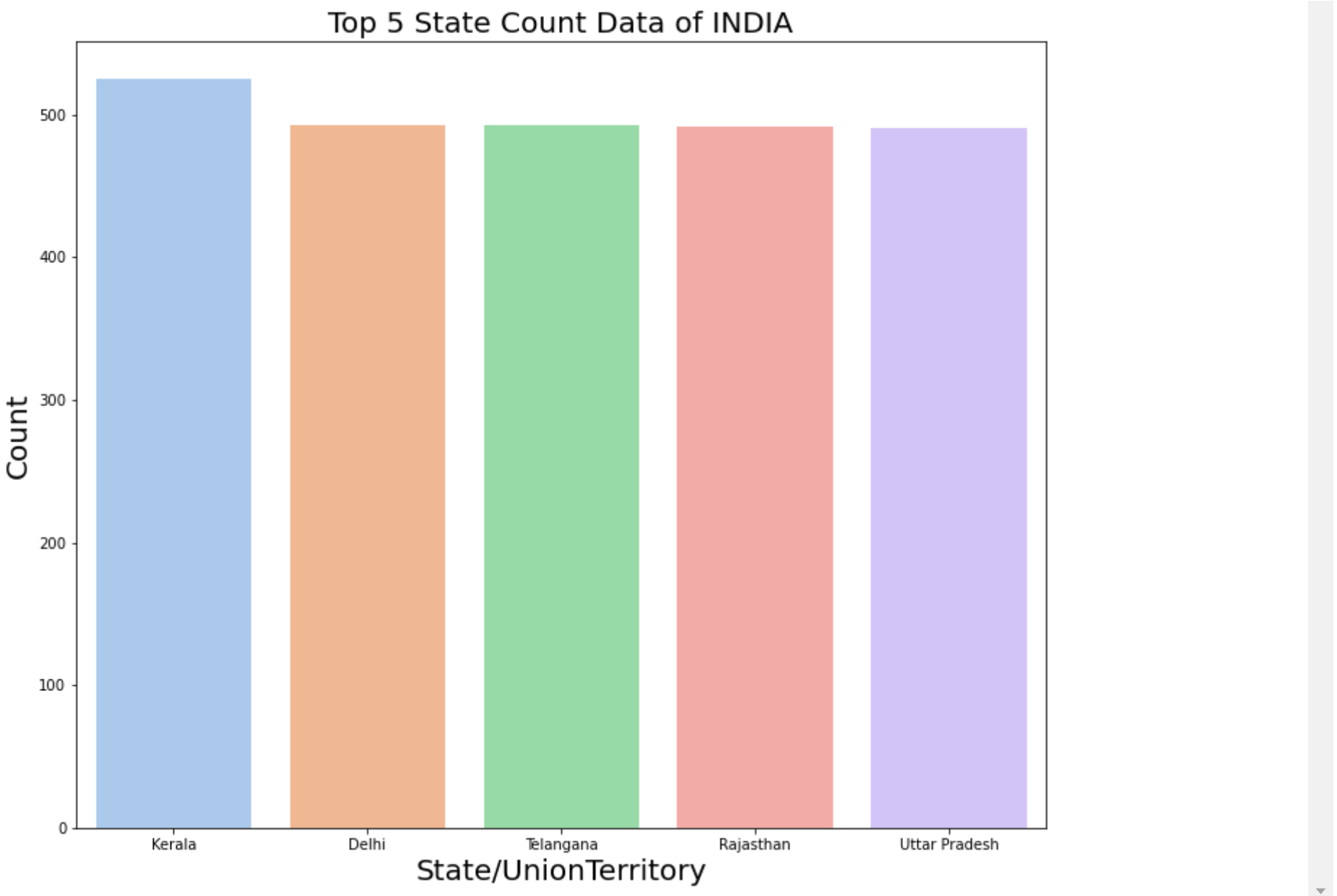
```
Unassigned                                    3
Name: State/UnionTerritory, dtype: int64
```

In [29]:
```
top5_states_count=allstates.head()
top5_states_count
```

Out[29]:
```
Kerala           525
Delhi            493
Telangana        493
Rajasthan        492
Uttar Pradesh    491
Name: State/UnionTerritory, dtype: int64
```

In [30]:
```
fig = plt.figure()
fig.set_figheight(10)
fig.set_figwidth(12)


sns.barplot(x=top5_states_count.index,y=top5_states_count.values,palette='pastel')
plt.xlabel('State/UnionTerritory',size=20)
plt.ylabel('Count',size=20)
plt.title("Top 5 State Count Data of INDIA",size=20)
plt.show()
```


Top 5 State Count Data of INDIA
Count
0
100
200
300
400
500
Kerala
Delhi
Telangana
Rajasthan
Uttar Pradesh
State/UnionTerritory

In [ ]:

In [31]:
```
total_cured_sum=covid19['Cured'].sum()
total_cured_sum
```

Out[31]: 3977194136

In [32]:
```
total_deaths_sum=covid19['Deaths'].sum()
total_deaths_sum
```

Out[32]: 58726000

In [33]:
```
total_confirmed_sum= covid19['Confirmed'].sum()
total_confirmed_sum
```

Out[33]: 4353478074

In [34]:
```
total_active_cases_sum=covid19['Active'].sum()
total_active_cases_sum
```

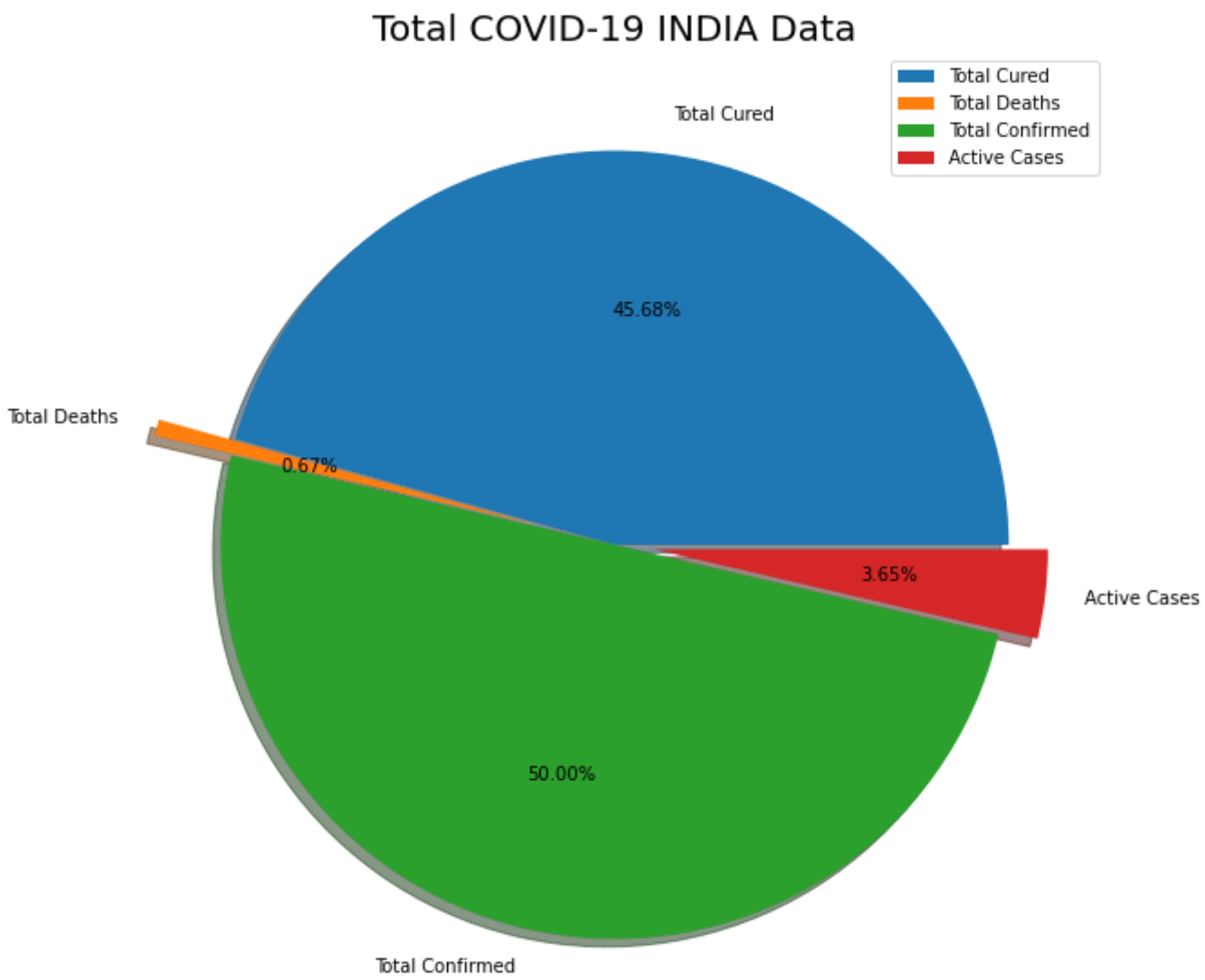
Out[34]: 317557938

In [35]:
```
result=np.array([total_cured_sum,total_deaths_sum,total_confirmed_sum,total_active_cases_sum])
lable = ["Total Cured","Total Deaths","Total Confirmed","Active Cases"]
e = [0.0,0.2,0.0,0.1]
```

In [36]:

```
fig = plt.figure()
fig.set_figheight(10)
fig.set_figwidth(12)

plt.pie(result,labels=lable,autopct='%1.2f%%',explode=e,shadow=True)
plt.title("Total COVID-19 INDIA Data",size=20,color='k')
plt.legend(lable)
plt.show()
```


Total COVID-19 INDIA Data
Total Cured
Total Deaths
Total Confirmed
Active Cases
Total Cured
45.68%
Total Deaths
0.67%
3.65%
Active Cases
50.00%
Total Confirmed

In [ ]:

In [ ]:

In [37]:
```
covid19
```

Out[37]:

	Date	Time	State/UnionTerritory	Cured	Deaths	Confirmed	Active
0	2020-01-30	6:00 PM	Kerala	0	0	1	1
1	2020-01-31	6:00 PM	Kerala	0	0	1	1
2	2020-02-01	6:00 PM	Kerala	0	0	2	2
3	2020-02-02	6:00 PM	Kerala	0	0	3	3
4	2020-02-03	6:00 PM	Kerala	0	0	3	3
...	...	...	...	...	...	...	...
16845	2021-07-07	8:00 AM	Telangana	613124	3703	628282	11455
16846	2021-07-07	8:00 AM	Tripura	63964	701	68612	3947
16847	2021-07-07	8:00 AM	Uttarakhand	332006	7338	340882	1538
16848	2021-07-07	8:00 AM	Uttar Pradesh	1682130	22656	1706818	2032
16849	2021-07-07	8:00 AM	West Bengal	1472132	17834	1507241	17275

16850 rows × 7 columns

In [ ]:
```

```

In [38]:
```
allstates_max=covid19.groupby('State/UnionTerritory')[['Active','Cured', 'Deaths', 'Confirmed']].max().sort_values(by='C
allstates_max=allstates_max.reset_index()
allstates_max
```

Out[38]:

	State/UnionTerritory	Active	Cured	Deaths	Confirmed
0	Maharashtra	701614	5872268	123531	6113335
1	Kerala	445692	2877557	13960	2996094
2	Karnataka	605515	2784030	35526	2859595
3	Tamil Nadu	313048	2435872	33132	2503481
4	Andhra Pradesh	211554	1861937	12898	1908065
5	Uttar Pradesh	310783	1682130	22656	1706818
6	West Bengal	132181	1472132	17834	1507241
7	Delhi	103424	1408853	25001	1434687
8	Chhattisgarh	131245	977893	13462	996359
9	Rajasthan	212753	942882	8942	952836
10	Odisha	106493	897362	4299	927186
11	Gujarat	148297	811699	10072	823964
12	Madhya Pradesh	111366	780578	9017	790042
13	Haryana	116867	758442	9506	769030
14	Bihar	115152	711913	9612	722746
15	Telangana	80695	613124	3703	628282
16	Punjab	79963	578590	16131	596736
17	Assam	56295	493306	4717	522267
18	Jharkhand	61195	340365	5118	346038
19	Uttarakhand	80000	332006	7338	340882
20	Jammu and Kashmir	52848	309554	4345	317481
21	Himachal Pradesh	40008	198134	3485	202945

	State/UnionTerritory	Active	Cured	Deaths	Confirmed
22	Goa	32953	162787	3079	167823
23	Puducherry	18277	114673	1763	118227
24	Manipur	9613	66132	1218	73581
25	Tripura	8302	63964	701	68612
26	Chandigarh	8653	60837	809	61752
27	Meghalaya	8255	47173	880	52358
28	Arunachal Pradesh	3918	34525	181	37879
29	Nagaland	5049	23982	503	25619
30	Mizoram	4471	18383	98	22155
31	Sikkim	4306	19200	309	21403
32	Ladakh	2041	19733	204	20137
33	Dadra and Nagar Haveli and Daman and Diu	2081	10532	4	10575
34	Lakshadweep	2320	9643	49	9947
35	Cases being reassigned to states	9265	0	0	9265
36	Andaman and Nicobar Islands	1154	7343	128	7487
37	Unassigned	77	0	0	77

In [ ]:

In [39]:
```
top_10=allstates_max.head(10)
top_10
```

Out[39]:

	State/UnionTerritory	Active	Cured	Deaths	Confirmed
0	Maharashtra	701614	5872268	123531	6113335
1	Kerala	445692	2877557	13960	2996094
2	Karnataka	605515	2784030	35526	2859595
3	Tamil Nadu	313048	2435872	33132	2503481
4	Andhra Pradesh	211554	1861937	12898	1908065
5	Uttar Pradesh	310783	1682130	22656	1706818
6	West Bengal	132181	1472132	17834	1507241
7	Delhi	103424	1408853	25001	1434687
8	Chhattisgarh	131245	977893	13462	996359
9	Rajasthan	212753	942882	8942	952836

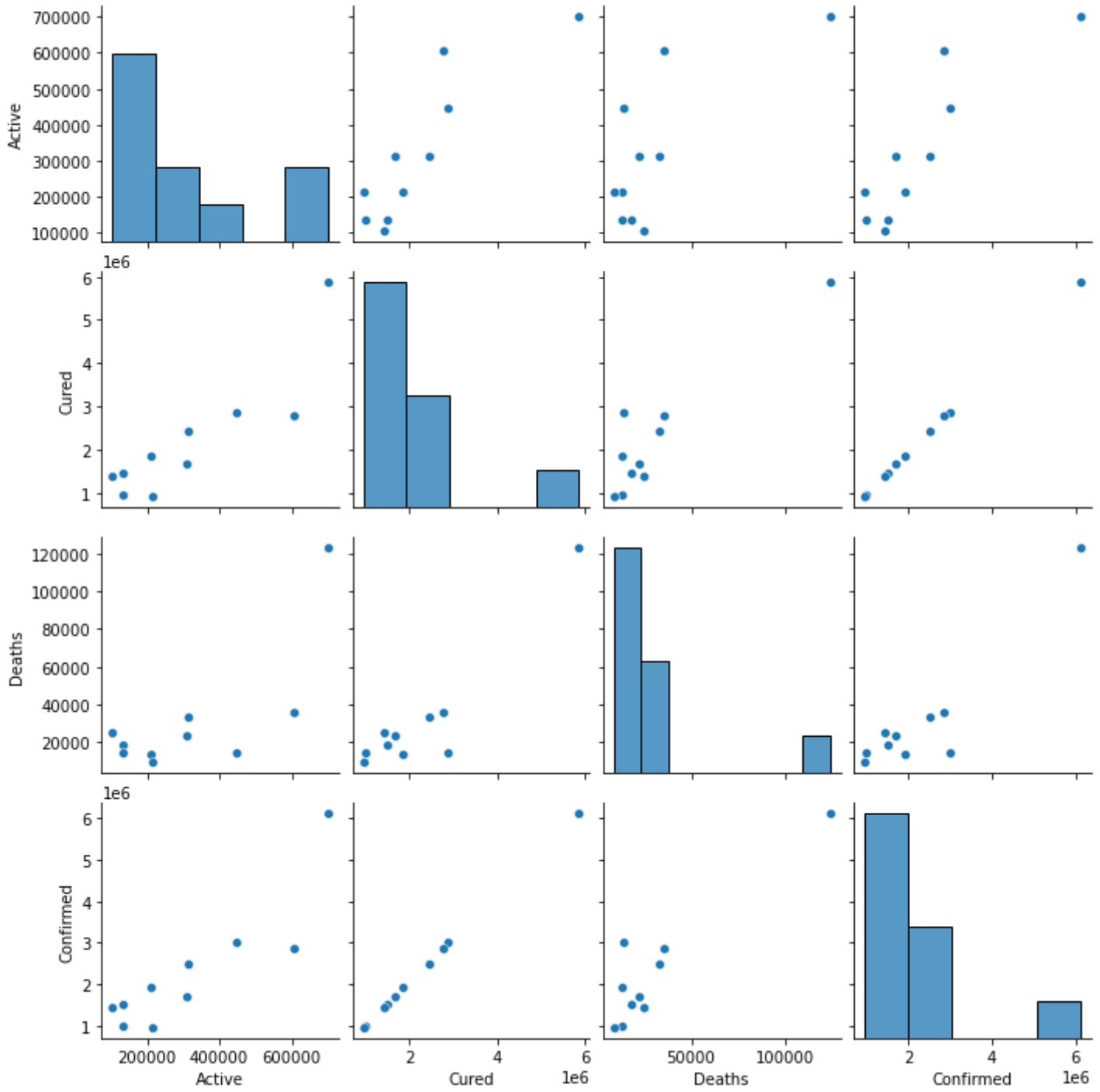
In [40]:
```
top_10.columns
```

Out[40]:
```
Index(['State/UnionTerritory', 'Active', 'Cured', 'Deaths', 'Confirmed'], dtype='object')
```

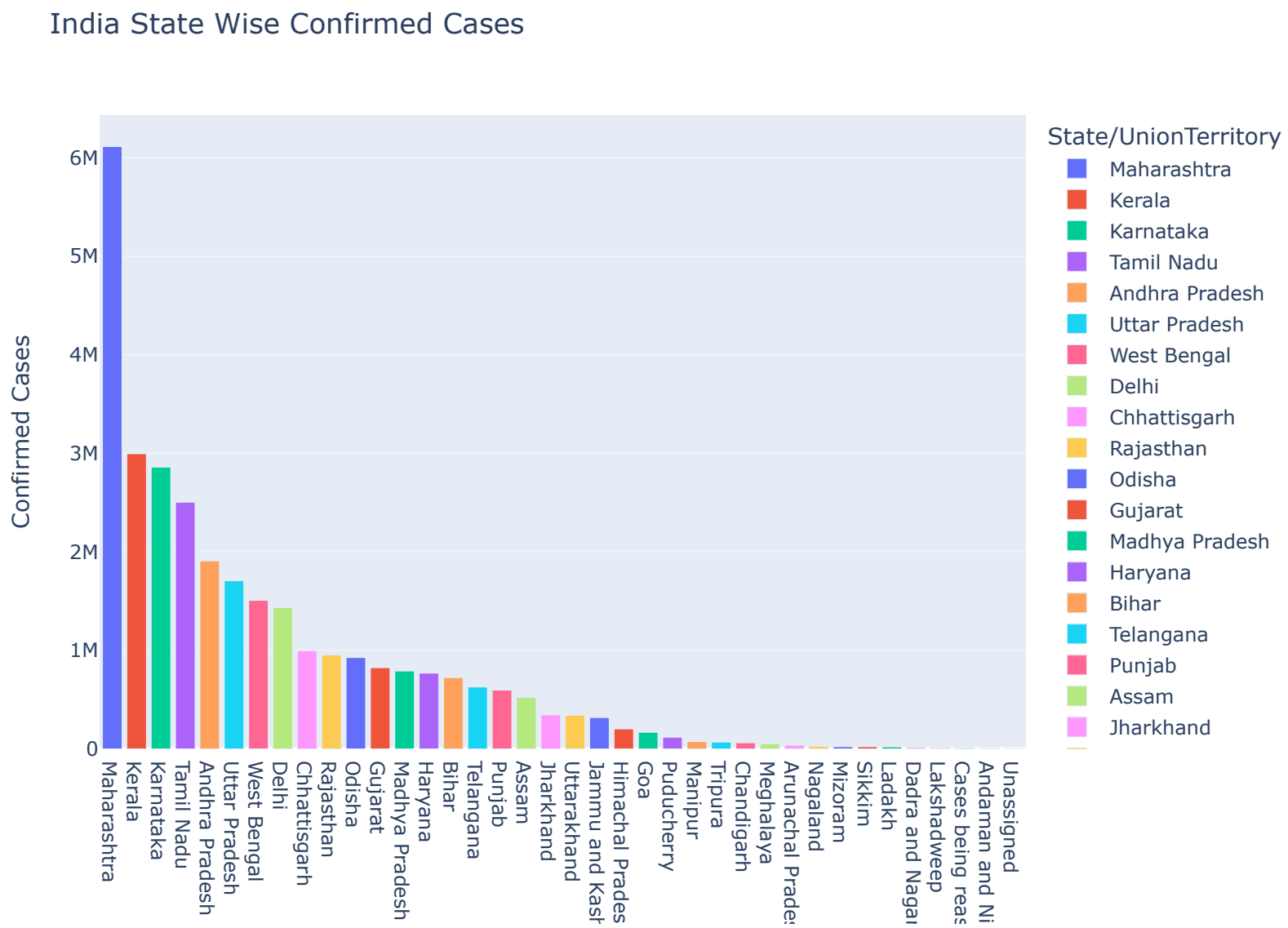
In [41]:

```
fig=plt.figure(figsize=(10,6))
sns.pairplot(top_10)
plt.show()
```

```
<Figure size 720x432 with 0 Axes>
```


Active
Cured
Deaths
Confirmed
1e6
700000
600000
500000
400000
300000
200000
100000
6
5
4
3
2
1
120000
100000
80000
60000
40000
20000
200000
400000
600000
50000
100000

In [42]:
```
px.bar(allstates_max,x='State/UnionTerritory', y='Confirmed',
       title="India State Wise Confirmed Cases",
       labels={'Confirmed':'Confirmed Cases'},
      color='State/UnionTerritory',
      height=800)
```



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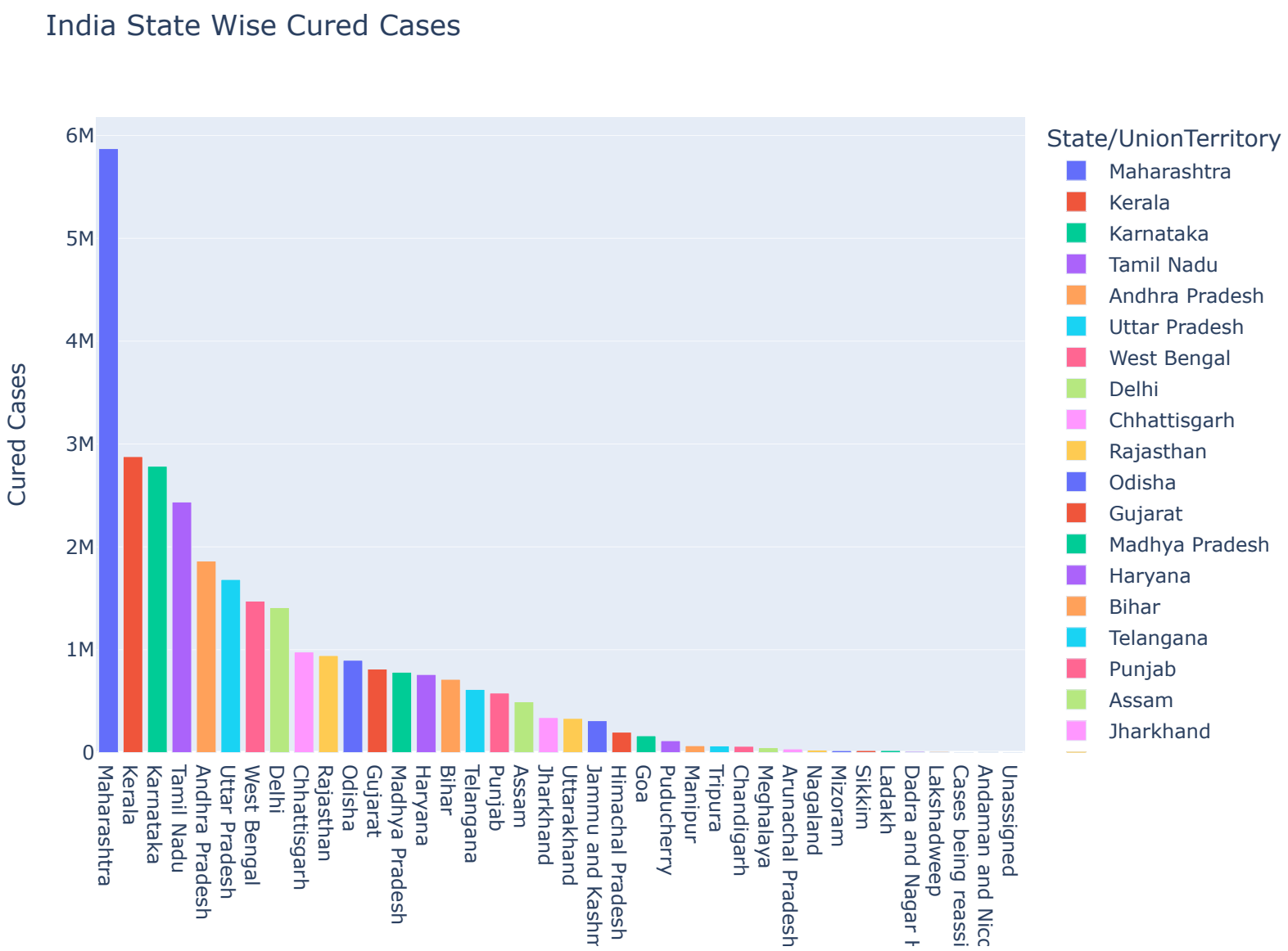
In [43]:
```
px.bar(allstates_max,x='State/UnionTerritory', y='Cured',
       title="India State Wise Cured Cases",
       labels={'Cured':'Cured Cases'},
      color='State/UnionTerritory',
      height=800)
```



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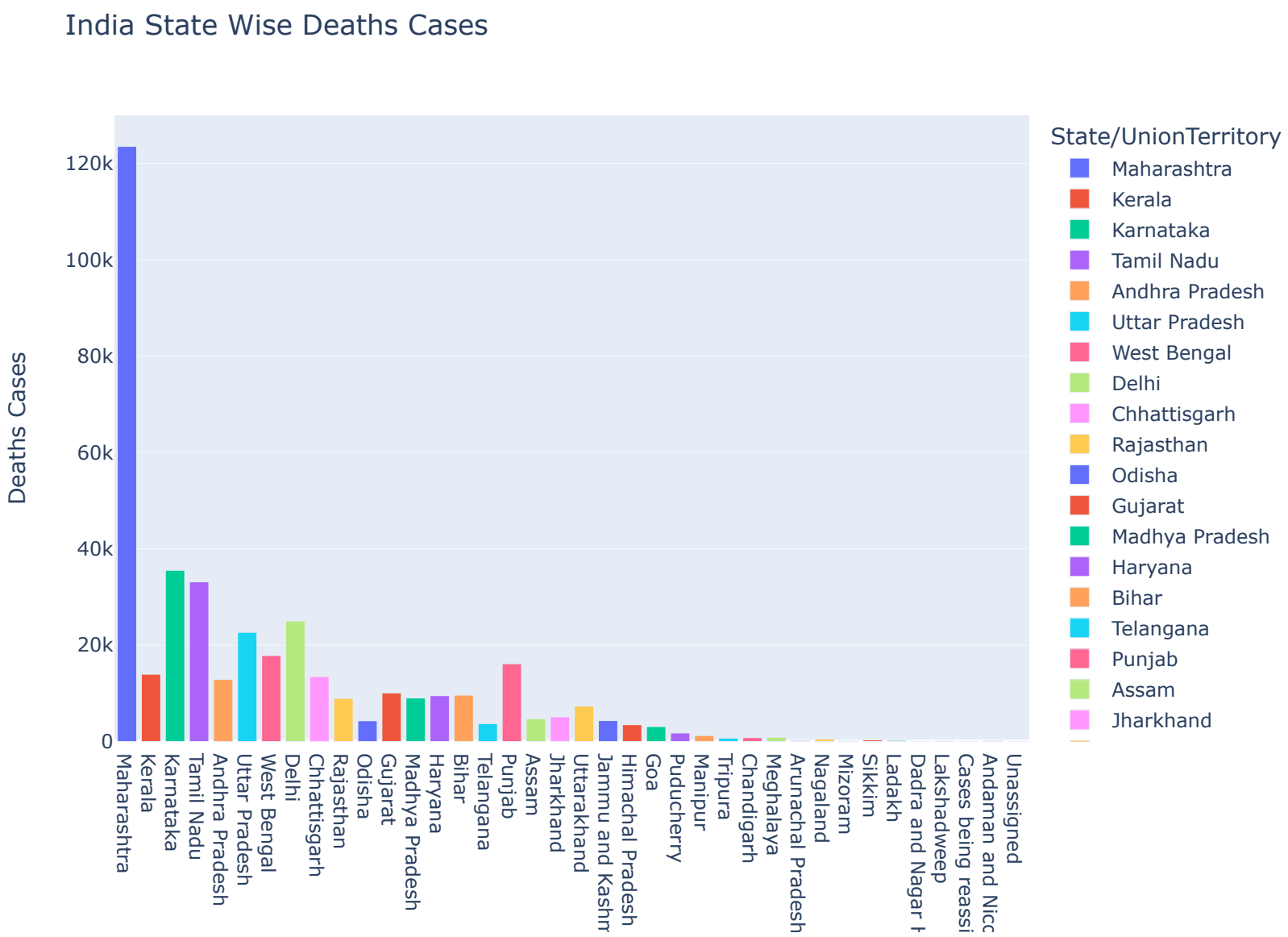
In [44]:
```
px.bar(allstates_max,x='State/UnionTerritory', y='Deaths',
       title="India State Wise Deaths Cases",
       labels={'Deaths':'Deaths Cases'},
      color='State/UnionTerritory',
      height=800)
```



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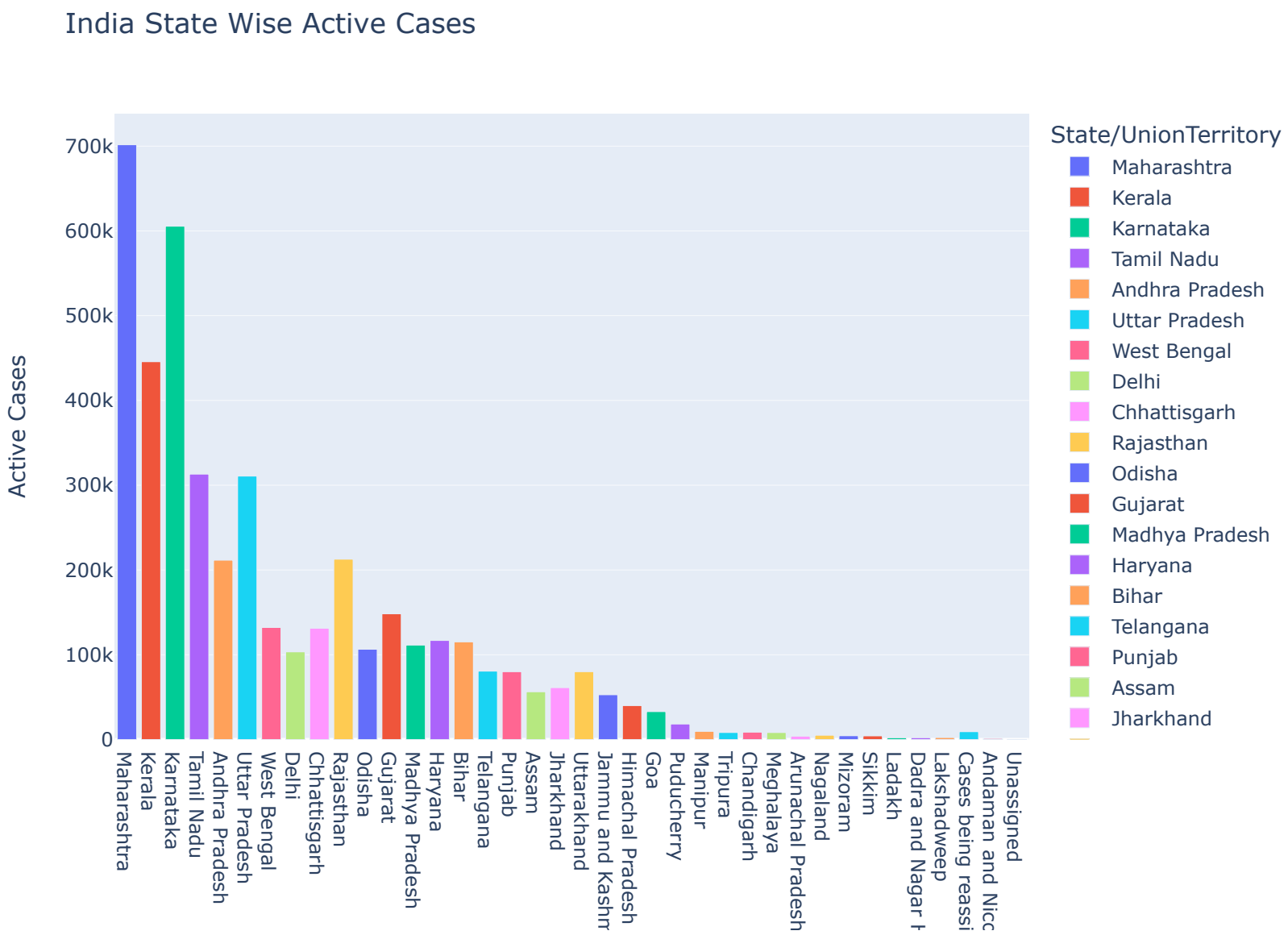
In [45]:
```
px.bar(allstates_max,x='State/UnionTerritory', y='Active',
       title="India State Wise Active Cases",
       labels={'Active':'Active Cases'},
      color='State/UnionTerritory',
      height=800)
```

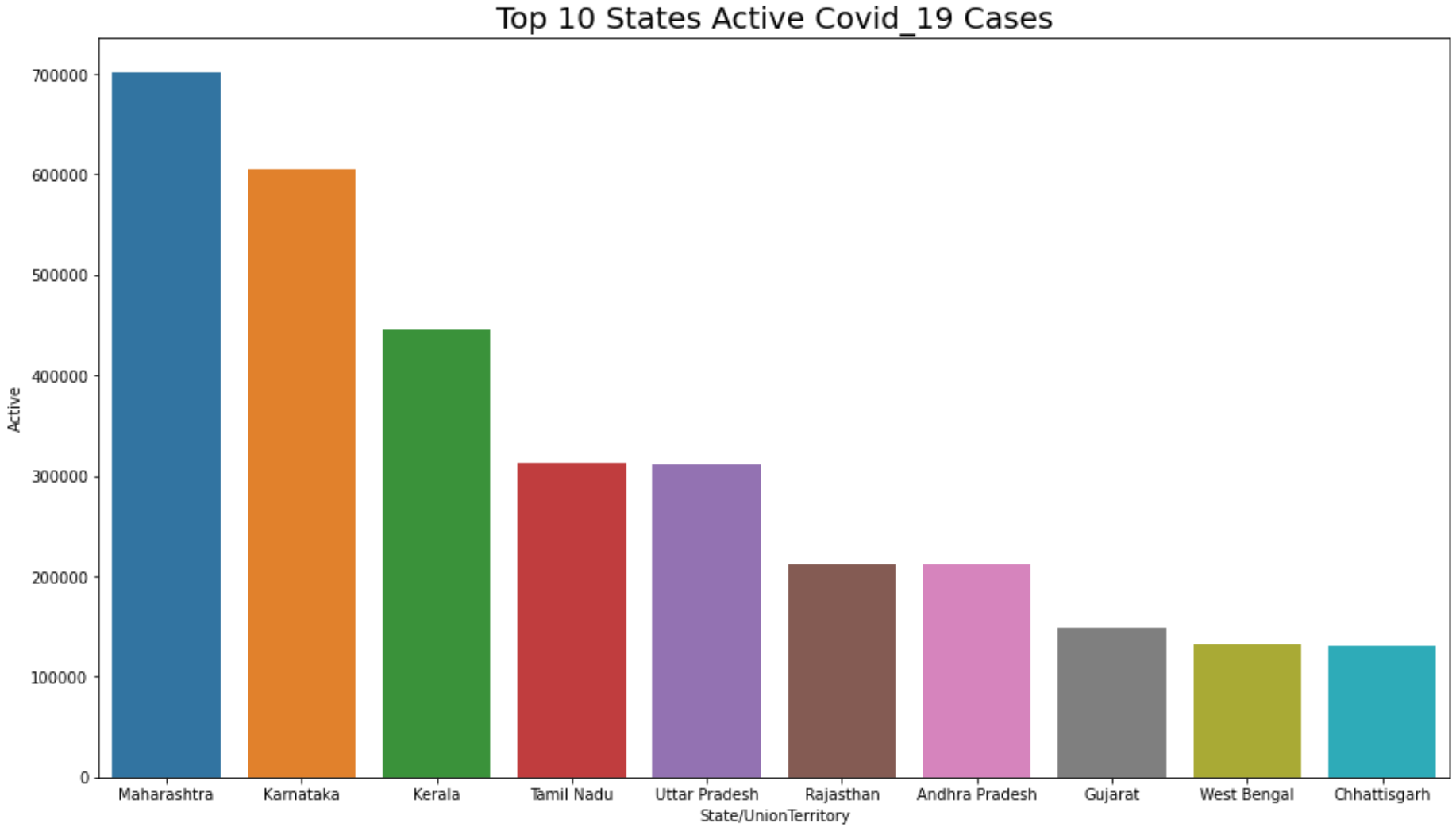


In [46]:
```
active_case = covid19.groupby('State/UnionTerritory').max()[['Active', 'Date']].sort_values(by=['Active'],ascending=Fals
active_case.head(10)
```

Out[46]:

	State/UnionTerritory	Active	Date
0	Maharashtra	701614	2021-07-07
1	Karnataka	605515	2021-07-07
2	Kerala	445692	2021-07-07
3	Tamil Nadu	313048	2021-07-07
4	Uttar Pradesh	310783	2021-07-07
5	Rajasthan	212753	2021-07-07
6	Andhra Pradesh	211554	2021-07-07
7	Gujarat	148297	2021-07-07
8	West Bengal	132181	2021-07-07
9	Chhattisgarh	131245	2021-07-07

In [156]:
```
fig = plt.figure(figsize=(16,9))
sns.barplot(data=active_case.head(10),x='State/UnionTerritory',y='Active')
plt.title("Top 10 States Active Covid_19 Cases",size=20)
plt.show()
```



In [ ]:

In [48]:
```
cured_rate = (total_cured_sum/total_confirmed_sum)*100
cured_rate
```

Out[48]: 91.35670533757235

In [49]:
```
death_rate = (total_deaths_sum/total_confirmed_sum)*100
death_rate
```

Out[49]: 1.3489444302183478

In [50]:
```
active_rate = (total_active_cases_sum/total_confirmed_sum)*100
active_rate
```

Out[50]: 7.294350232209301

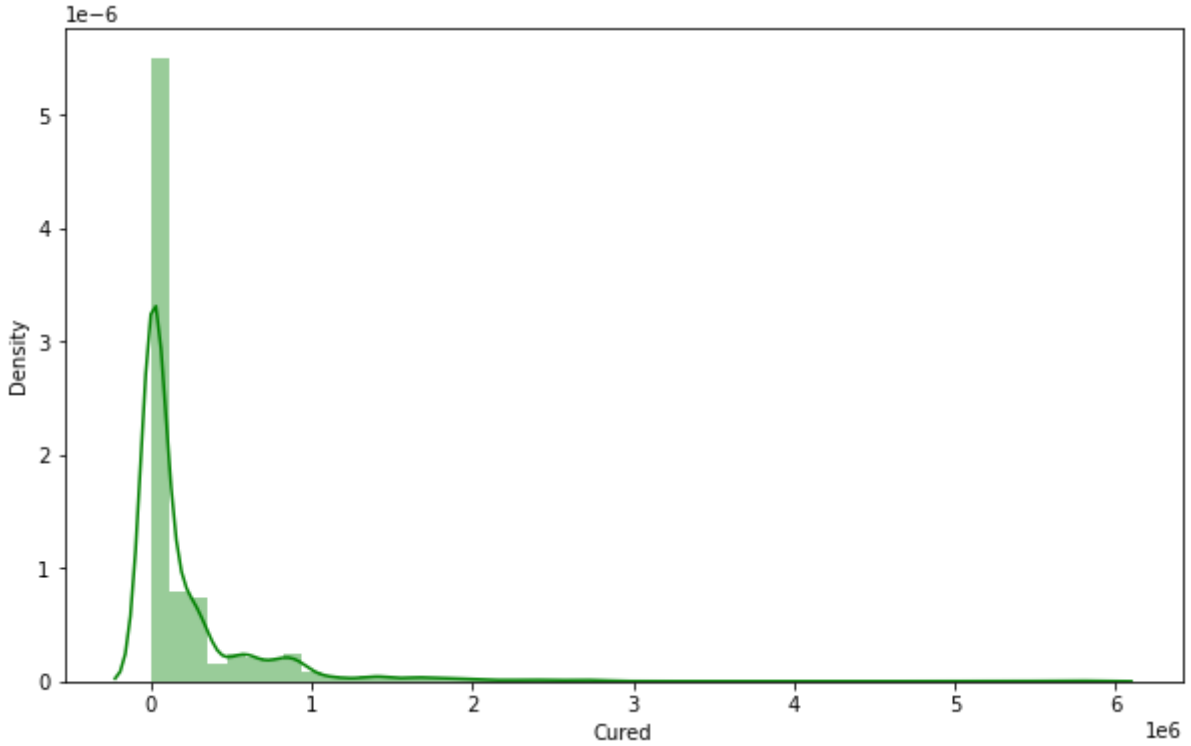
In [ ]:

In [ ]:

In [51]:
```
fig = plt.figure(figsize=(10,6))
sns.distplot(covid19['Cured'],kde=True,color='green')
plt.show()
```

```
C:\Users\Yash\anaconda3\lib\site-packages\seaborn\distributions.py:2619: FutureWarning:

`distplot` is a deprecated function and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `histplot` (an axes-level function for histograms).
```

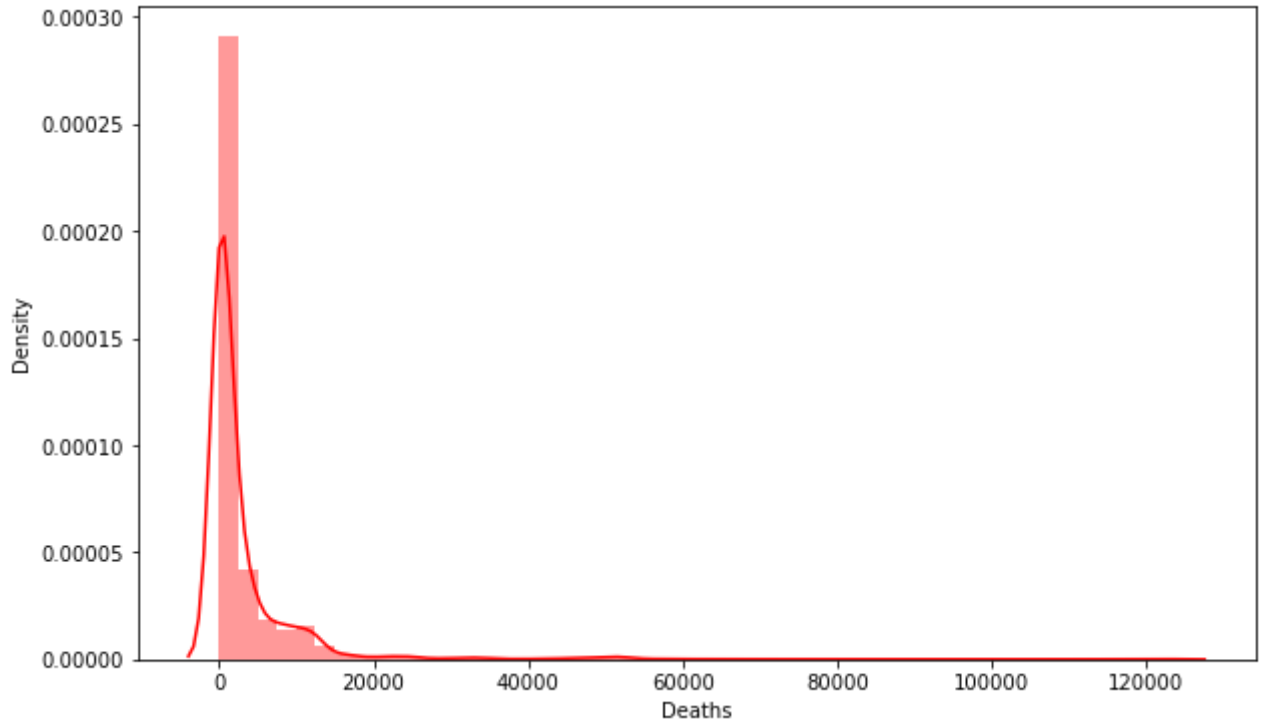


In [ ]:

In [52]:
```
fig = plt.figure(figsize=(10,6))
sns.distplot(covid19['Deaths'],kde=True,color='red')
plt.show()
```

```
C:\Users\Yash\anaconda3\lib\site-packages\seaborn\distributions.py:2619: FutureWarning:

`distplot` is a deprecated function and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `histplot` (an axes-level function for histograms).
```

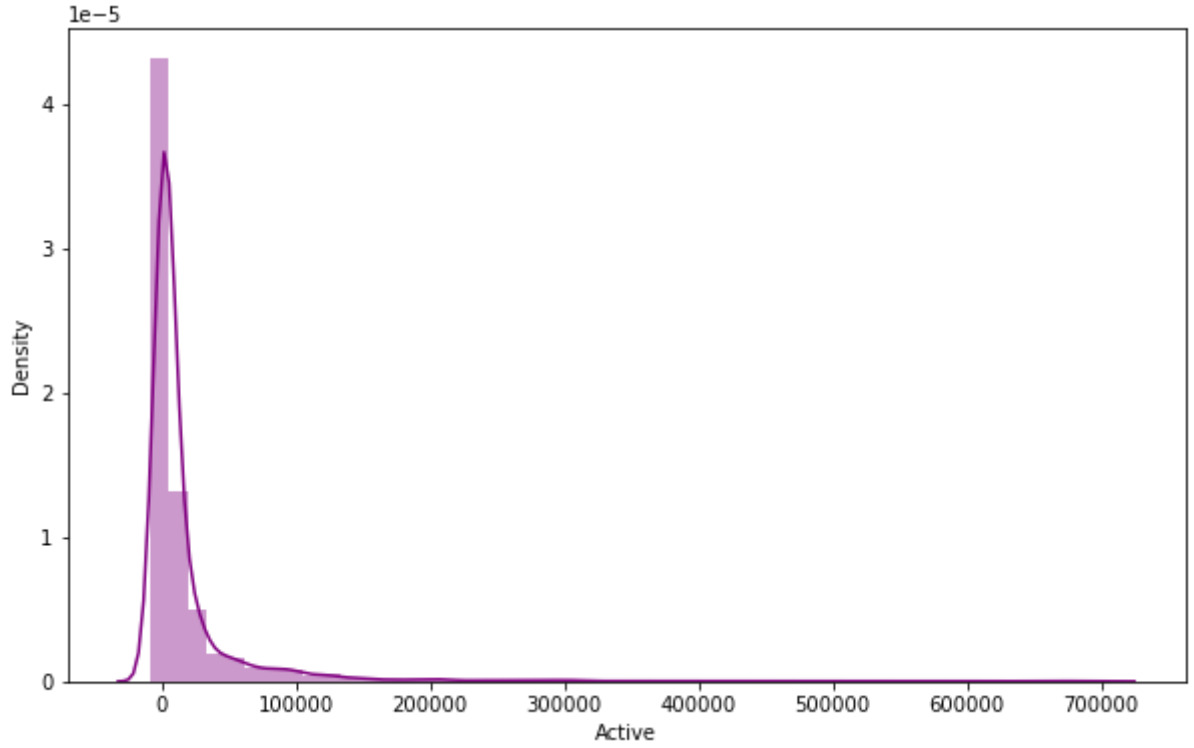


In [ ]:

In [53]:
```
fig = plt.figure(figsize=(10,6))
sns.distplot(covid19['Active'],kde=True,color='purple')
plt.show()
```

```
C:\Users\Yash\anaconda3\lib\site-packages\seaborn\distributions.py:2619: FutureWarning:

`distplot` is a deprecated function and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `histplot` (an axes-level function for histograms).
```



In [ ]:

Analyzing Date Wise India Covid-19 Data

In [54]:
```
covid19["Date"] = pd.to_datetime(covid19["Date"], format = "%Y-%m-%d")
covid19['Year']= pd.DatetimeIndex(covid19['Date']).year
covid19['Month']= pd.DatetimeIndex(covid19['Date']).month
covid19['Day']= pd.DatetimeIndex(covid19['Date']).day
```

In [ ]:

In [ ]:

In [55]:
```
covid19.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 16850 entries, 0 to 16849
Data columns (total 10 columns):
 #   Column                Non-Null Count  Dtype         
---  ------                --------------  -----         
 0   Date                  16850 non-null  datetime64[ns]
 1   Time                  16850 non-null  object        
 2   State/UnionTerritory  16850 non-null  object        
 3   Cured                 16850 non-null  int64         
 4   Deaths                16850 non-null  int64         
 5   Confirmed             16850 non-null  int64         
 6   Active                16850 non-null  int64         
 7   Year                  16850 non-null  int64         
 8   Month                 16850 non-null  int64         
 9   Day                   16850 non-null  int64         
dtypes: datetime64[ns](1), int64(7), object(2)
memory usage: 1.3+ MB
```

In [68]:
```
covid19
```

Out[68]:

	Date	Time	State/UnionTerritory	Cured	Deaths	Confirmed	Active	Year	Month	Day
0	2020-01-30	6:00 PM	Kerala	0	0	1	1	2020	1	30
1	2020-01-31	6:00 PM	Kerala	0	0	1	1	2020	1	31
2	2020-02-01	6:00 PM	Kerala	0	0	2	2	2020	2	1
3	2020-02-02	6:00 PM	Kerala	0	0	3	3	2020	2	2
4	2020-02-03	6:00 PM	Kerala	0	0	3	3	2020	2	3
...	...	...	...	...	...	...	...	...	...	...
16845	2021-07-07	8:00 AM	Telangana	613124	3703	628282	11455	2021	7	7
16846	2021-07-07	8:00 AM	Tripura	63964	701	68612	3947	2021	7	7
16847	2021-07-07	8:00 AM	Uttarakhand	332006	7338	340882	1538	2021	7	7
16848	2021-07-07	8:00 AM	Uttar Pradesh	1682130	22656	1706818	2032	2021	7	7
16849	2021-07-07	8:00 AM	West Bengal	1472132	17834	1507241	17275	2021	7	7

16850 rows × 10 columns

In [ ]:
```

```

In [56]:
```
covid19['Year'].unique()
```

Out[56]:
```
array([2020, 2021], dtype=int64)
```

In [57]:
```
yearly_data=covid19.groupby('Year')[['Cured','Deaths','Active','Confirmed']].sum().reset_index()
yearly_data
```

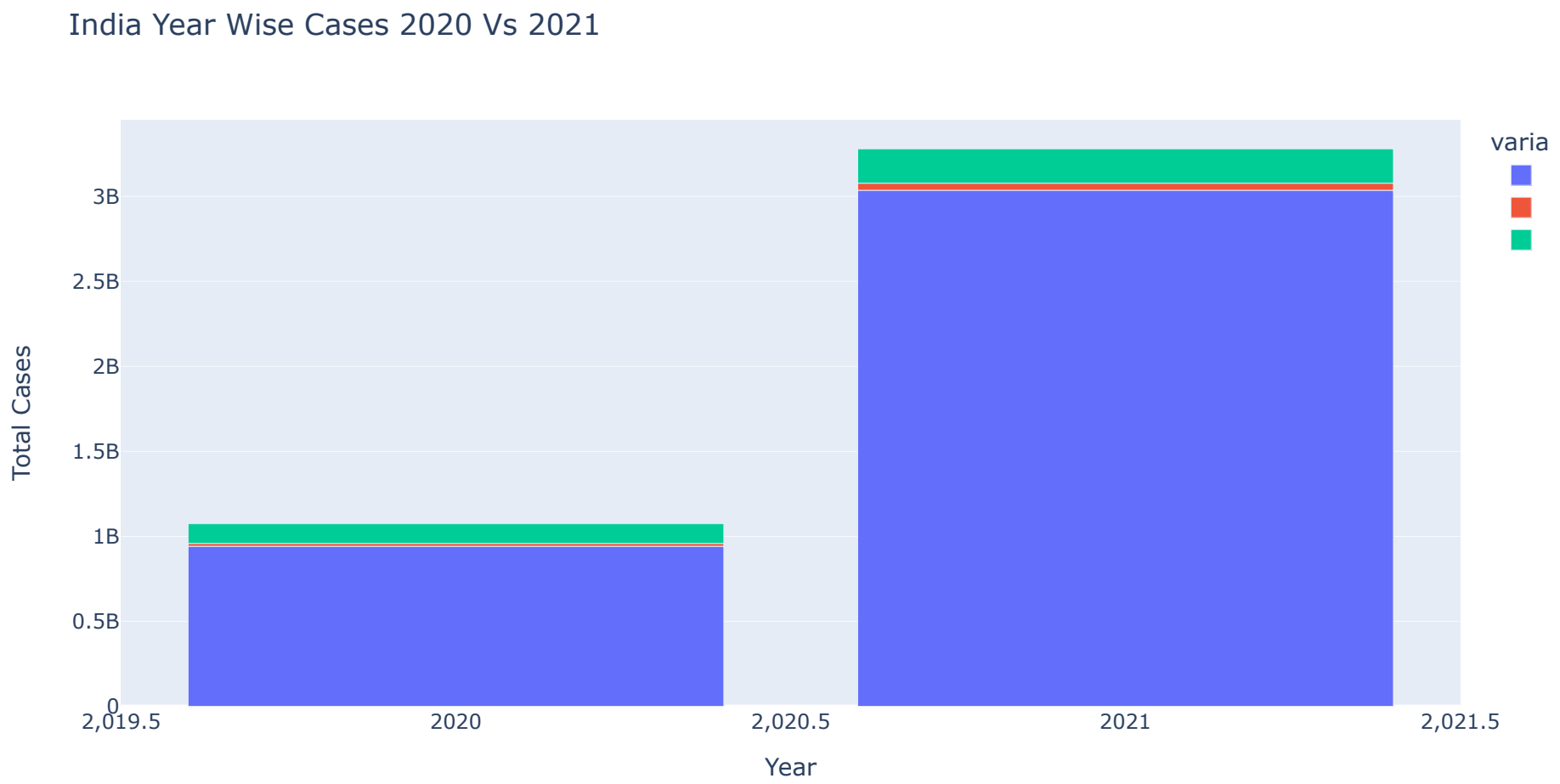
Out[57]:

	Year	Cured	Deaths	Active	Confirmed
0	2020	941314195	17022508	115686078	1074022781
1	2021	3035879941	41703492	201871860	3279455293

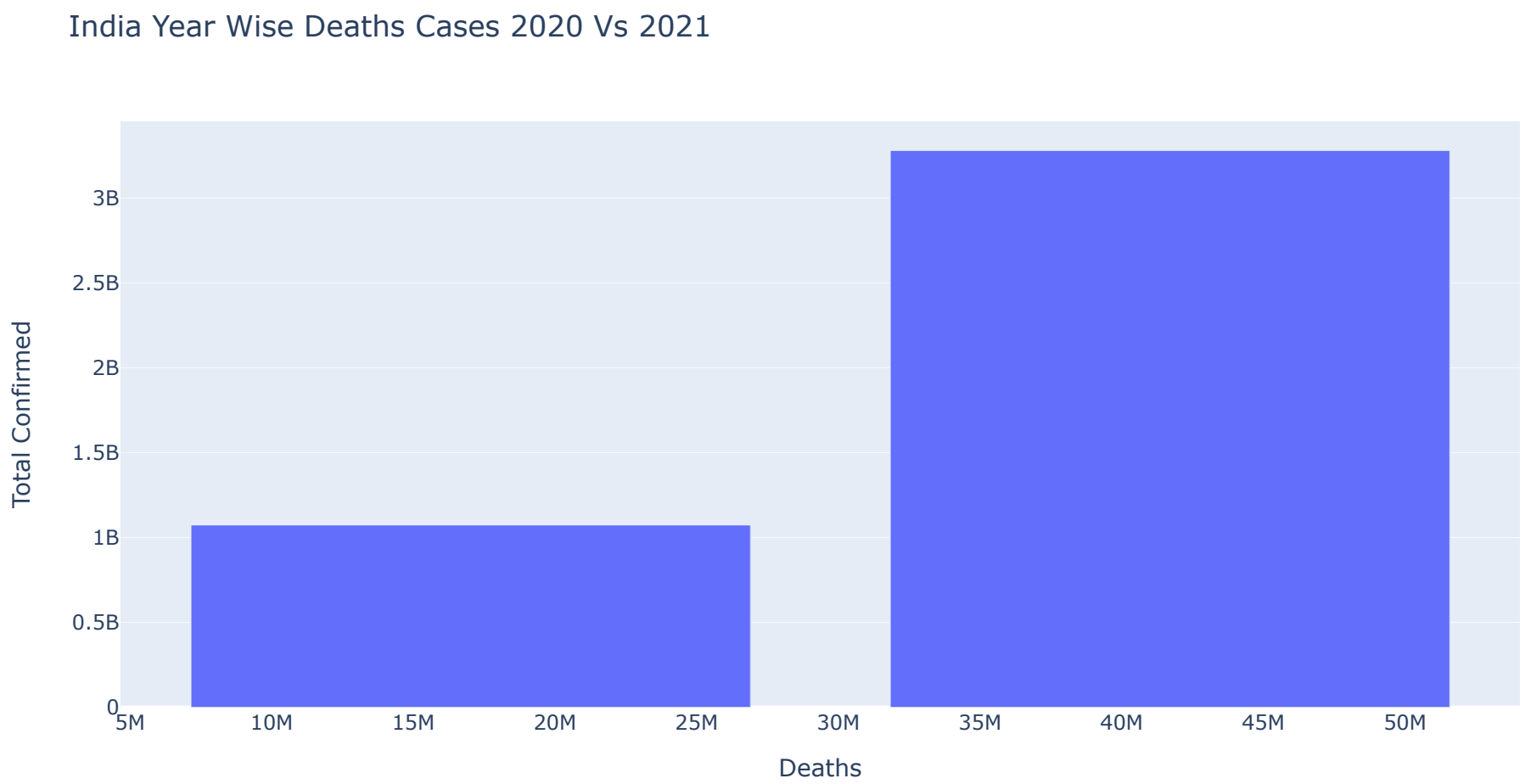
In [ ]:

In [ ]:

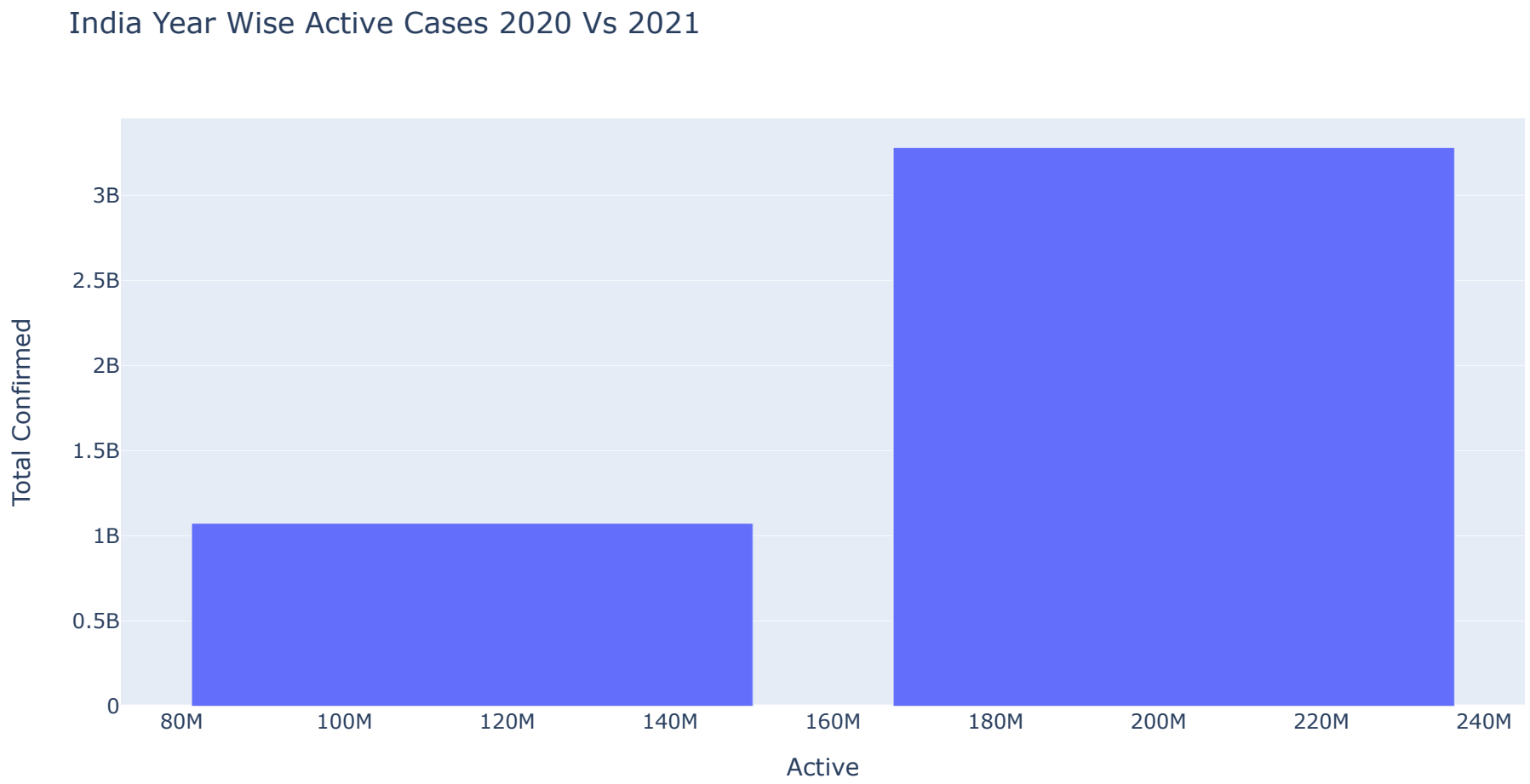
In [154]:
```
px.bar(yearly_data, x='Year', y=['Cured','Deaths','Active'],labels={'value':'Total Cases'},
      title="India Year Wise Cases 2020 Vs 2021")
```



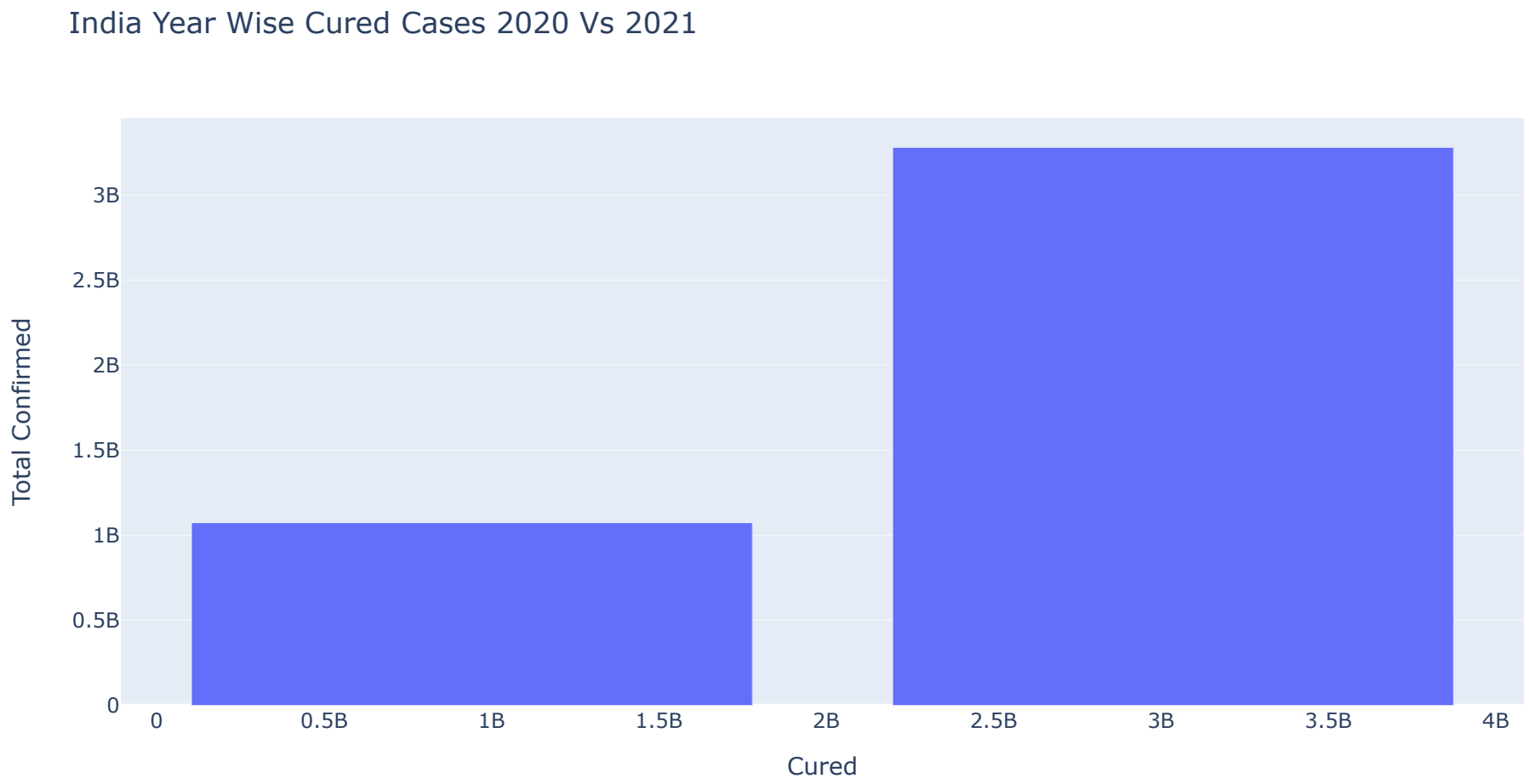
In [59]:
```
px.bar(yearly_data, x='Deaths', y='Confirmed',
       hover_name='Year',
       labels={'Confirmed':'Total Confirmed'},
       title="India Year Wise Deaths Cases 2020 Vs 2021"
       )
```



In [60]:
```
px.bar(yearly_data, x='Active', y='Confirmed',
       hover_name='Year',
       labels={'Confirmed':'Total Confirmed'},
       title="India Year Wise Active Cases 2020 Vs 2021")
```



In [61]:
```
px.bar(yearly_data, x='Cured', y='Confirmed',
       hover_name='Year',
       labels={'Confirmed':'Total Confirmed'},
       title="India Year Wise Cured Cases 2020 Vs 2021")
```



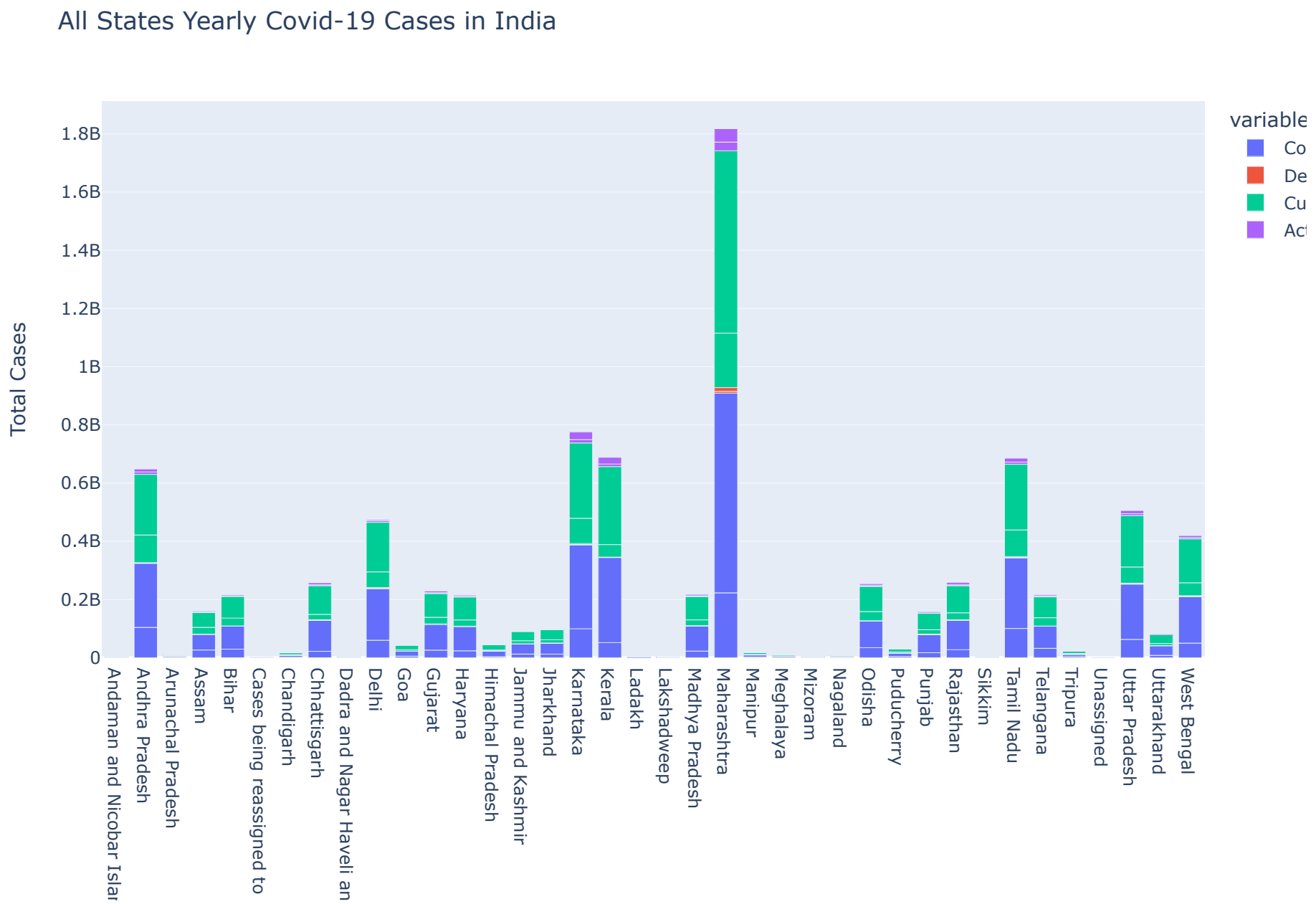
In [157]:
```
allstates_yearly_data=covid19.groupby(['State/UnionTerritory','Year'])[['Cured','Deaths','Active','Confirmed']].sum().re
allstates_yearly_data
```

Out[157]:

	State/UnionTerritory	Year	Cured	Deaths	Active	Confirmed
0	Andaman and Nicobar Islands	2020	534731	7772	48335	590838
1	Andaman and Nicobar Islands	2021	1055204	14852	14354	1084410
2	Andhra Pradesh	2020	95094768	871178	8168120	104134066
3	Andhra Pradesh	2021	208333131	1604638	10074948	220012717
4	Arunachal Pradesh	2020	1442769	4488	232251	1679508
...	...	...	...	...	...	...
69	Uttar Pradesh	2021	177050153	2411300	10493519	189954972
70	Uttarakhand	2020	6864570	121701	973986	7960257
71	Uttarakhand	2021	29819818	606811	2792510	33219139
72	West Bengal	2020	44508487	941478	4645244	50095209
73	West Bengal	2021	150788352	2273362	6665925	159727639

74 rows × 6 columns

In [165]:
```
px.bar(allstates_yearly_data,x='State/UnionTerritory', y=['Confirmed','Deaths','Cured','Active'],labels={'value':'Total
       hover_data=['Year'],title='All States Yearly Covid-19 Cases in India', height=800)
```



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In [ ]:

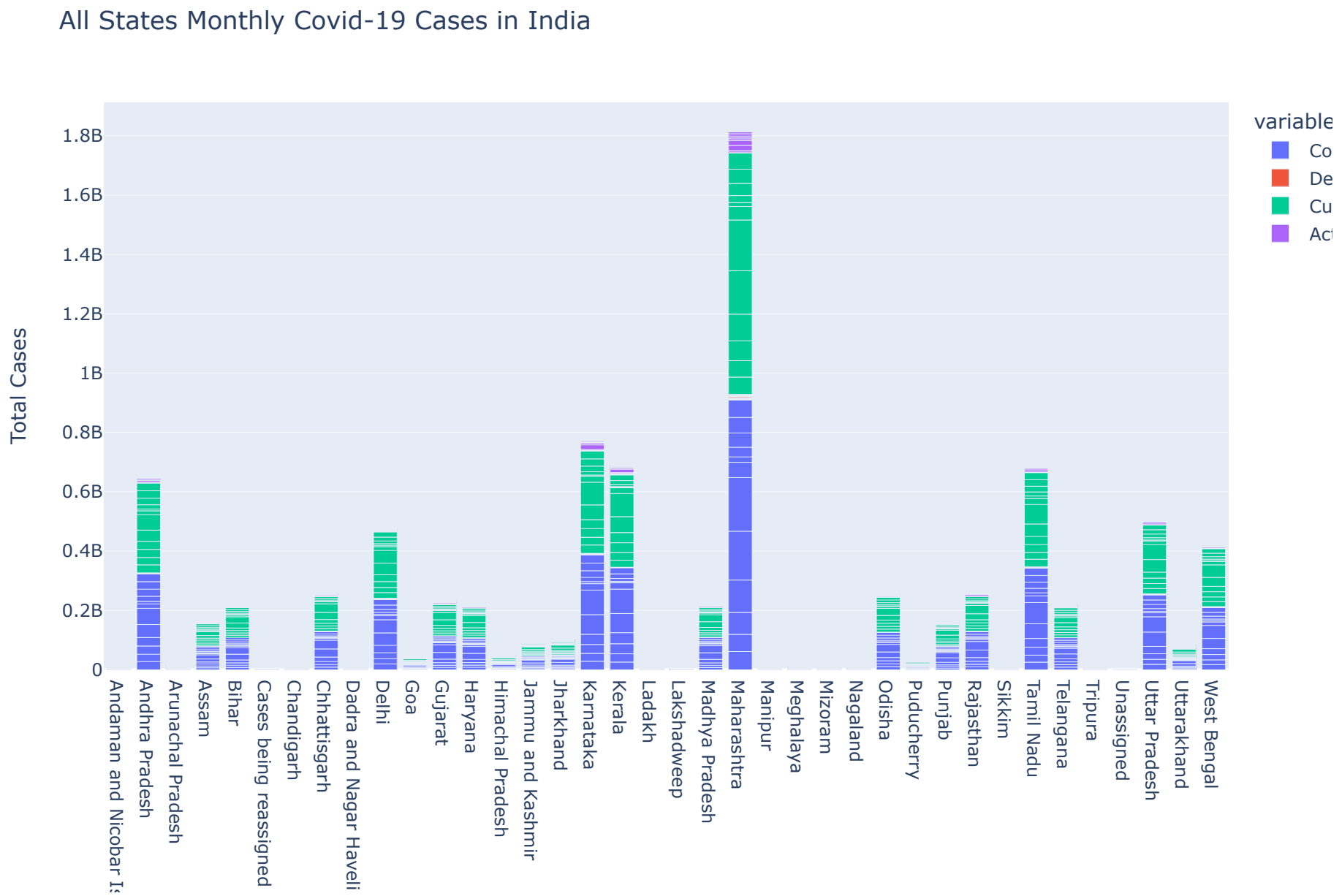
In [166]:
```
tates_monthly_data=covid19.groupby(['State/UnionTerritory','Month'])[['Cured','Deaths','Active','Confirmed']].sum().reset_
tates_monthly_data
```

Out[166]:

	State/UnionTerritory	Month	Cured	Deaths	Active	Confirmed
0	Andaman and Nicobar Islands	1	151473	1922	792	154187
1	Andaman and Nicobar Islands	2	138309	1736	164	140209
2	Andaman and Nicobar Islands	3	153888	1922	280	156090
3	Andaman and Nicobar Islands	4	155615	1905	3320	160840
4	Andaman and Nicobar Islands	5	194448	2728	6936	204112
...	...	...	...	...	...	...
428	West Bengal	8	2668216	73557	795791	3537564
429	West Bengal	9	5379943	121453	731518	6232914
430	West Bengal	10	8463405	181984	998450	9643839
431	West Bengal	11	11728981	228800	904434	12862215
432	West Bengal	12	15314155	282550	614339	16211044

433 rows × 6 columns

In [168]:
```
px.bar(allstates_monthly_data,x='State/UnionTerritory', y=['Confirmed','Deaths','Cured','Active'],labels={'value':'Total
       hover_data=['Month'],title='All States Monthly Covid-19 Cases in India', height=800)
```



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In [ ]:

In [83]:
```
india_datewise = covid19.groupby('Date')[['Confirmed','Cured','Deaths','Active']].sum().reset_index()
india_datewise
```

Out[83]:

	Date	Confirmed	Cured	Deaths	Active
0	2020-01-30	1	0	0	1
1	2020-01-31	1	0	0	1
2	2020-02-01	2	0	0	2
3	2020-02-02	3	0	0	3
4	2020-02-03	3	0	0	3
...	...	...	...	...	...
520	2021-07-03	30502362	29605779	401050	495533
521	2021-07-04	30545433	29658078	402005	485350
522	2021-07-05	30585229	29700430	402728	482071
523	2021-07-06	30619932	29752294	403281	464357
524	2021-07-07	30663665	29799534	404211	459920

525 rows × 5 columns

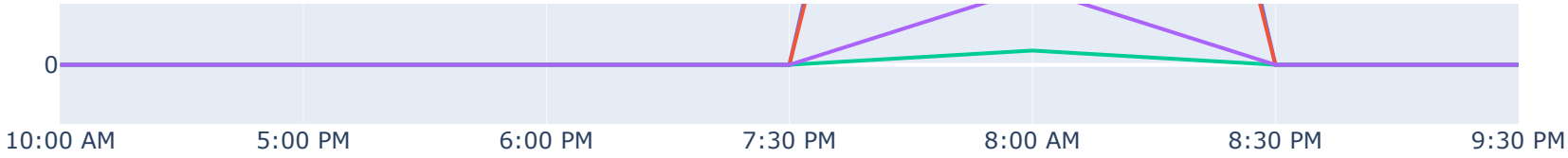
In [155]:
```
px.line(india_datewise,x='Date', y=['Confirmed','Cured','Deaths','Active'],labels={'value':'Total Cases'},
        title='Date Wise Covid-19 Cases in India', height=800)
```

In [133]:
```
india_time_wise = covid19.groupby('Time')[['Confirmed','Cured','Deaths','Active']].sum().reset_index()
india_time_wise
```

Out[133]:

	Time	Confirmed	Cured	Deaths	Active
0	10:00 AM	724	67	17	640
1	5:00 PM	602073	128646	19369	454058
2	6:00 PM	25714	1898	600	23216
3	7:30 PM	2858	240	68	2550
4	8:00 AM	4352844057	3977063059	58705880	317075118
5	8:30 PM	1397	124	35	1238
6	9:30 PM	1251	102	31	1118

In [134]:
```
px.line(india_time_wise,x='Time', y=['Confirmed','Cured','Deaths','Active'],labels={'value':'Total Cases'},
        title='Covid-19 Time Wise Cases in India', height=800)
```



In [ ]:

In [ ]:

India Covid-19 Data of Maharashtra State

In [87]:
```
maha= covid19[covid19["State/UnionTerritory"] == 'Maharashtra']
maha
```

Out[87]:

	Date	Time	State/UnionTerritory	Cured	Deaths	Confirmed	Active	Year	Month	Day
76	2020-03-09	6:00 PM	Maharashtra	0	0	2	2	2020	3	9
91	2020-03-10	6:00 PM	Maharashtra	0	0	5	5	2020	3	10
97	2020-03-11	6:00 PM	Maharashtra	0	0	2	2	2020	3	11
120	2020-03-12	6:00 PM	Maharashtra	0	0	11	11	2020	3	12
133	2020-03-13	6:00 PM	Maharashtra	0	0	14	14	2020	3	13
...	...	...	...	...	...	...	...	...	...	...
16690	2021-07-03	8:00 AM	Maharashtra	5836920	122353	6079352	120079	2021	7	3
16726	2021-07-04	8:00 AM	Maharashtra	5845315	122724	6088841	120802	2021	7	4
16762	2021-07-05	8:00 AM	Maharashtra	5848693	123030	6098177	126454	2021	7	5
16798	2021-07-06	8:00 AM	Maharashtra	5861720	123136	6104917	120061	2021	7	6
16834	2021-07-07	8:00 AM	Maharashtra	5872268	123531	6113335	117536	2021	7	7

486 rows × 10 columns

In [88]:
```
maha.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 486 entries, 76 to 16834
Data columns (total 10 columns):
 #   Column                Non-Null Count  Dtype         
---  ------                --------------  -----         
 0   Date                  486 non-null    datetime64[ns]
 1   Time                  486 non-null    object        
 2   State/UnionTerritory  486 non-null    object        
 3   Cured                 486 non-null    int64         
 4   Deaths                486 non-null    int64         
 5   Confirmed             486 non-null    int64         
 6   Active                486 non-null    int64         
 7   Year                  486 non-null    int64         
 8   Month                 486 non-null    int64         
 9   Day                   486 non-null    int64         
dtypes: datetime64[ns](1), int64(7), object(2)
memory usage: 41.8+ KB
```

In [89]:
```
maha.describe()
```

Out[89]:

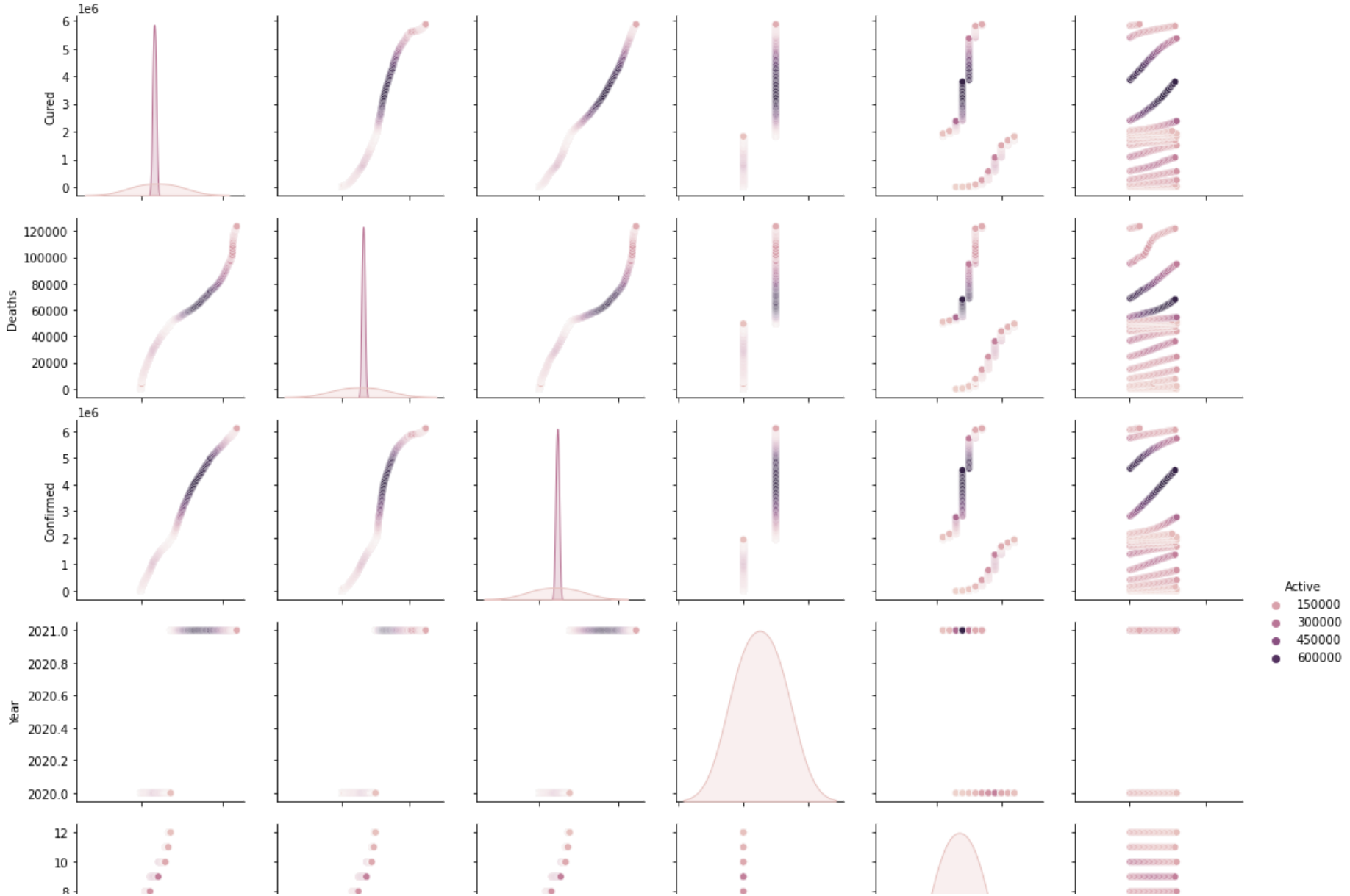
	Cured	Deaths	Confirmed	Active	Year	Month	Day
count	4.860000e+02	486.000000	4.860000e+02	486.000000	486.000000	486.000000	486.000000
mean	1.674463e+06	39741.835391	1.870149e+06	155944.508230	2020.386831	6.080247	15.744856
std	1.710989e+06	31861.231600	1.831266e+06	168833.300211	0.487526	3.146548	8.810065
min	0.000000e+00	0.000000	2.000000e+00	2.000000	2020.000000	1.000000	1.000000
25%	1.197165e+05	9299.500000	2.187718e+05	46101.000000	2020.000000	4.000000	8.000000
50%	1.556812e+06	44884.500000	1.706879e+06	96492.500000	2020.000000	6.000000	16.000000
75%	2.066541e+06	52468.500000	2.216942e+06	193650.750000	2021.000000	8.750000	23.000000
max	5.872268e+06	123531.000000	6.113335e+06	701614.000000	2021.000000	12.000000	31.000000

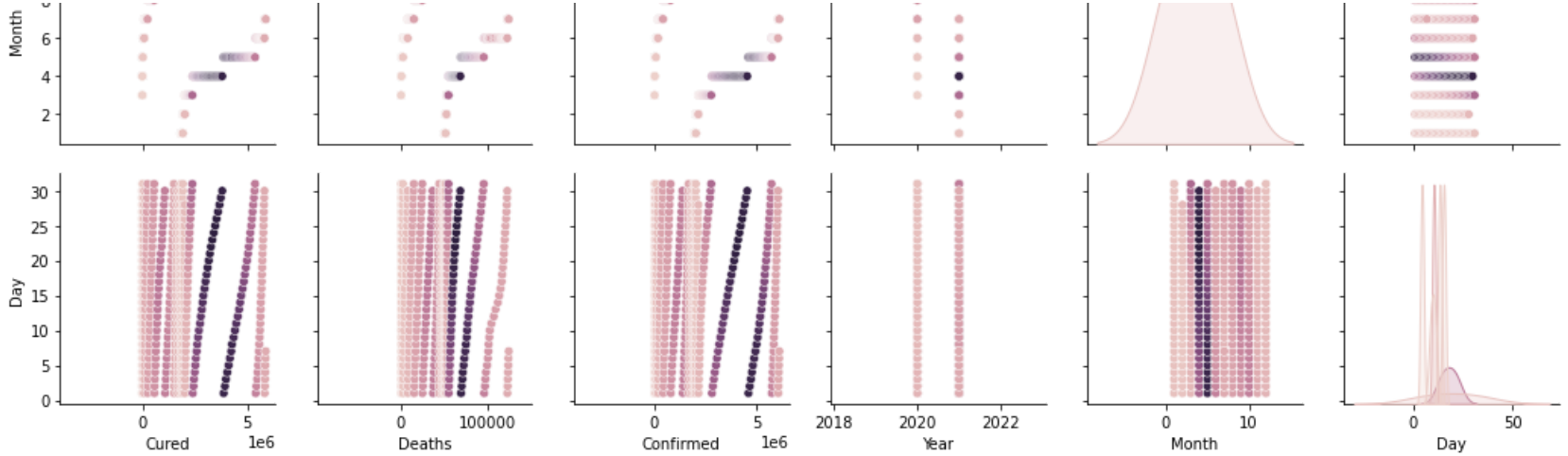
In [ ]:
```

```

In [90]:
```
fig = plt.figure(figsize=(10,6))
sns.pairplot(maha,hue='Active')
plt.show()
```

```
<Figure size 720x432 with 0 Axes>
```

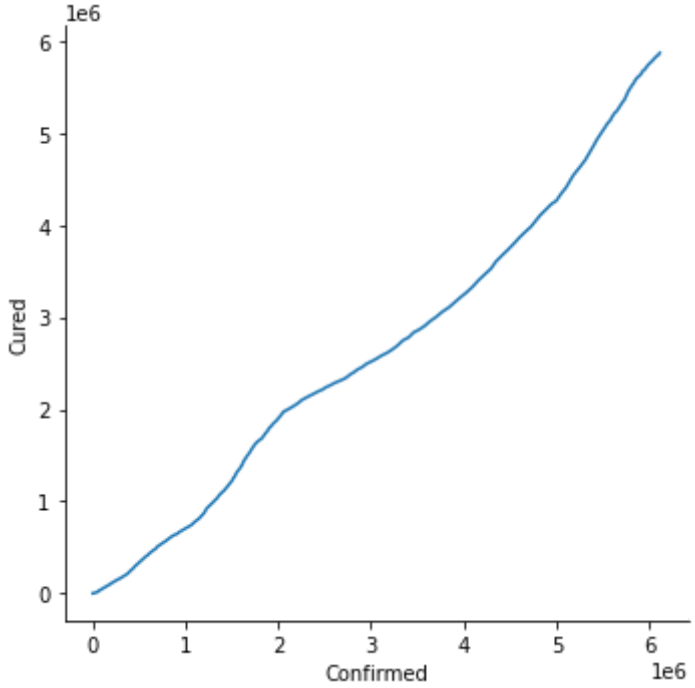



Month
Day
Cured
Deaths
Confirmed
Year
Month
Day
1e6
1e6
100000
2018
2020
2022

In [ ]:

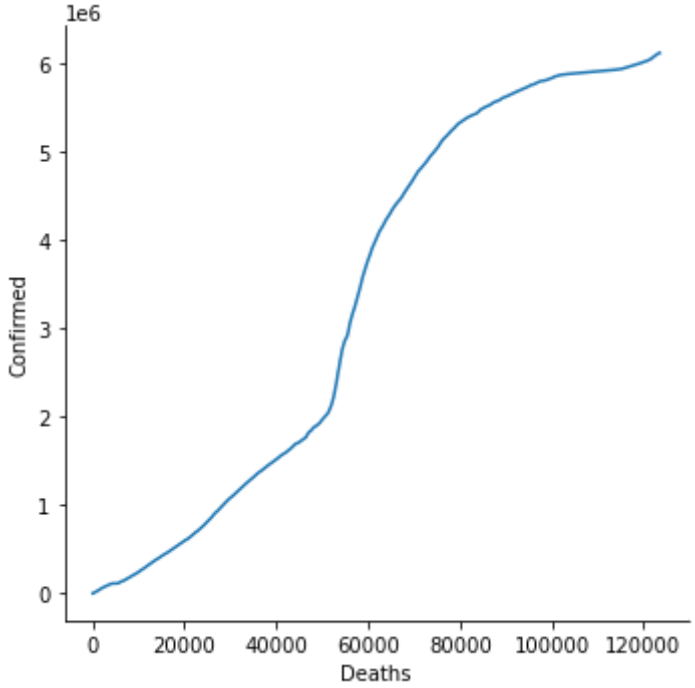
In [91]:
```
fig = plt.figure(figsize=(10,6))
sns.relplot(x='Confirmed',y='Cured',data=maha,kind='line')
plt.show()
```

```
<Figure size 720x432 with 0 Axes>
```

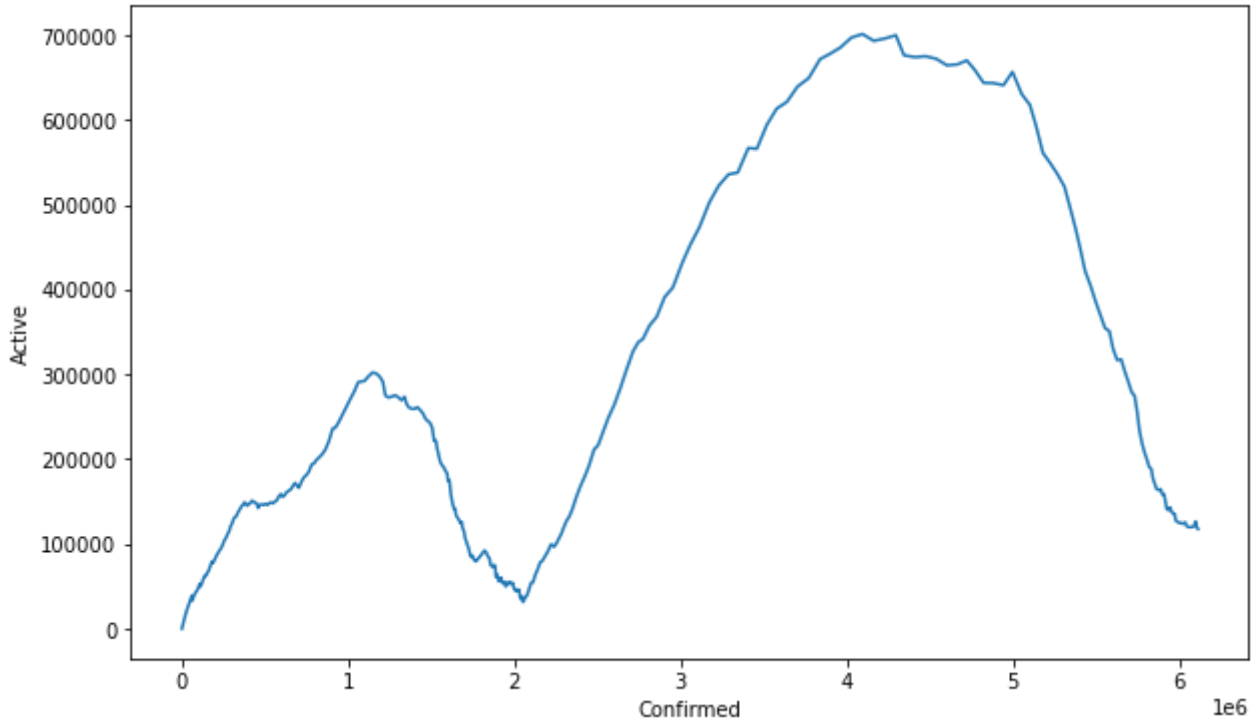


In [92]:
```
fig = plt.figure(figsize=(10,6))
sns.relplot(x='Deaths',y='Confirmed',data=maha,kind='line')
plt.show()
```

```
<Figure size 720x432 with 0 Axes>
```

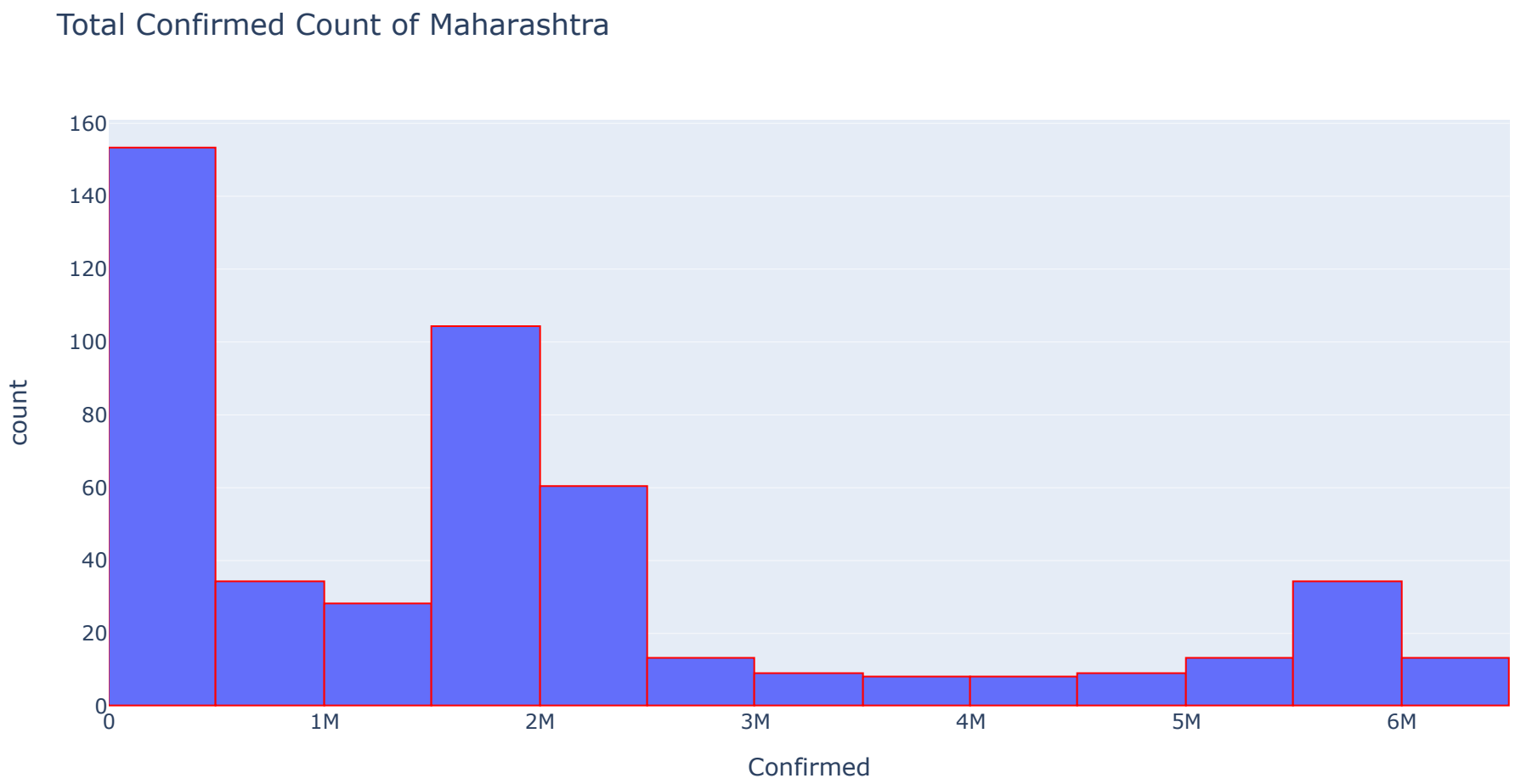


In [93]:
```
fig = plt.figure(figsize=(10,6))
sns.lineplot(y='Active',x='Confirmed',data=maha)
plt.show()
```



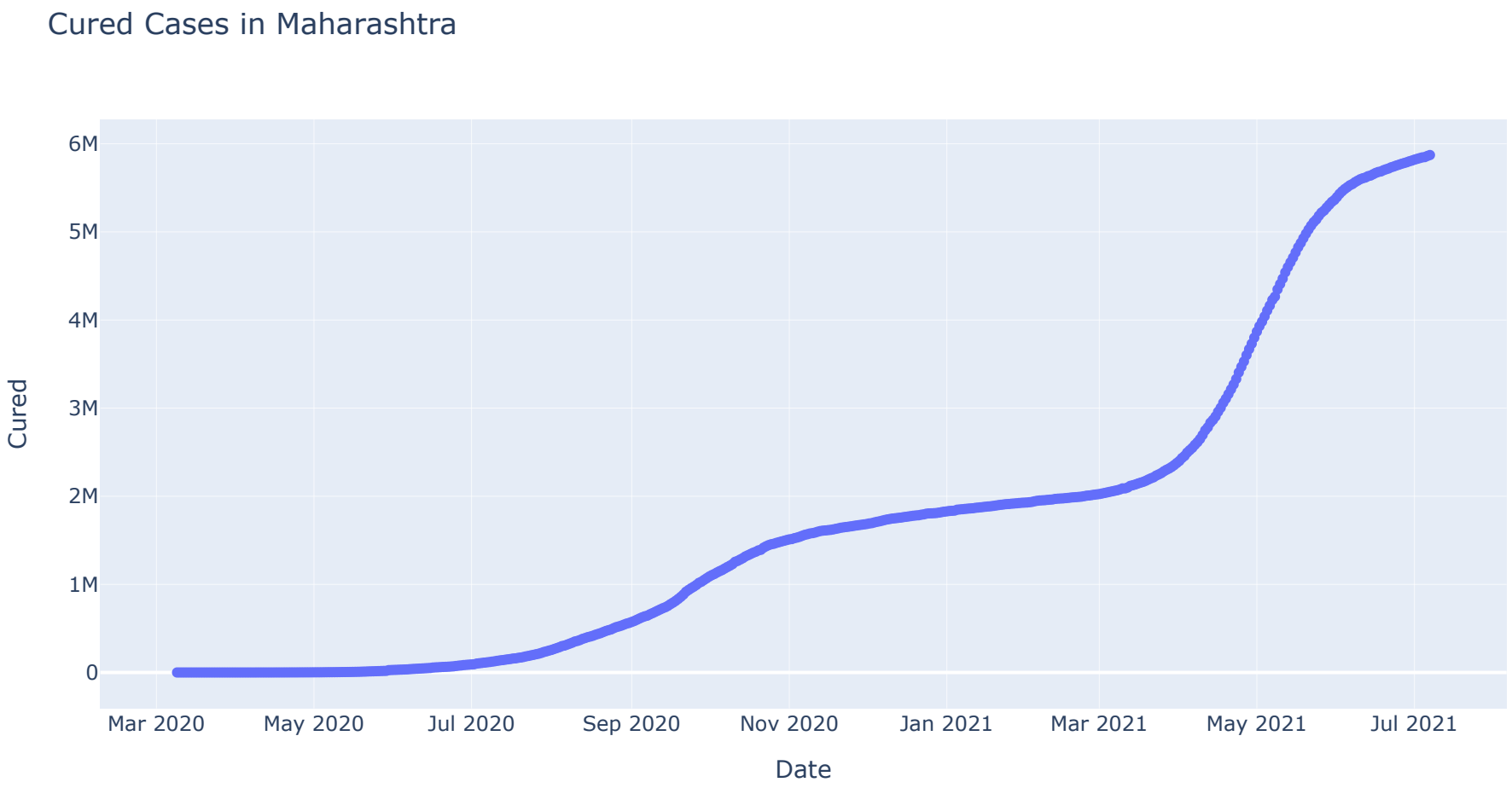
In [ ]:

In [94]:
```
fig=px.histogram(x='Confirmed',data_frame=maha,title='Total Confirmed Count of Maharashtra')
fig.update_traces(marker_line_width=1,marker_line_color='red')
```

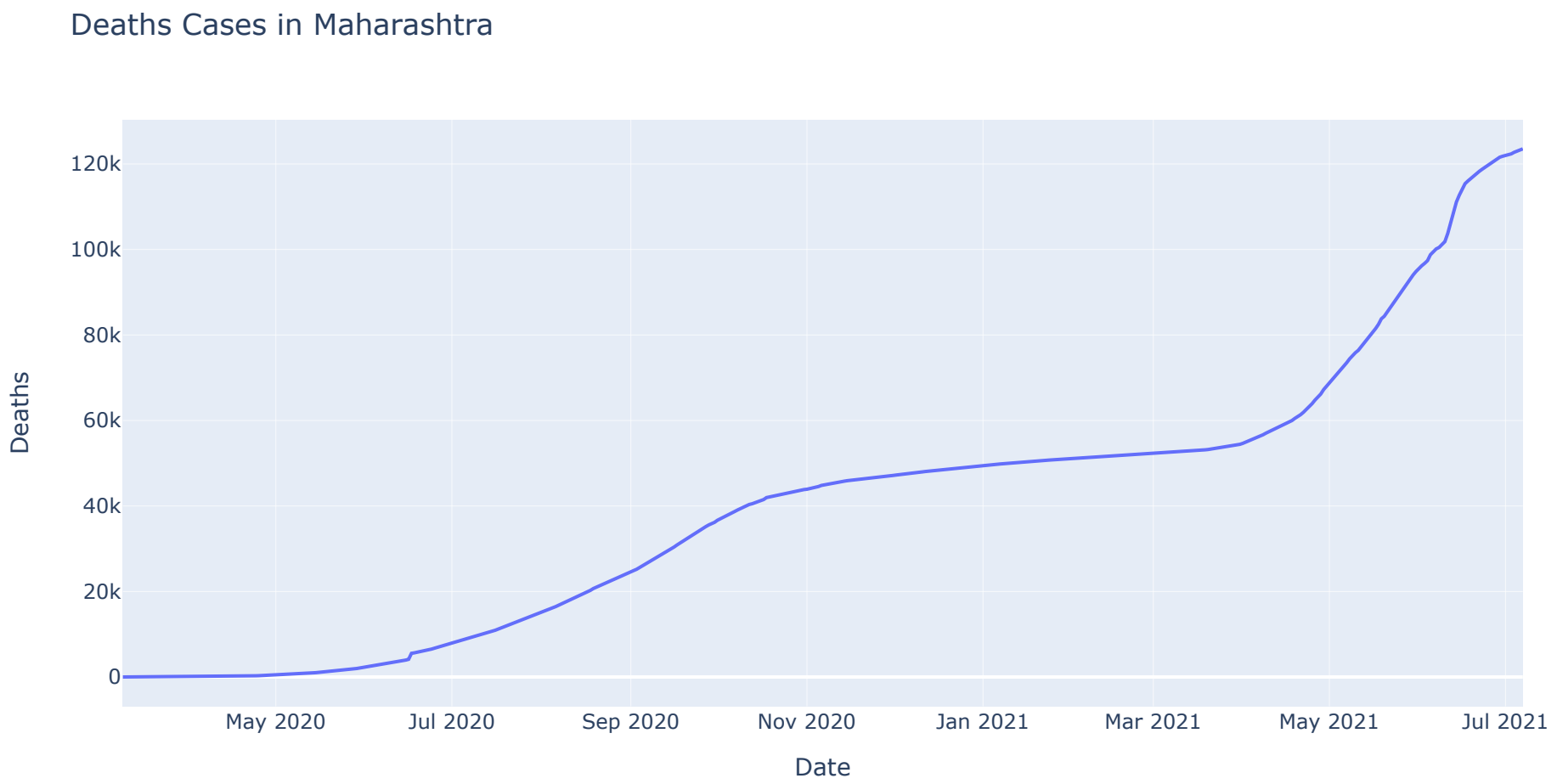


In [95]:

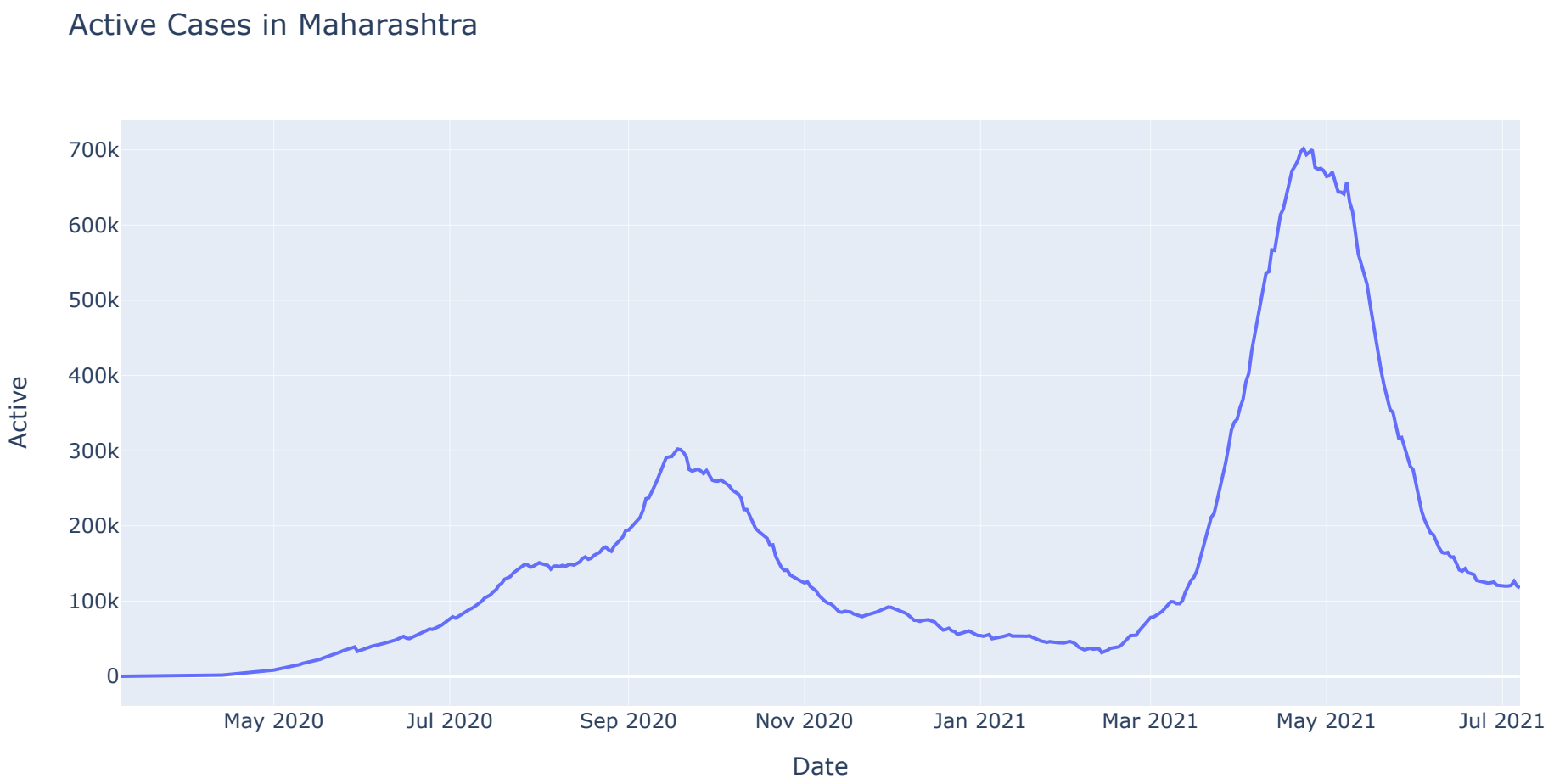
```
fig = px.scatter(data_frame=maha, x="Date", y="Cured", title='Cured Cases in Maharashtra')
fig.show()
```



In [96]:
```
fig = px.line(data_frame=maha, x="Date", y="Deaths", title='Deaths Cases in Maharashtra')
fig.show()
```

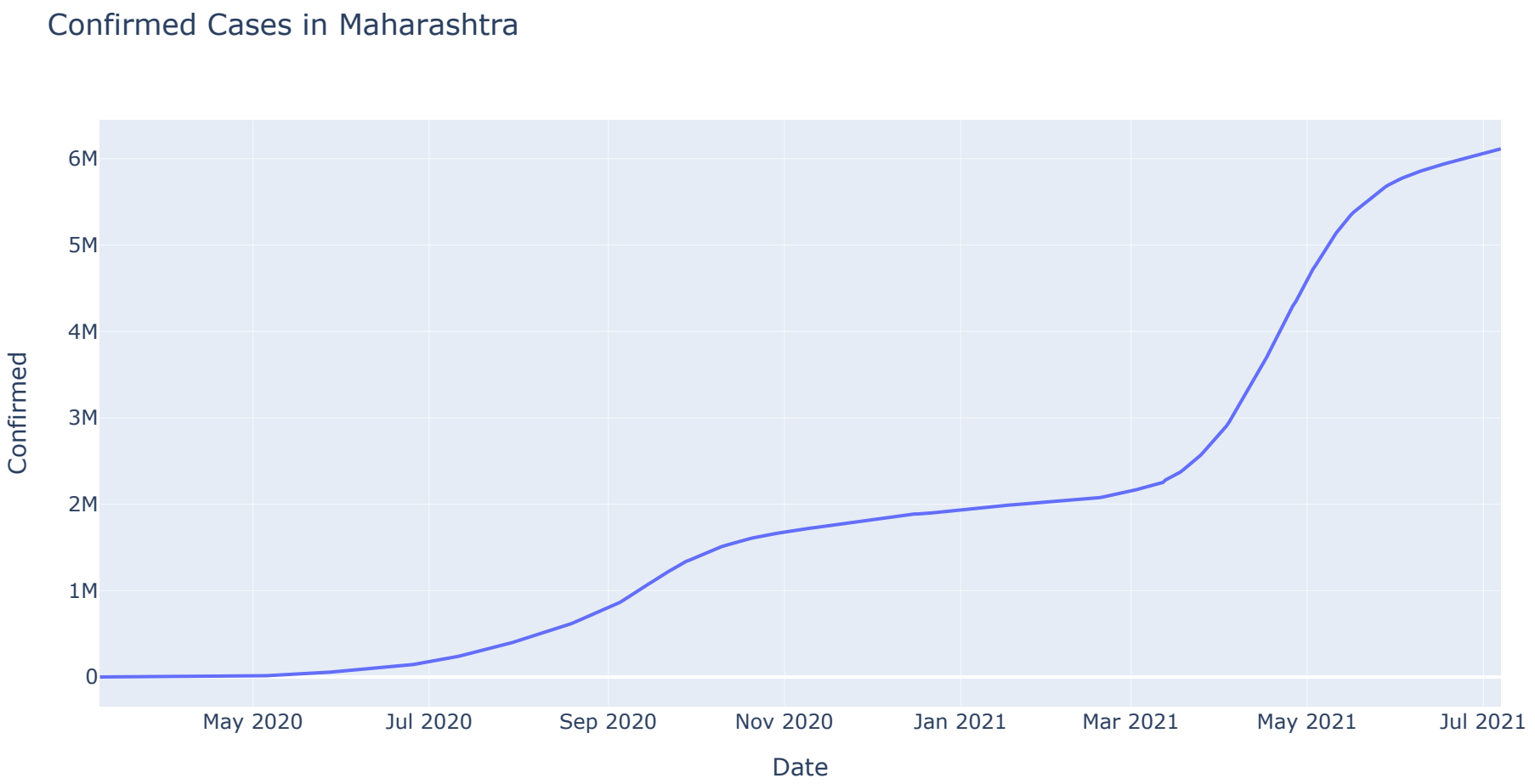


In [97]:
```
fig = px.line(data_frame=maha, x="Date", y="Active", title='Active Cases in Maharashtra')
fig.show()
```



In [ ]:

In [98]:
```
fig = px.line(data_frame=maha, x="Date", y="Confirmed", title='Confirmed Cases in Maharashtra')
fig.show()
```



In [ ]:

In [99]:
```
maha_cured_sum = maha['Cured'].sum()
maha_cured_sum
```

Out[99]: 813788907

In [100]:
```
maha_deaths_sum = maha['Deaths'].sum()
maha_deaths_sum
```

Out[100]: 19314532

In [101]:
```
maha_confirmed_sum = maha['Confirmed'].sum()
maha_confirmed_sum
```

Out[101]: 908892470

In [102]:
```
maha_active_sum = maha['Active'].sum()
maha_active_sum
```

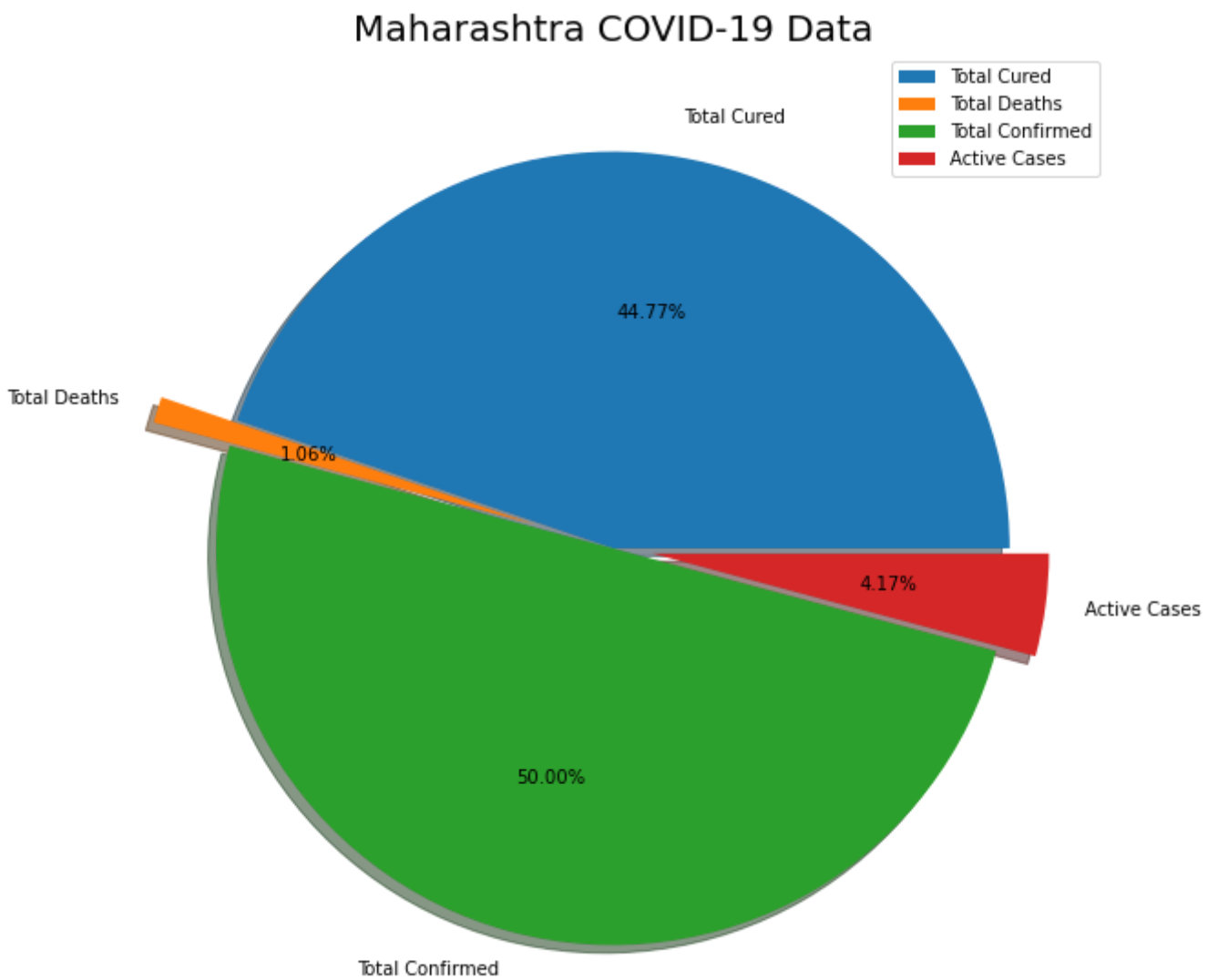
Out[102]: 75789031

In [103]:
```
result=np.array([maha_cured_sum,maha_deaths_sum,maha_confirmed_sum,maha_active_sum])
lable = ["Total Cured","Total Deaths","Total Confirmed","Active Cases"]
e = [0.0,0.2,0.0,0.1]
```

In [104]:

```
fig = plt.figure()
fig.set_figheight(10)
fig.set_figwidth(12)

plt.pie(result,labels=lable,autopct='%1.2f%%',explode=e,shadow=True)
plt.title("Maharashtra COVID-19 Data",size=20,color='k')
plt.legend(lable)
plt.show()
```


Maharashtra COVID-19 Data
Total Cured
Total Deaths
Total Confirmed
Active Cases
Total Cured
44.77%
Total Deaths
1.06%
4.17%
Active Cases
50.00%
Total Confirmed

In [ ]:

In [ ]:

Date Wise Covid-19 Data of Maharashtra

In [105]:
```
maha['Year'].unique()
```

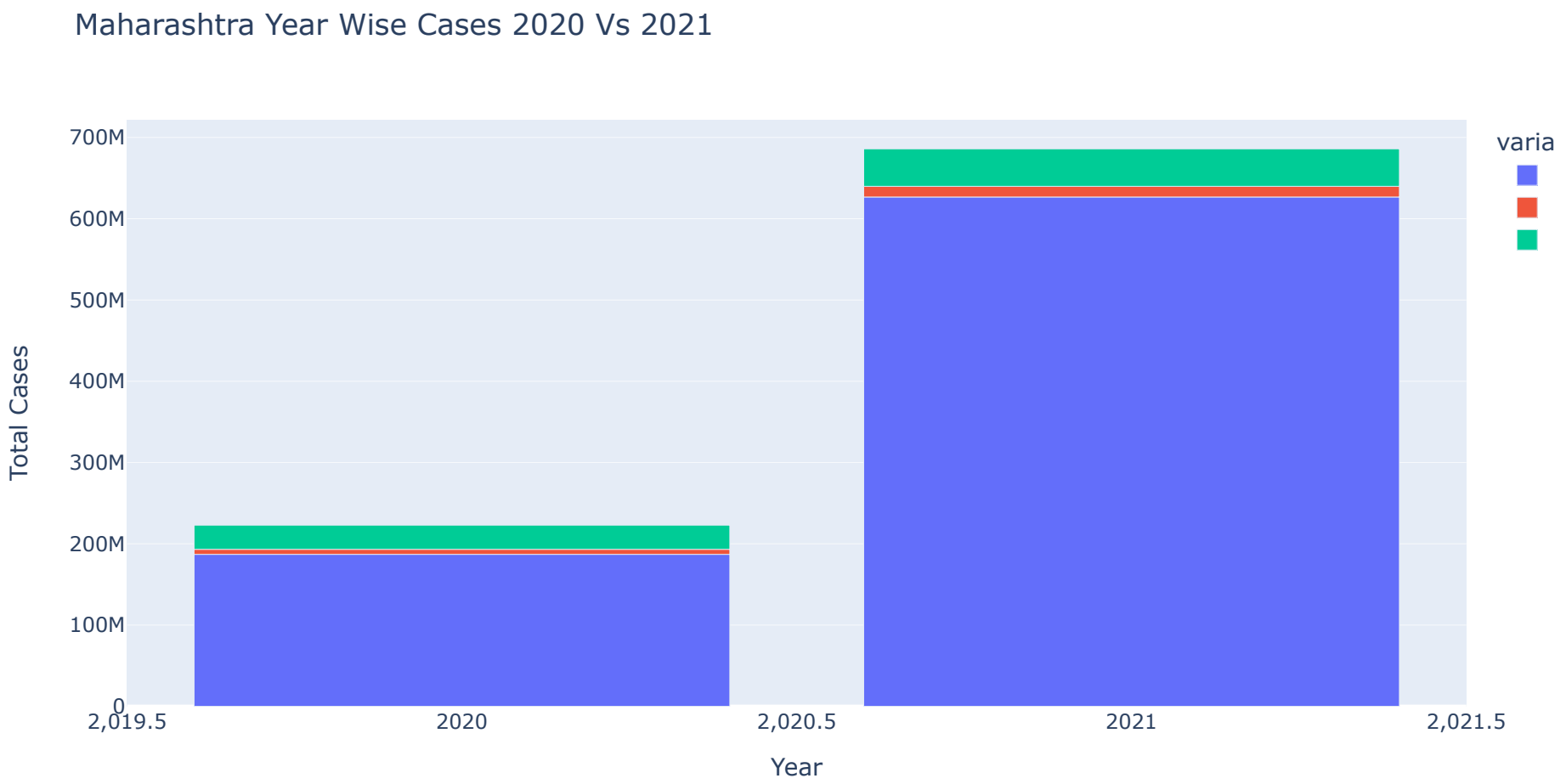
Out[105]:
```
array([2020, 2021], dtype=int64)
```

In [111]:
```
maha_yearly_data=maha.groupby('Year')[['Cured','Deaths','Confirmed','Active']].sum().reset_index()
maha_yearly_data
```

Out[111]:

	Year	Cured	Deaths	Confirmed	Active
0	2020	187034270	6184938	222900632	29681424
1	2021	626754637	13129594	685991838	46107607

In [112]:
```
px.bar(maha_yearly_data, x='Year', y=['Cured','Deaths','Active'],labels={'value':'Total Cases'},
      title="Maharashtra Year Wise Cases 2020 Vs 2021")
```

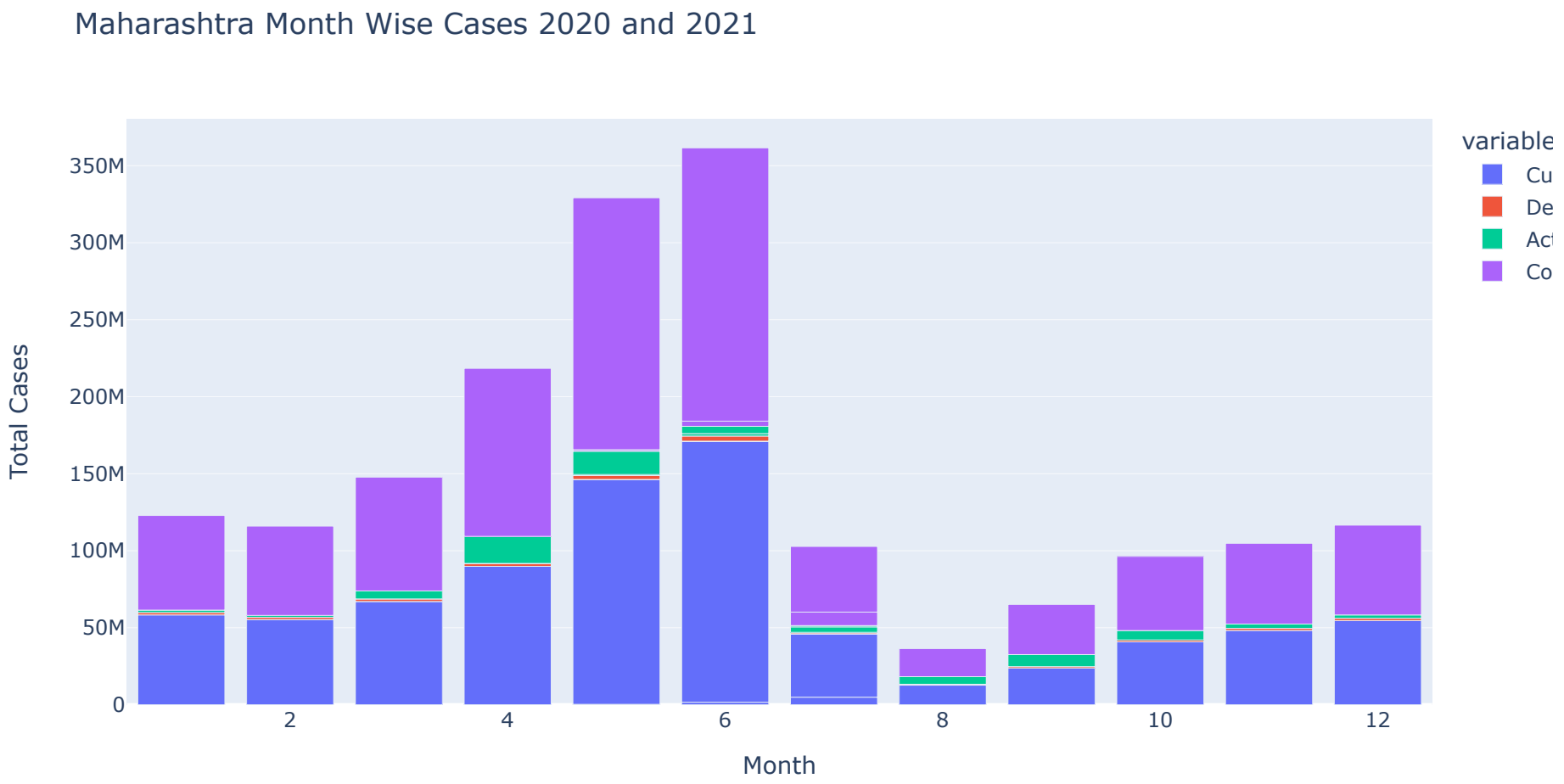


In [122]:
```
maha_monthly_data=maha.groupby(['Year','Month'])[['Cured','Deaths','Active','Confirmed']].sum().reset_index()
maha_monthly_data
```

Out[122]:

	Year	Month	Cured	Deaths	Active	Confirmed
0	2020	3	131	49	1567	1747
1	2020	4	13946	5354	87738	107038
2	2020	5	278831	35892	699395	1014118
3	2020	6	1645719	141287	1567368	3354374
4	2020	7	4906066	342978	3525455	8774499
5	2020	8	12695192	609995	4922664	18227851
6	2020	9	23832012	908307	7822361	32562680
7	2020	10	40815564	1269079	6066289	48150932
8	2020	11	48214136	1372935	2814126	52401197
9	2020	12	54632673	1499062	2174461	58306196
10	2021	1	58313365	1559536	1560294	61433195
11	2021	2	55303793	1442941	1246207	57992941
12	2021	3	67054059	1644545	5174645	73873249
13	2021	4	89845420	1795338	17453798	109094556
14	2021	5	145968060	2518750	15072468	163559278
15	2021	6	169356588	3309568	4755838	177421994
16	2021	7	40913352	858916	844357	42616625

In [153]:
```
px.bar(maha_monthly_data, x='Month', y=['Cured','Deaths','Active','Confirmed'],labels={'value':'Total Cases'},hover_data
      title="Maharashtra Month Wise Cases 2020 and 2021")
```



In [ ]:

In [ ]:

In [149]:
```
maha_daily_data=maha.groupby('Day')[['Cured','Deaths','Active','Confirmed']].sum()
maha_daily_data
```

Out[149]:

Day	Cured	Deaths	Active	Confirmed
1	28502795	671418	2517739	31691952
2	28705621	675239	2513821	31894681
3	28891775	678691	2525002	32095468
4	29099470	682181	2514001	32295652
5	29300242	686996	2519299	32506537
6	29483671	690680	2535271	32709622
7	29677537	694557	2561712	32933806
8	23967103	574368	2478722	27020193
9	24178446	577963	2468515	27224924
10	24377326	581289	2467463	27426078
11	24575007	585843	2442015	27602865
12	24762640	591370	2450733	27804743
13	24972625	596086	2445214	28013925
14	25128349	601768	2482311	28212428
15	25309260	605938	2488038	28403236
16	25510779	610594	2468902	28590275
17	25696275	616353	2472008	28784636
18	25881287	620316	2477835	28979438
19	26074231	624381	2484121	29182733
20	26273293	627784	2482733	29383810
21	26467406	631671	2490152	29589229
22	26685958	635536	2473251	29794745

Day	Cured	Deaths	Active	Confirmed
23	26887754	638880	2469316	29995950
24	27086246	643384	2470901	30200531
25	27281221	646918	2477519	30405658
26	27472257	651119	2489912	30613288
27	27657098	654846	2497452	30809396
28	27839463	658807	2520080	31018350
29	26005105	610463	2448175	29063743
30	26204715	614151	2437315	29256181
31	13833952	334942	1219503	15388397

In [ ]:

In [ ]: