The objective of analysis of this DataSet is to determine the impact of Covid-19 in different Countries and to provide a visuallization of the analysis.

Source of the Datasets from Kaggle: 1)Uncover DataSet used for the uncover challenge. 2)novel-corona-virus-2019-dataset from Kaggle 3)coronavirusdataset 4)patient

In [1]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

import plotly
import plotly.graph_objs as go
import plotly.offline as py
import plotly.express as px
py.init_notebook_mode(connected=True)
```

In [2]:

```
who_data=pd.read_csv('world-health-organization-who-situation-reports.csv')
new_york_times=pd.read_csv('covid-19-state-level-data.csv')
new_york_times
```

Out[2]:

	date	state	fips	cases	deaths
0	2020-01-21	Washington	53	1	0
1	2020-01-22	Washington	53	1	0
2	2020-01-23	Washington	53	1	0
3	2020-01-24	Illinois	17	1	0
4	2020-01-24	Washington	53	1	0
...	...	...	...	...	...
3089	2020-04-27	Virginia	51	13535	458
3090	2020-04-27	Washington	53	13864	771
3091	2020-04-27	West Virginia	54	1077	37
3092	2020-04-27	Wisconsin	55	6081	281
3093	2020-04-27	Wyoming	56	389	7

3094 rows × 5 columns

In [3]:

```
who_data.isnull().sum()
```

Out[3]:

```
date               0
location           0
new_cases        160
new_deaths      2327
total_cases        0
total_deaths    2280
dtype: int64
```

In [4]:

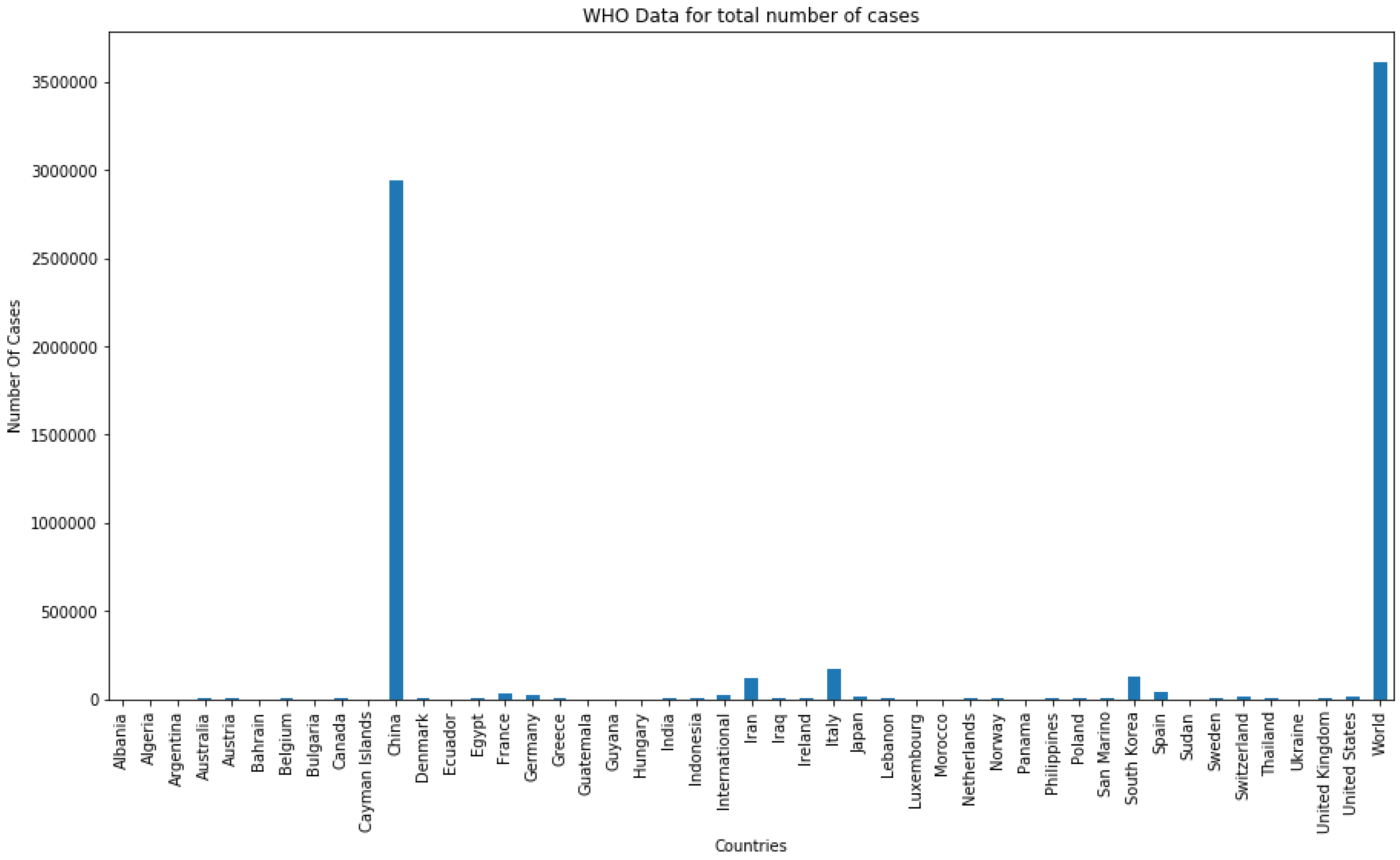
```
who_data.dropna(subset=['total_deaths','new_cases','new_deaths'],inplace=True)
```

In [5]:

```
death_count_who=who_data.groupby('location')['total_cases'].sum()
plot1=death_count_who.plot.bar(figsize=(15,8))
plot1.set_title('WHO Data for total number of cases')
plot1.set_xlabel('Countries')
plot1.set_ylabel('Number Of Cases')
```

Out[5]:

```
Text(0, 0.5, 'Number Of Cases')
```



In [11]:

```
usa=who_data[who_data['location']=='United States']
total_cases_usa=usa.groupby(['location',who_data['date'].dt.month])['total_cases'].sum()
total_cases_usa
```

Out[11]:

```
location       date
United States  3       12980
Name: total_cases, dtype: int64
```

In [7]:

```
who_data['date'].dtype
```

Out[7]:

```
dtype('O')
```

In [8]:

```
who_data['date']=pd.to_datetime(who_data['date'])
```

In [9]:

```
new_york_times['date'].dtype
```

Out[9]:

```
dtype('O')
```

In [10]:

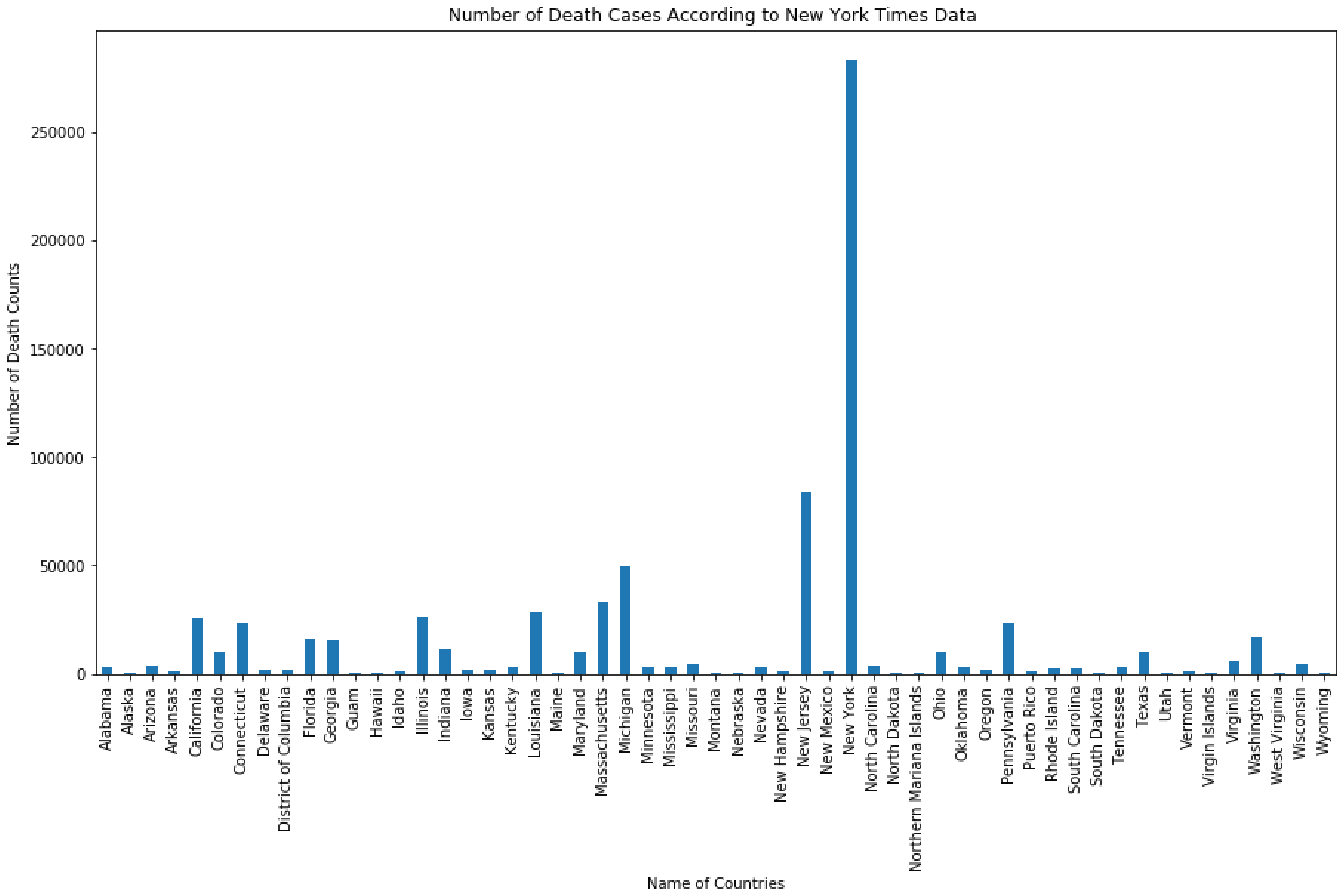
```
new_york_times['date']=pd.to_datetime(new_york_times['date'])
```

In [12]:

```
state_death_count=new_york_times.groupby('state')['deaths'].sum()
plot1=state_death_count.plot.bar(figsize=(15,8))
plot1.set_title('Number of Death Cases According to New York Times Data ')
plot1.set_ylabel('Number of Death Counts')
plot1.set_xlabel('Name of Countries')
```

Out[12]:

```
Text(0.5, 0, 'Name of Countries')
```

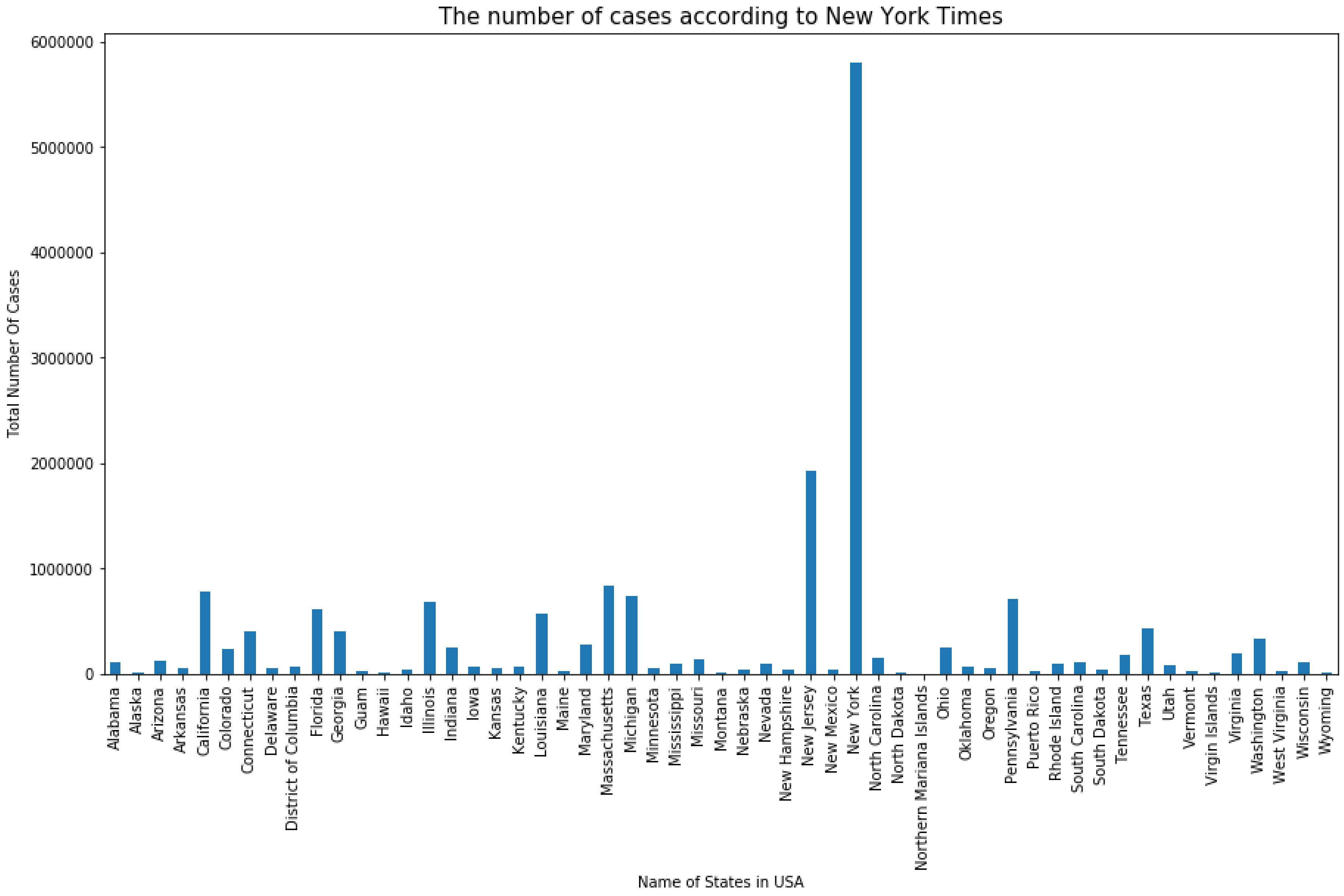


In [13]:

```
state_cases=new_york_times.groupby('state')['cases'].sum()
plot1=state_cases.plot.bar(figsize=(15,8))
plot1.set_title('The number of cases according to New York Times',size=15)
plot1.set_xlabel('Name of States in USA')
plot1.set_ylabel('Total Number Of Cases')
```

Out[13]:

```
Text(0, 0.5, 'Total Number Of Cases')
```



In [14]:

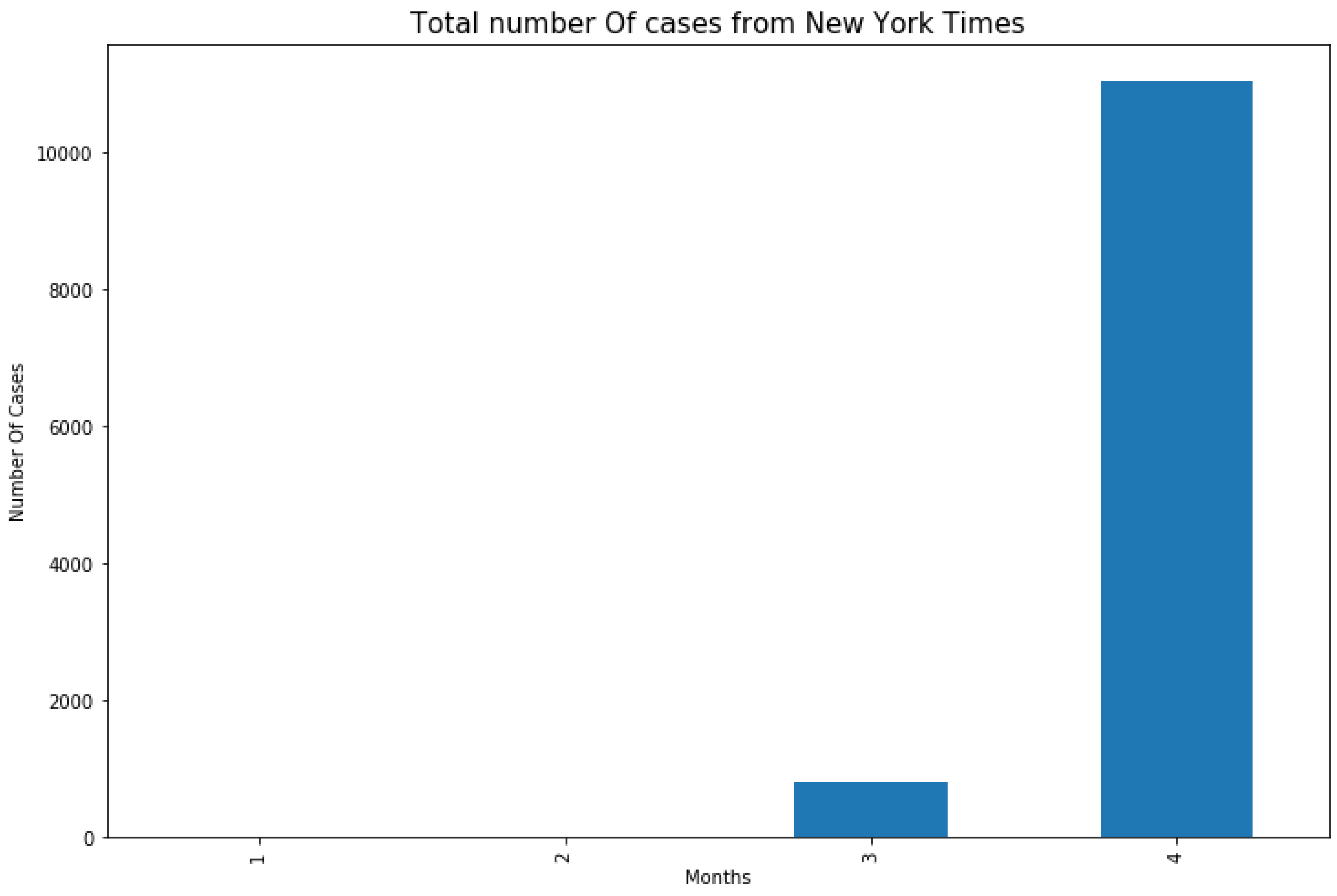
```
deaths=new_york_times.groupby(new_york_times['date'].dt.month)['cases'].sum()
deaths
```

Out[14]:

```
date
1          41
2         736
3     1093593
4    16381537
Name: cases, dtype: int64
```

In [15]:
```
cases_over_time=new_york_times.groupby(new_york_times['date'].dt.month)['cases'].mean()
plot1=cases_over_time.plot.bar(figsize=(12,8))
plot1.set_title('Total number Of cases from New York Times',size=15)
plot1.set_ylabel('Number Of Cases')
plot1.set_xlabel('Months')
```

Out[15]:
```
Text(0.5, 0, 'Months')
```



In [16]:
```
covid_19_data=pd.read_csv('covid_19_data.csv')
covid_19_data
```

Out[16]:

	SNo	ObservationDate	Province/State	Country/Region	Last Update	Confirmed	Deaths	Recovered
0	1	01/22/2020	Anhui	Mainland China	1/22/2020 17:00	1.0	0.0	0.0
1	2	01/22/2020	Beijing	Mainland China	1/22/2020 17:00	14.0	0.0	0.0
2	3	01/22/2020	Chongqing	Mainland China	1/22/2020 17:00	6.0	0.0	0.0
3	4	01/22/2020	Fujian	Mainland China	1/22/2020 17:00	1.0	0.0	0.0
4	5	01/22/2020	Gansu	Mainland China	1/22/2020 17:00	0.0	0.0	0.0
...	...	...	...	...	...	...	...	...
25577	25578	05/16/2020	Wyoming	US	2020-05-17 02:32:32	741.0	7.0	0.0
25578	25579	05/16/2020	Xinjiang	Mainland China	2020-05-17 02:32:32	76.0	3.0	73.0
25579	25580	05/16/2020	Yukon	Canada	2020-05-17 02:32:32	11.0	0.0	11.0
25580	25581	05/16/2020	Yunnan	Mainland China	2020-05-17 02:32:32	185.0	2.0	183.0
25581	25582	05/16/2020	Zhejiang	Mainland China	2020-05-17 02:32:32	1268.0	1.0	1267.0

25582 rows × 8 columns

Converted the data types to Integer from float so that it is easier and relatable to our analysis

In [17]:
```
covid_19_data['Recovered']=covid_19_data['Recovered'].astype('int64')
covid_19_data['Deaths']=covid_19_data['Deaths'].astype('int64')
covid_19_data['Confirmed']=covid_19_data['Confirmed'].astype('int64')
```

In [18]:
```
covid_19_data
```

Out[18]:

	SNo	ObservationDate	Province/State	Country/Region	Last Update	Confirmed	Deaths	Recovered
0	1	01/22/2020	Anhui	Mainland China	1/22/2020 17:00	1	0	0
1	2	01/22/2020	Beijing	Mainland China	1/22/2020 17:00	14	0	0
2	3	01/22/2020	Chongqing	Mainland China	1/22/2020 17:00	6	0	0
3	4	01/22/2020	Fujian	Mainland China	1/22/2020 17:00	1	0	0
4	5	01/22/2020	Gansu	Mainland China	1/22/2020 17:00	0	0	0
...	...	...	...	...	...	...	...	...
25577	25578	05/16/2020	Wyoming	US	2020-05-17 02:32:32	741	7	0
25578	25579	05/16/2020	Xinjiang	Mainland China	2020-05-17 02:32:32	76	3	73
25579	25580	05/16/2020	Yukon	Canada	2020-05-17 02:32:32	11	0	11
25580	25581	05/16/2020	Yunnan	Mainland China	2020-05-17 02:32:32	185	2	183
25581	25582	05/16/2020	Zhejiang	Mainland China	2020-05-17 02:32:32	1268	1	1267

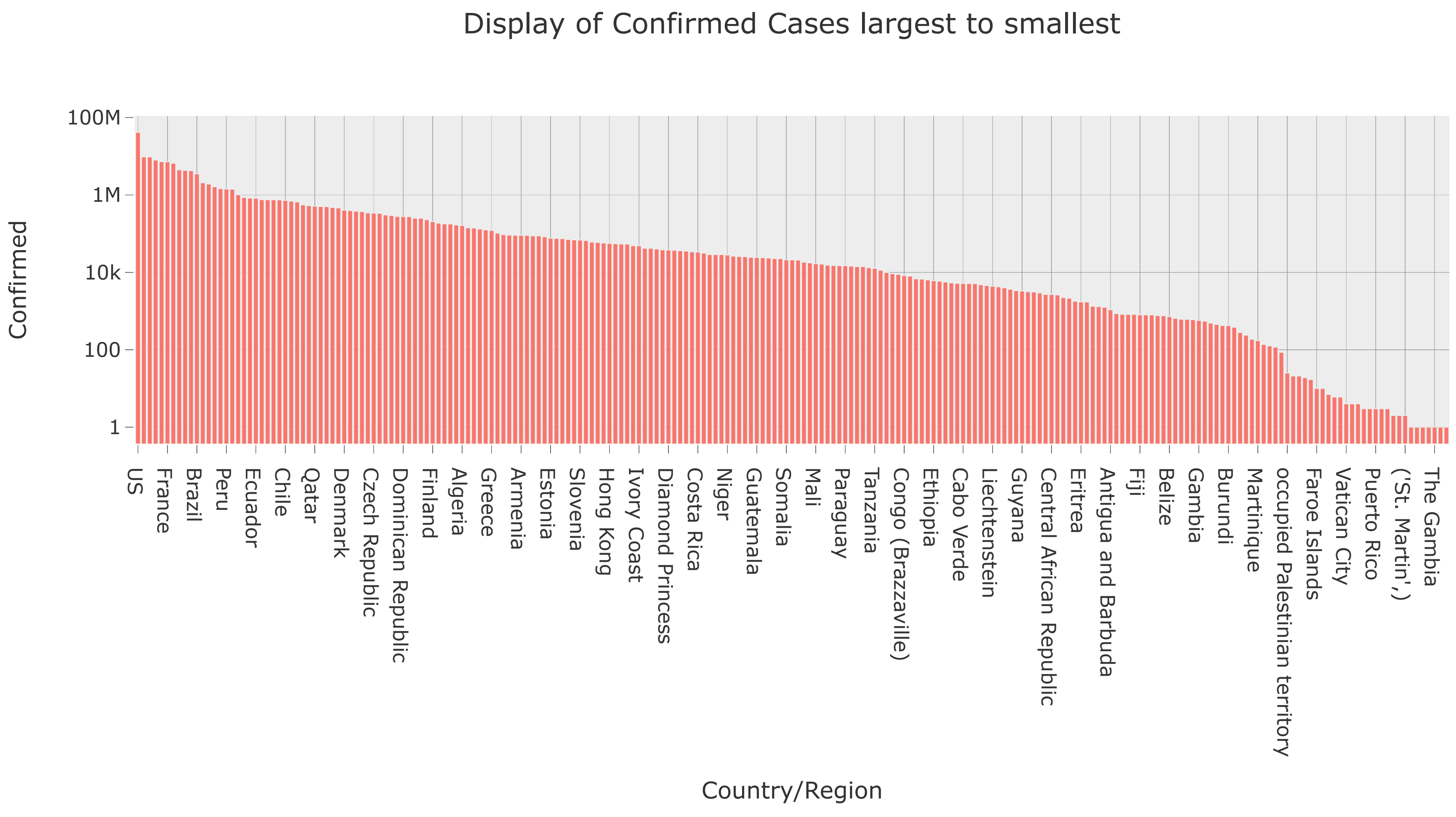
25582 rows × 8 columns

In [19]:
```
number_of_confirmed_cases=covid_19_data.groupby('Country/Region')['Confirmed'].sum()
number_of_confirmed_cases.sort_values(ascending=False)
```

Out[19]:
```
Country/Region
US                        41229508
Spain                      9670184
Italy                      9611750
Mainland China             7972075
Germany                    7256240
                            ...   
Republic of the Congo            1
North Ireland                    1
East Timor                       1
Channel Islands                  1
 Azerbaijan                      1
Name: Confirmed, Length: 223, dtype: int64
```

In [20]:
```
number_of_confirmed_cases_df=number_of_confirmed_cases.to_frame().reset_index()
number_of_confirmed_cases_df.columns=['Country/Region','Confirmed']
```

In [21]:
```
cases=number_of_confirmed_cases_df.sort_values(by='Confirmed',ascending=False)
fig=px.bar(cases,x='Country/Region',y='Confirmed',
            log_y=True, template='ggplot2', title='Display of Confirmed Cases largest to smallest')
fig.show()
```



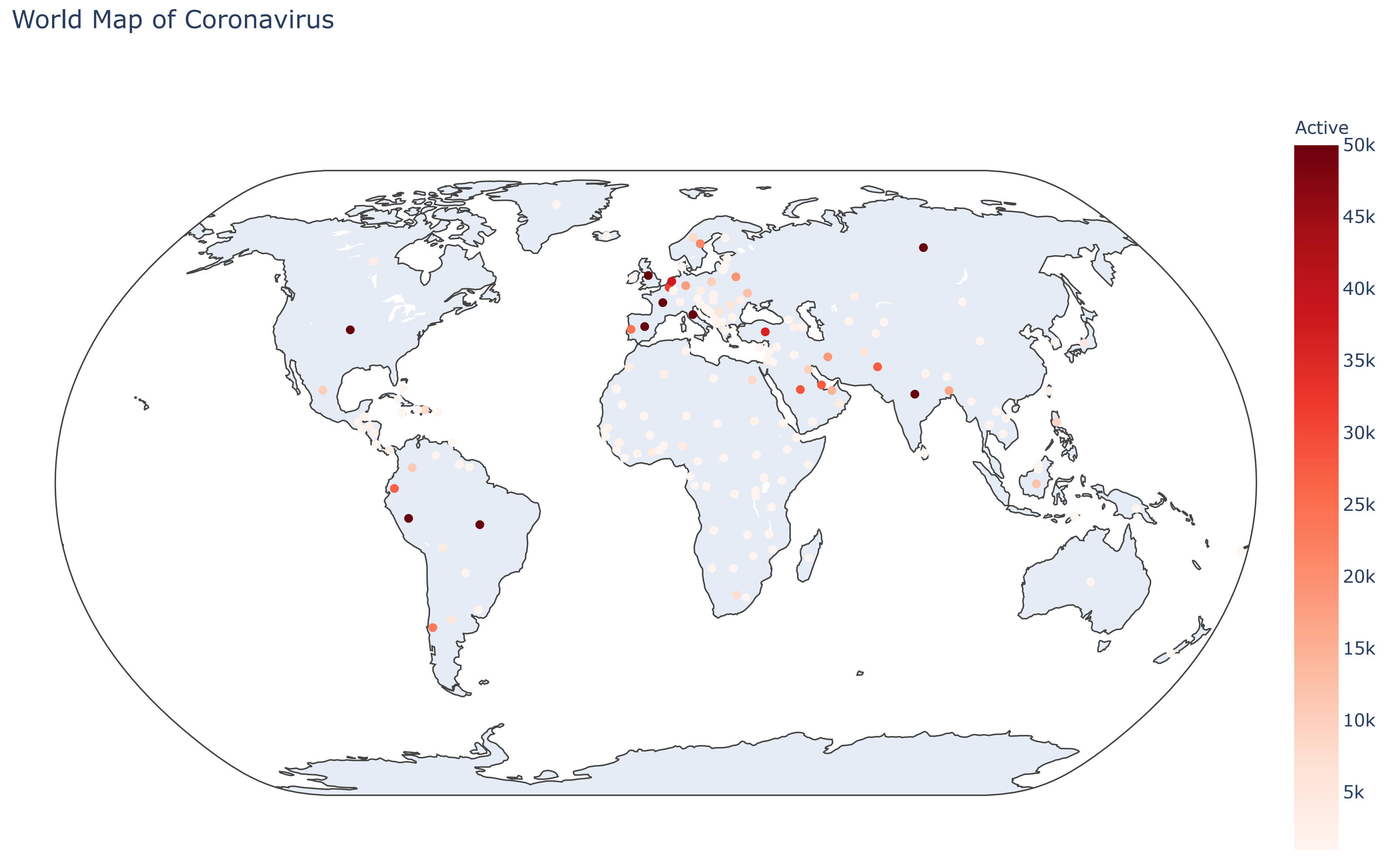
In [24]:
```
top_5_countries=cases.head()
top_5_countries
```

Out[24]:

	Country/Region	Confirmed
208	US	41229508
188	Spain	9670184
101	Italy	9611750
124	Mainland China	7972075
76	Germany	7256240

Number Of Active Cases

In [22]:
```
covid_19_data_cases=covid_19_data.groupby('Country/Region')[['Confirmed','Deaths','Recovered']].max()
covid_19_data_cases=covid_19_data_cases.reset_index()
covid_19_data_cases['Active']=covid_19_data_cases['Confirmed']-covid_19_data_cases['Deaths']-covid_19_data_cases['Recovered']
covid_19_data_cases['Country']=covid_19_data_cases['Country/Region']
covid_19_data_cases
fig = px.scatter_geo(covid_19_data_cases, locations="Country", locationmode='country names',
                     color="Active", hover_name="Country/Region",hover_data = [covid_19_data_cases.Recovered,covid_19_data_cases.Deaths,covid_19_data_cases.Active],projection
                     width=1000, height=700,
                     color_continuous_scale='Reds',
                     range_color=[1000,50000],

                     title='World Map of Coronavirus')
fig.update(layout_coloraxis_showscale=True)
py.offline.iplot(fig)
```



In [23]:
```
covid_19_data['ObservationDate']=pd.to_datetime(covid_19_data['ObservationDate'])
```

In [24]:

```
covid_19_data['ObservationDate'].dtype
```

Out[24]:

```
dtype('<M8[ns]')
```

In [25]:

```
number_of_death_cases_time=covid_19_data.groupby(covid_19_data['ObservationDate'].dt.month)['Deaths'].sum()
number_of_recovered_cases_time=covid_19_data.groupby(covid_19_data['ObservationDate'].dt.month)['Recovered'].sum()
number_of_confirmed_cases=covid_19_data.groupby(covid_19_data['ObservationDate'].dt.month)['Confirmed'].sum()
```

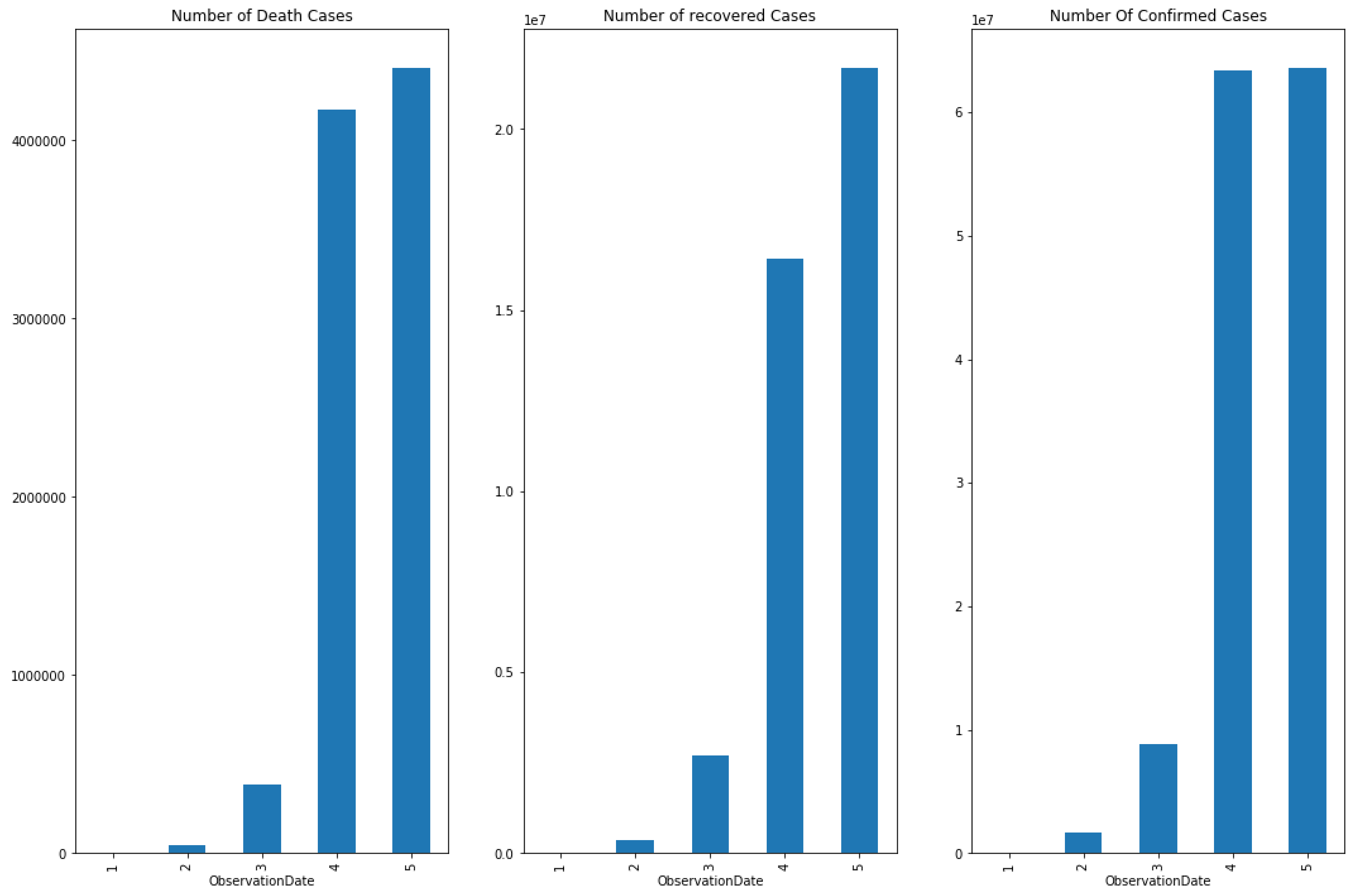
In [ ]:

In [26]:

```
fig,axes=plt.subplots(1,3,figsize=(18,12))
plot1=number_of_death_cases_time.plot.bar(ax=axes[0])
plot1.set_title('Number of Death Cases')
plot2=number_of_recovered_cases_time.plot.bar(ax=axes[1])
plot2.set_title('Number of recovered Cases')
plot3=number_of_confirmed_cases.plot.bar(ax=axes[2])
plot3.set_title('Number Of Confirmed Cases')
```

Out[26]:

```
Text(0.5, 1.0, 'Number Of Confirmed Cases')
```



In [ ]:

In [27]:

```
number_of_confirmed_cases
```

Out[27]:

```
ObservationDate
1       38535
2     1671959
3     8894726
4    63402512
5    63593481
Name: Confirmed, dtype: int64
```

In [28]:

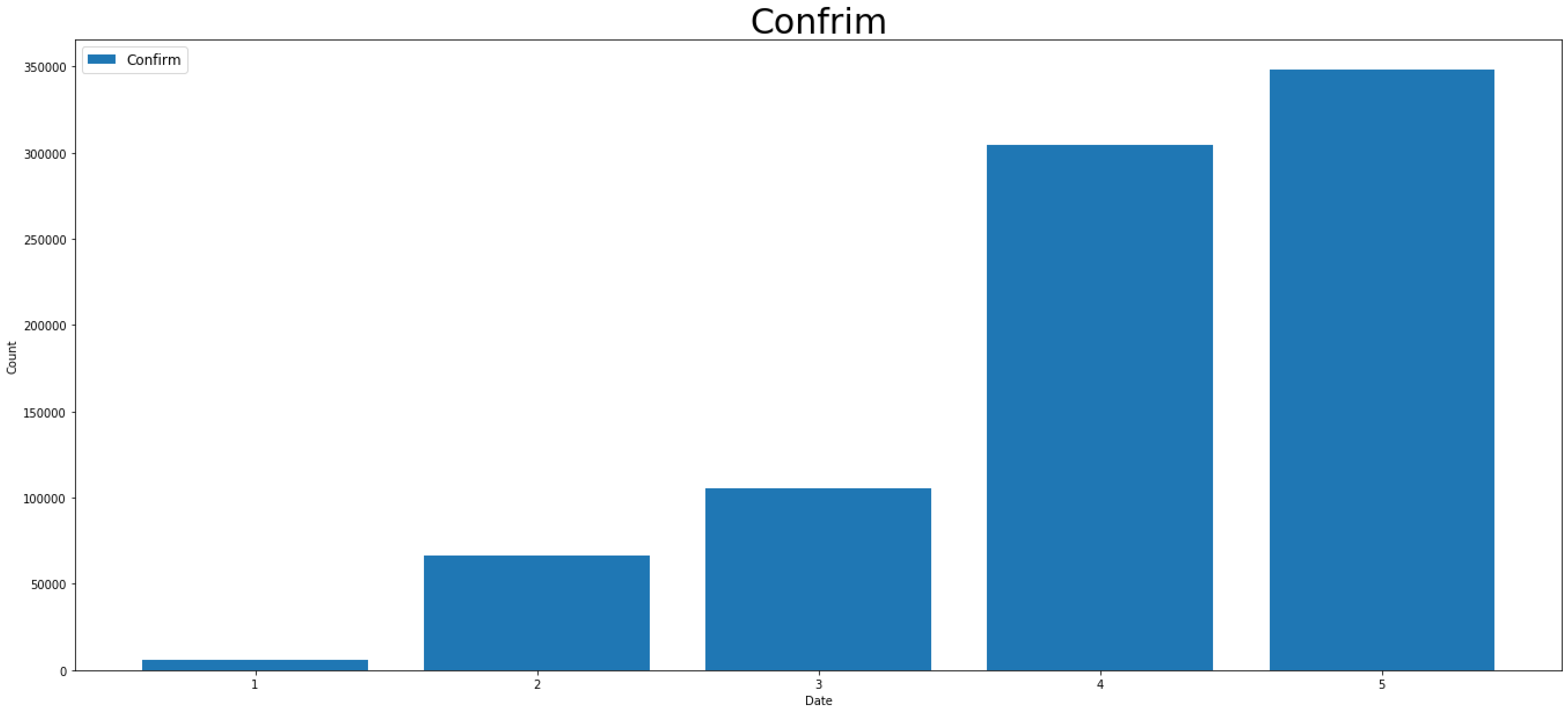
```
covid_19_data['Recovered'].dtype
```

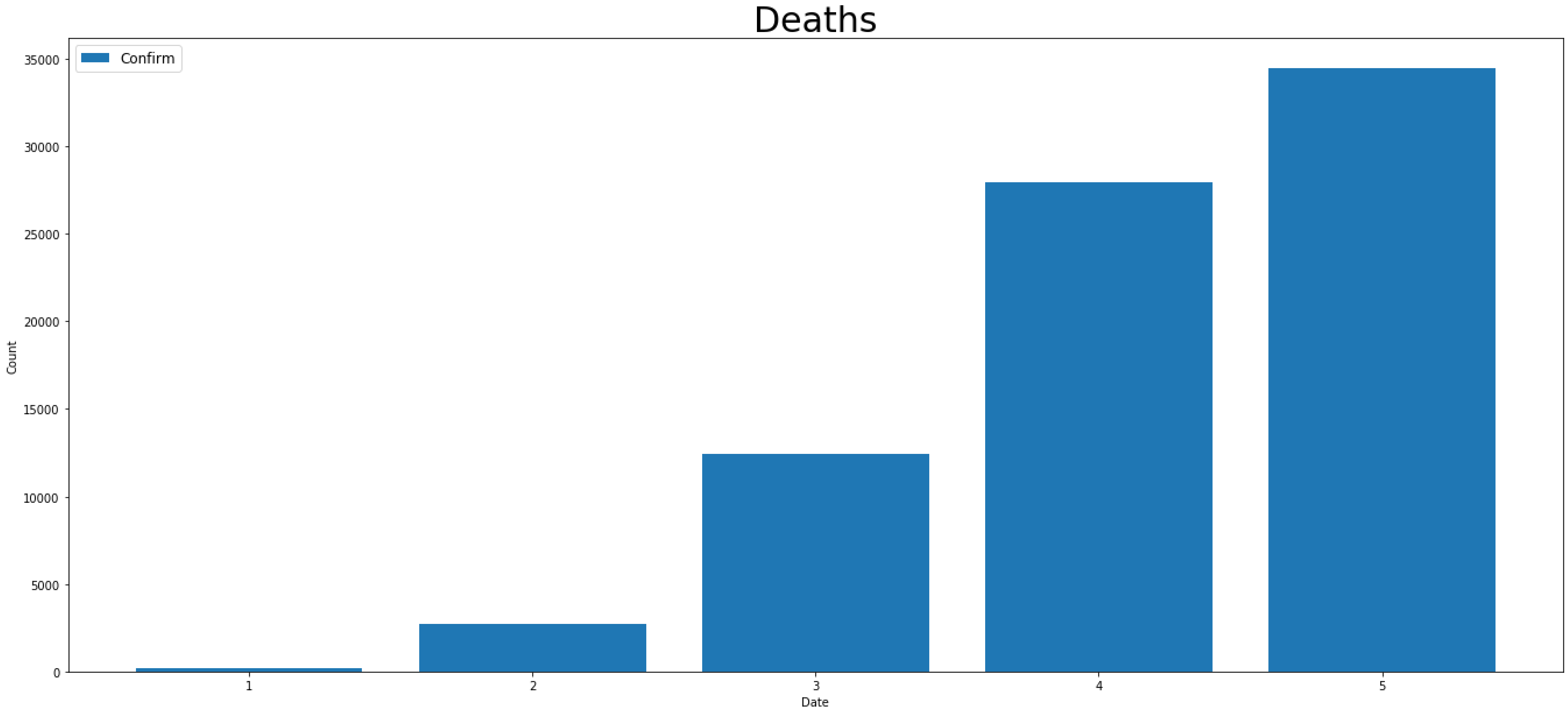
Out[28]:

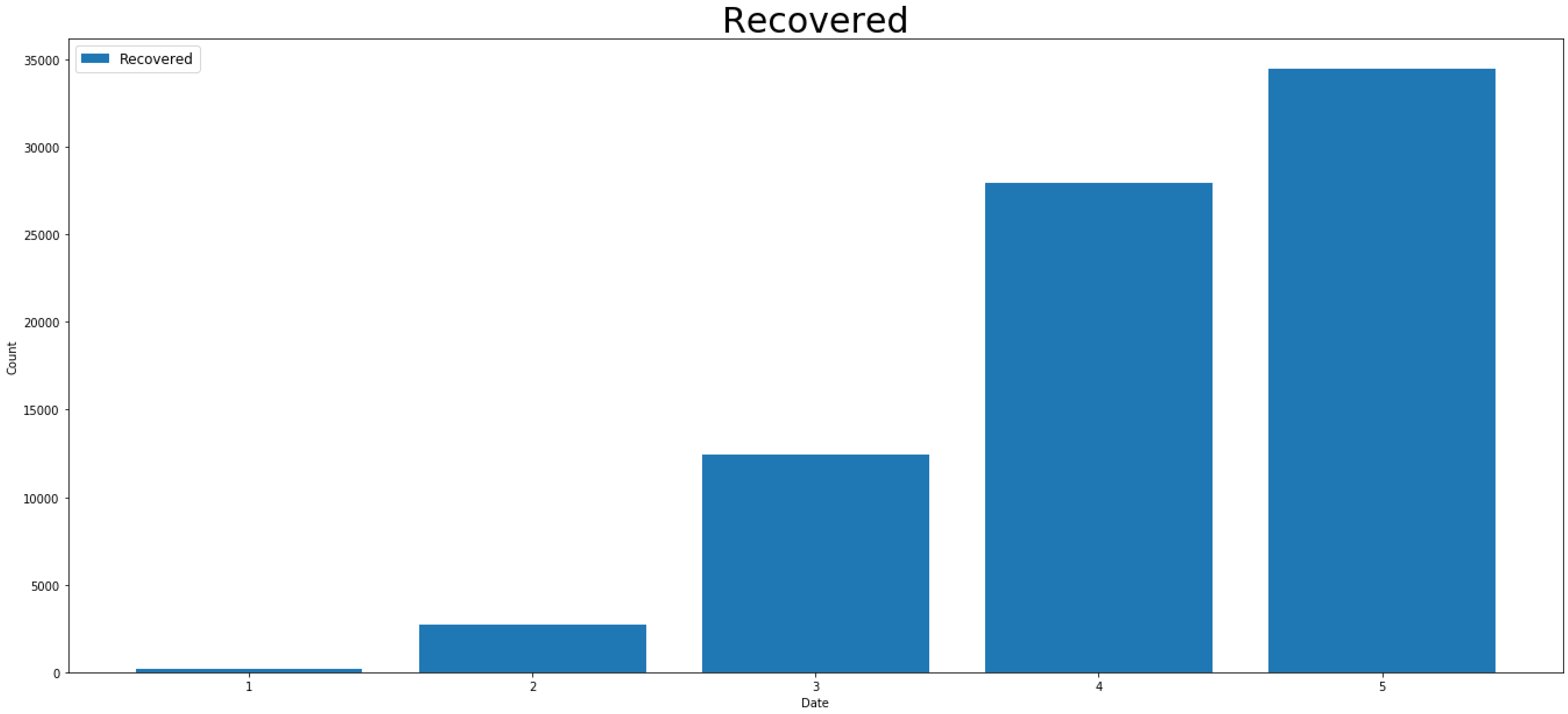
```
dtype('int64')
```

In [29]:

```
plt.figure(figsize=(23,10))
plt.bar(covid_19_data['ObservationDate'].dt.month,covid_19_data.Confirmed,label="Confirm")
plt.xlabel('Date')
plt.ylabel("Count")
plt.legend(frameon=True, fontsize=12)
plt.title('Confrim',fontsize=30)
plt.show()


plt.figure(figsize=(23,10))
plt.bar(covid_19_data['ObservationDate'].dt.month,covid_19_data.Deaths,label="Confirm")
plt.xlabel('Date')
plt.ylabel("Count")
plt.legend(frameon=True, fontsize=12)
plt.title('Deaths',fontsize=30)
plt.show()

plt.figure(figsize=(23,10))
plt.bar(covid_19_data['ObservationDate'].dt.month,covid_19_data.Deaths,label="Recovered")
plt.xlabel('Date')
plt.ylabel("Count")
plt.legend(frameon=True, fontsize=12)
plt.title('Recovered',fontsize=30)
plt.show()
```

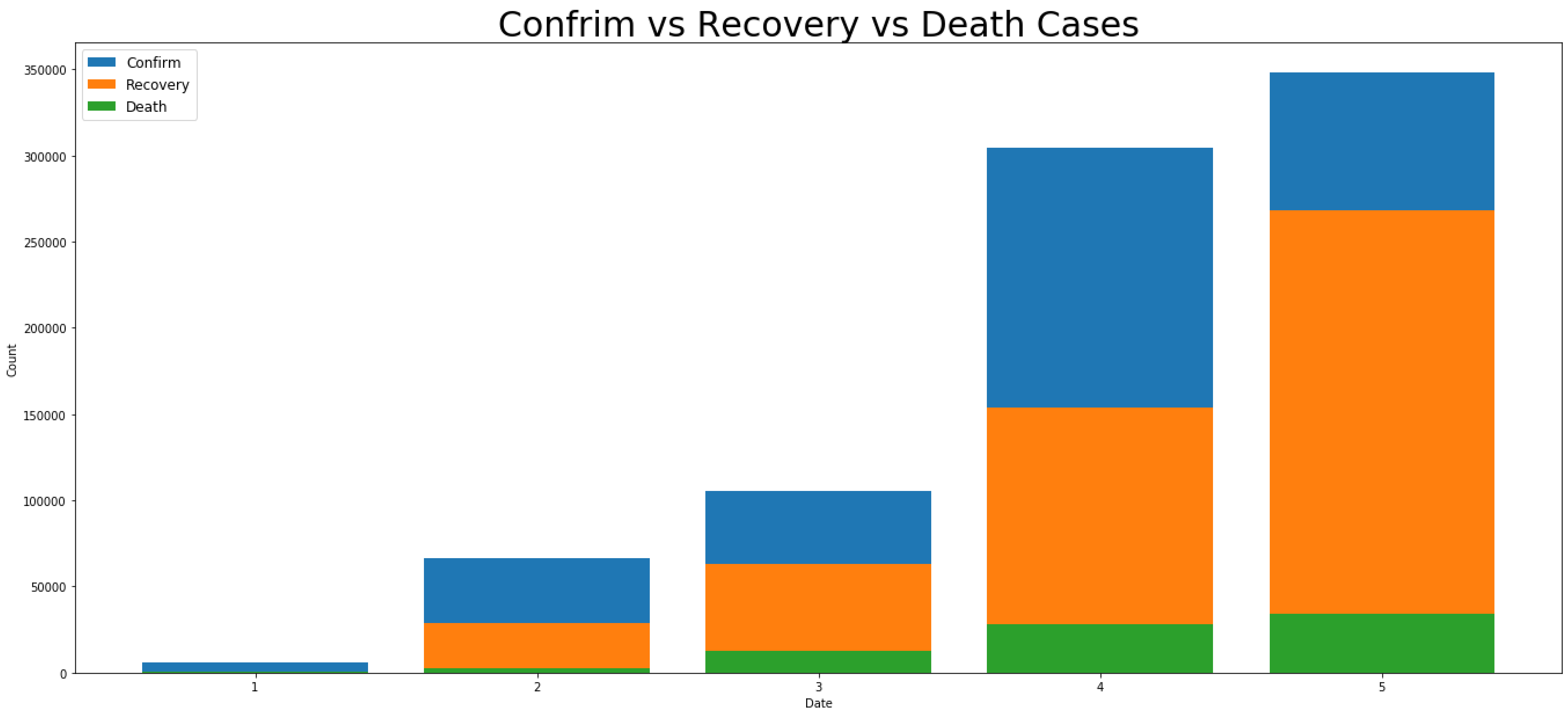



Deaths
Confirm
Count
Date
0
5000
10000
15000
20000
25000
30000
35000
1
2
3
4
5


Recovered
Recovered
Count
Date
0
5000
10000
15000
20000
25000
30000
35000
1
2
3
4
5

In [73]:

```
plt.figure(figsize=(23,10))
covid_19_data['ObservationDate']=pd.to_datetime(covid_19_data['ObservationDate'])
plt.bar(covid_19_data['ObservationDate'].dt.month, covid_19_data.Confirmed,label="Confirm")
plt.bar(covid_19_data['ObservationDate'].dt.month, covid_19_data.Recovered,label="Recovery")
plt.bar(covid_19_data['ObservationDate'].dt.month, covid_19_data.Deaths,label="Death")
plt.xlabel('Date')
plt.ylabel("Count")
plt.legend(frameon=True, fontsize=12)
plt.title('Confrim vs Recovery vs Death Cases',fontsize=30)
plt.show()
```



In [ ]:

In [31]:

```
patients=pd.read_csv('PatientInfo.csv')
patients2=pd.read_csv('patient.csv')
patients.isnull().sum()
```

Out[31]:

```
patient_id               0
global_num            1131
sex                    158
birth_year             544
age                    166
country                  0
province                 0
city                    79
disease               3501
infection_case         770
infection_order       3488
infected_by           2683
contact_number        2871
symptom_onset_date    3024
confirmed_date           3
released_date         2162
deceased_date         3457
state                    0
dtype: int64
```

In [32]:

```
patients.dropna(subset=['sex'],inplace=True)
```

In [33]:

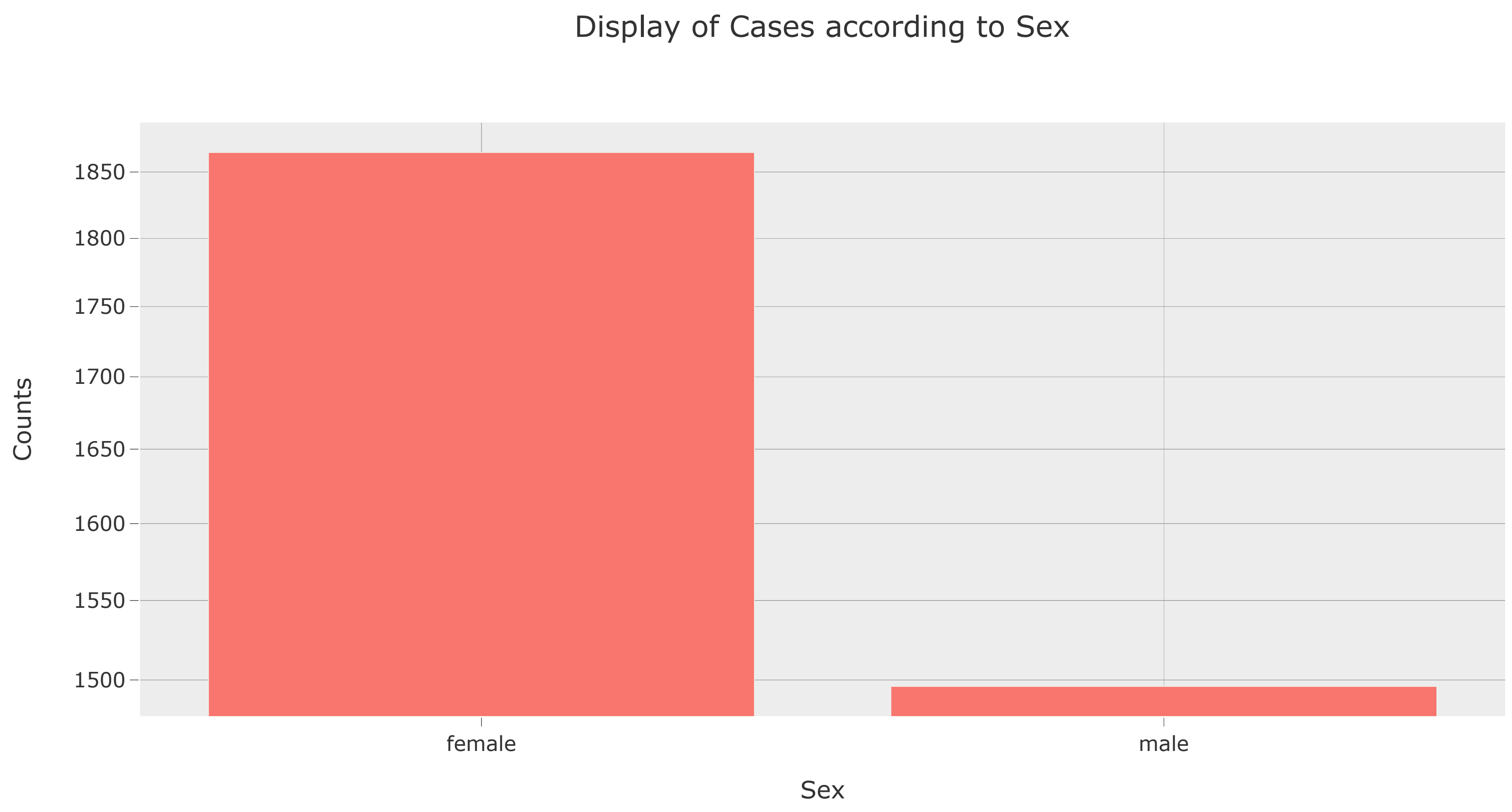
```
patients.isnull().sum()
```

Out[33]:

```
patient_id               0
global_num            1121
sex                      0
birth_year             387
age                     10
country                  0
province                 0
city                    76
disease               3343
infection_case         765
infection_order       3330
infected_by           2532
contact_number        2718
symptom_onset_date    2879
confirmed_date           3
released_date         2004
deceased_date         3299
state                    0
dtype: int64
```

In [34]:

```
sex_infected=patients['sex'].value_counts()
sex_infected_df=sex_infected.to_frame().reset_index()
sex_infected_df.columns=['Sex','Counts']
sex_infected_df
fig=px.bar(sex_infected_df,x='Sex',y='Counts',
             log_y=True, template='ggplot2', title='Display of Cases according to Sex')
fig.show()
```

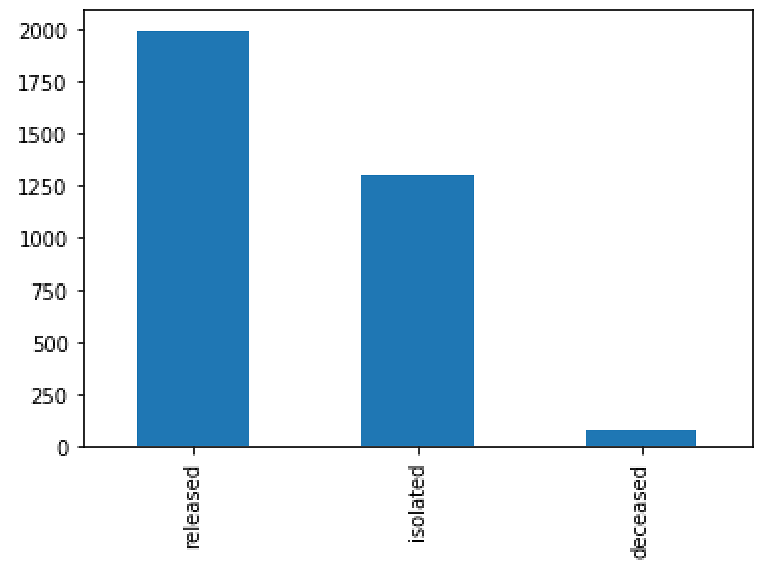


In [35]:

```
patients_state=patients[(patients['state']=='released')|(patients['state']=='deceased')|(patients['state']=='isolated')]
patients_state['state'].value_counts().plot.bar()
```

Out[35]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x2d93d758e08>
```



In [36]:

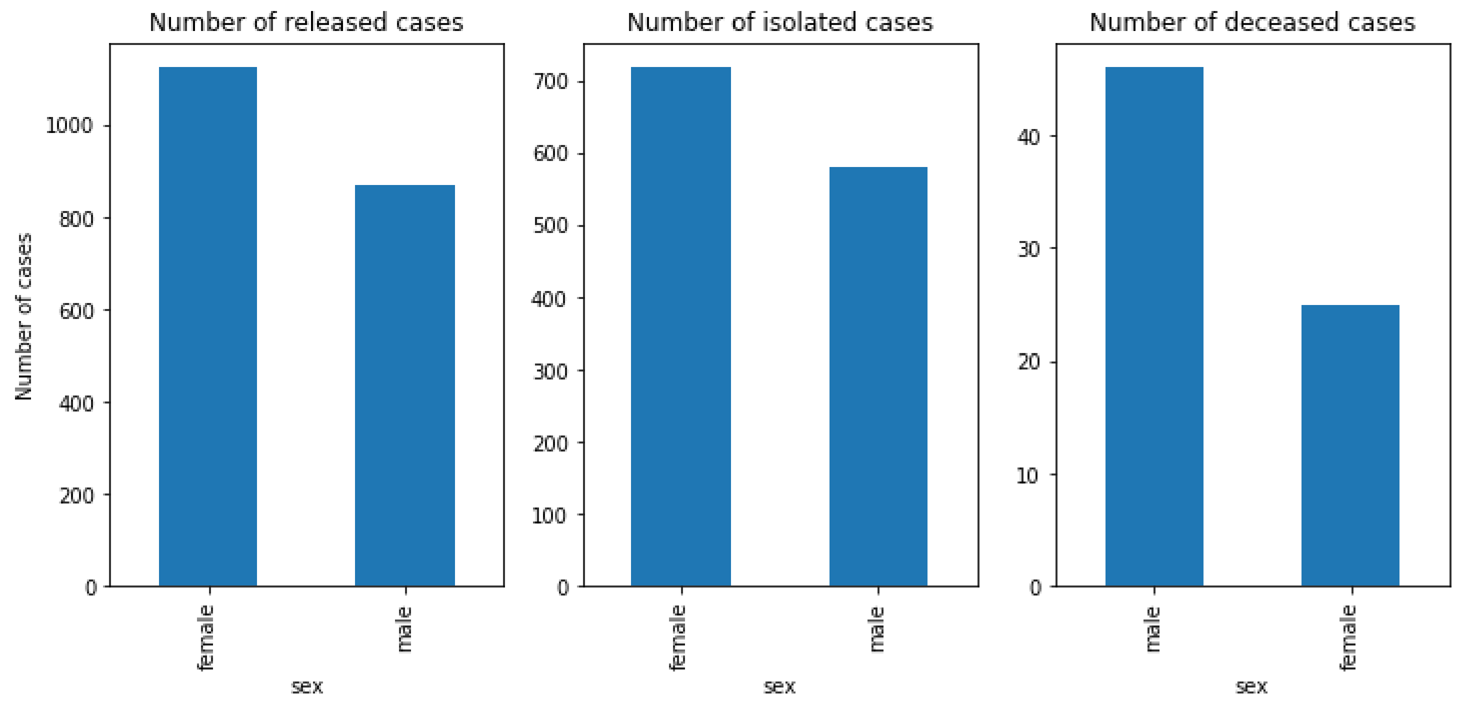
```
released_patients=patients[(patients['state']=='released')]
deceased_patients=patients[(patients['state']=='deceased')]
isolated_patients=patients[(patients['state']=='isolated')]
```

In [37]:

```
fig,axes=plt.subplots(1,3,figsize=(12,5))
plot1=released_patients['sex'].value_counts().plot.bar(ax=axes[0])
plot2=isolated_patients['sex'].value_counts().plot.bar(ax=axes[1])
plot3=deceased_patients['sex'].value_counts().plot.bar(ax=axes[2])

plot1.set_title('Number of released cases')
plot1.set_xlabel('sex')
plot1.set_ylabel('Number of cases')

plot2.set_title('Number of isolated cases')
plot2.set_xlabel('sex')

plot3.set_title('Number of deceased cases')
plot3.set_xlabel('sex')
```

Out[37]:

```
Text(0.5, 0, 'sex')
```



In [38]:

```
#Finding the patients reason for spread of virus from patient.csv

patients2.dropna(subset=['infection_reason'],inplace=True)
patients2.isnull().sum()
```

Out[38]:

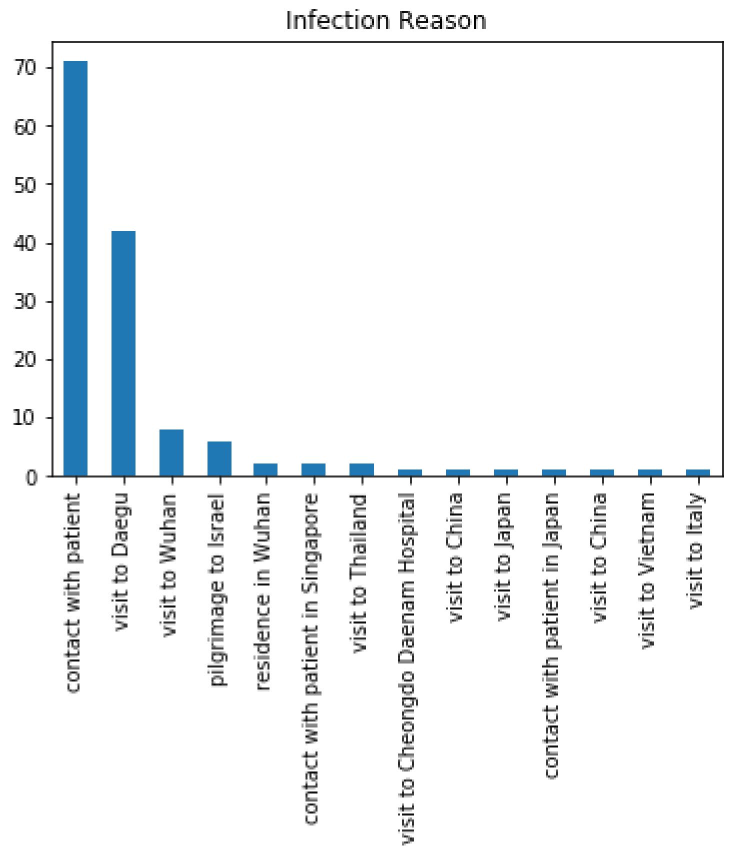
```
id                    0
sex                   1
birth_year            6
country               0
region                0
group                99
infection_reason      0
infection_order     105
infected_by          72
contact_number      100
confirmed_date        0
released_date       111
deceased_date       139
state                 0
dtype: int64
```

In [39]:

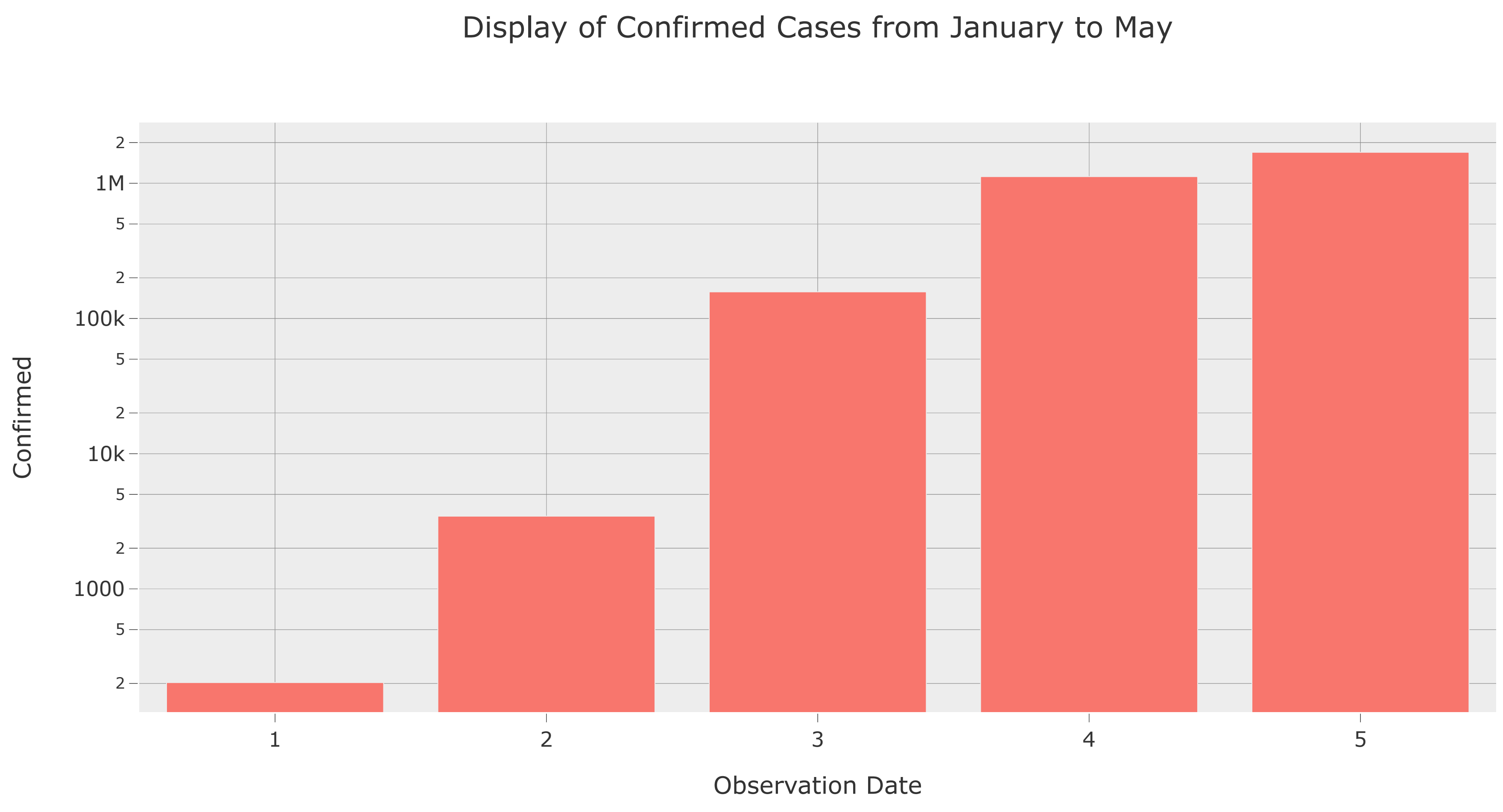
```
plt1=patients2['infection_reason'].value_counts().plot.bar();
plt1.set_title('Infection Reason')
```

Out[39]:

```
Text(0.5, 1.0, 'Infection Reason')
```



In [40]:
```
confirmed_cases=covid_19_data.pivot_table('Confirmed',columns=covid_19_data['ObservationDate'].dt.month,index='Country/Region')
result=confirmed_cases.sum()
plresult=result.sort_values(ascending=False)

df=plresult.to_frame().reset_index()
df.columns=['Observation Date','Confirmed']


fig=px.bar(df,x='Observation Date',y='Confirmed',
             log_y=True, template='ggplot2', title='Display of Confirmed Cases from January to May')
fig.show()
```



Analysis Of Data with USA and the World for Confirmed Cases

In [41]:
```
usa_state_level=pd.read_csv('covid-statistics-by-us-states-daily-updates.csv')
usa_state_level
```

Out[41]:

	date	state	positive	negative	pending	hospitalizedcurrently	hospitalizedcumulative	inicucurrently	inicucumulative	onventilatorcurrently	...	hospitalized	total	totaltestresults	posneg	fips	deathincrease	h
0	2020-04-28	AK	351.0	16738.0	NaN	16.0	NaN	NaN	NaN	NaN	...	NaN	17089.0	17089.0	17089.0	2	0.0	
1	2020-04-28	AL	6687.0	69140.0	NaN	NaN	911.0	NaN	335.0	NaN	...	911.0	75827.0	75827.0	75827.0	1	20.0	
2	2020-04-28	AR	3111.0	37560.0	NaN	104.0	NaN	NaN	NaN	20.0	...	NaN	40671.0	40671.0	40671.0	5	2.0	
3	2020-04-28	AS	0.0	3.0	17.0	NaN	NaN	NaN	NaN	NaN	...	NaN	20.0	3.0	3.0	60	0.0	
4	2020-04-28	AZ	6948.0	60490.0	NaN	737.0	1095.0	303.0	NaN	193.0	...	1095.0	67438.0	67438.0	67438.0	4	18.0	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
3036	2020-01-26	WA	1.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	1.0	1.0	1.0	53	0.0	
3037	2020-01-25	WA	1.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	1.0	1.0	1.0	53	0.0	
3038	2020-01-24	WA	1.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	1.0	1.0	1.0	53	0.0	
3039	2020-01-23	WA	1.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	1.0	1.0	1.0	53	0.0	
3040	2020-01-22	WA	1.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	1.0	1.0	1.0	53	NaN	

3041 rows × 25 columns

In [42]:
```
usa_state_level.isnull().sum()
```

Out[42]:
```
date                          0
state                         0
positive                     15
negative                    181
pending                    2395
hospitalizedcurrently      2042
hospitalizedcumulative     1960
inicucurrently             2549
inicucumulative            2849
onventilatorcurrently      2652
onventilatorcumulative     2984
recovered                  2197
hash                          0
datechecked                   0
death                       727
hospitalized               1960
total                         2
totaltestresults              2
posneg                        2
fips                          0
deathincrease                56
hospitalizedincrease         56
negativeincrease             56
positiveincrease             56
totaltestresultsincrease     56
dtype: int64
```

In [43]:
```
usa_state_level.dropna(subset=['death','total','totaltestresults','recovered'],inplace=True)
```

In [44]:
```
usa_state_level.isnull().sum()
```

Out[44]:
```
date                        0
state                       0
positive                    0
negative                    0
pending                   735
hospitalizedcurrently     272
hospitalizedcumulative    311
inicucurrently            556
inicucumulative           751
onventilatorcurrently     629
onventilatorcumulative    803
recovered                   0
hash                        0
datechecked                 0
death                       0
hospitalized              311
total                       0
totaltestresults            0
posneg                      0
fips                        0
deathincrease               0
hospitalizedincrease        0
negativeincrease            0
positiveincrease            0
totaltestresultsincrease    0
dtype: int64
```

In [45]:
```
for i in['positive','negative','death','recovered','totaltestresults','total']:
    usa_state_level[i]=usa_state_level[i].astype(int)

usa_state_level
```

Out[45]:

	date	state	positive	negative	pending	hospitalizedcurrently	hospitalizedcumulative	inicucurrently	inicucumulative	onventilatorcurrently	...	hospitalized	total	totaltestresults	posneg	fips	deathincrease	ho
0	2020-04-28	AK	351	16738	NaN	16.0	NaN	NaN	NaN	NaN	...	NaN	17089	17089	17089.0	2	0.0	
2	2020-04-28	AR	3111	37560	NaN	104.0	NaN	NaN	NaN	20.0	...	NaN	40671	40671	40671.0	5	2.0	
4	2020-04-28	AZ	6948	60490	NaN	737.0	1095.0	303.0	NaN	193.0	...	1095.0	67438	67438	67438.0	4	18.0	
6	2020-04-28	CO	13879	52462	NaN	994.0	2485.0	NaN	NaN	NaN	...	2485.0	66341	66341	66341.0	8	26.0	
8	2020-04-28	DC	3994	14891	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	18885	18885	18885.0	11	5.0	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
1857	2020-03-26	DE	130	36	NaN	13.0	NaN	NaN	NaN	NaN	...	NaN	166	166	166.0	10	1.0	
1862	2020-03-26	IA	179	2578	NaN	31.0	46.0	NaN	NaN	NaN	...	46.0	2757	2757	2757.0	19	0.0	
1893	2020-03-26	SD	46	1973	125.0	NaN	NaN	NaN	NaN	NaN	...	NaN	2144	2019	2019.0	46	0.0	
1906	2020-03-25	AR	280	1437	NaN	22.0	NaN	NaN	NaN	4.0	...	NaN	1717	1717	1717.0	5	2.0	
1929	2020-03-25	MN	287	11188	NaN	26.0	35.0	NaN	NaN	NaN	...	35.0	11475	11475	11475.0	27	0.0	

834 rows × 25 columns

In [46]:
```
usa_state_level['date'].dtype
```

Out[46]:
```
dtype('O')
```

In [47]:
```
usa_state_level['date']=pd.to_datetime(usa_state_level['date'])
```

In [48]:
```
usa_state_level['date'].dtype
```

Out[48]:
```
dtype('<M8[ns]')
```

In [49]:

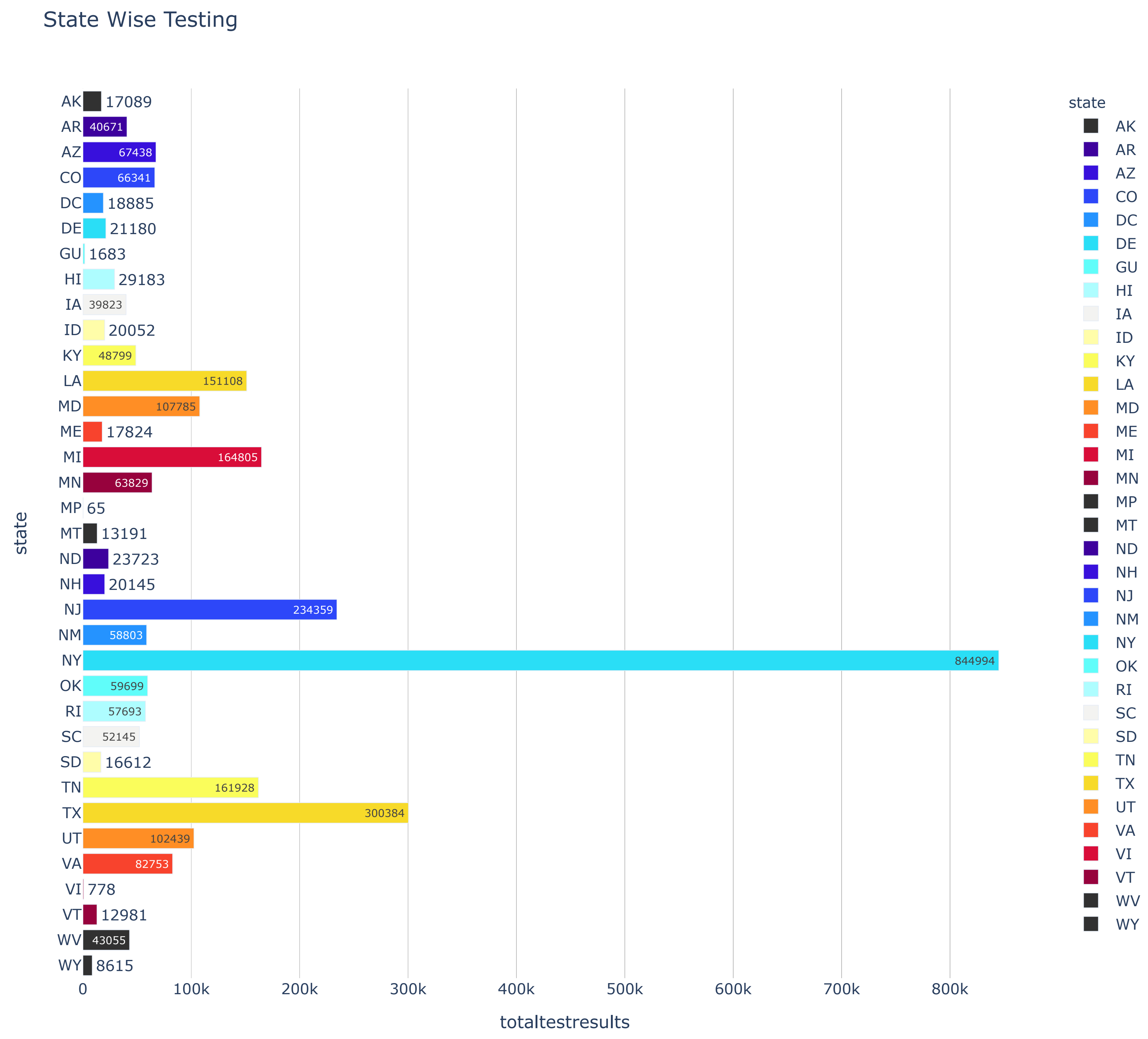
```
cases_counts=usa_state_level.groupby('state')['totaltestresults','positive','negative'].max().reset_index()
cases_counts
```

Out[49]:

	state	totaltestresults	positive	negative
0	AK	17089	351	16738
1	AR	40671	3111	37560
2	AZ	67438	6948	60490
3	CO	66341	13879	52462
4	DC	18885	3994	14891
5	DE	21180	4575	16605
6	GU	1683	145	1538
7	HI	29183	607	28576
8	IA	39823	6376	33447
9	ID	20052	1917	18135
10	KY	48799	4146	44653
11	LA	151108	27286	123822
12	MD	107785	20113	87672
13	ME	17824	1040	16784
14	MI	164805	39262	125543
15	MN	63829	4181	59648
16	MP	65	14	51
17	MT	13191	451	12740
18	ND	23723	991	22732
19	NH	20145	1938	18207
20	NJ	234359	113856	120503
21	NM	58803	2823	55980
22	NY	844994	295106	549888
23	OK	59699	3410	56289
24	RI	57693	7926	49767
25	SC	52145	5613	46532
26	SD	16612	2313	14299
27	TN	161928	10052	151876
28	TX	300384	26171	274213
29	UT	102439	4343	98096
30	VA	82753	13794	68959
31	VI	778	59	719
32	VT	12981	816	12165
33	WV	43055	1079	41976
34	WY	8615	389	8226

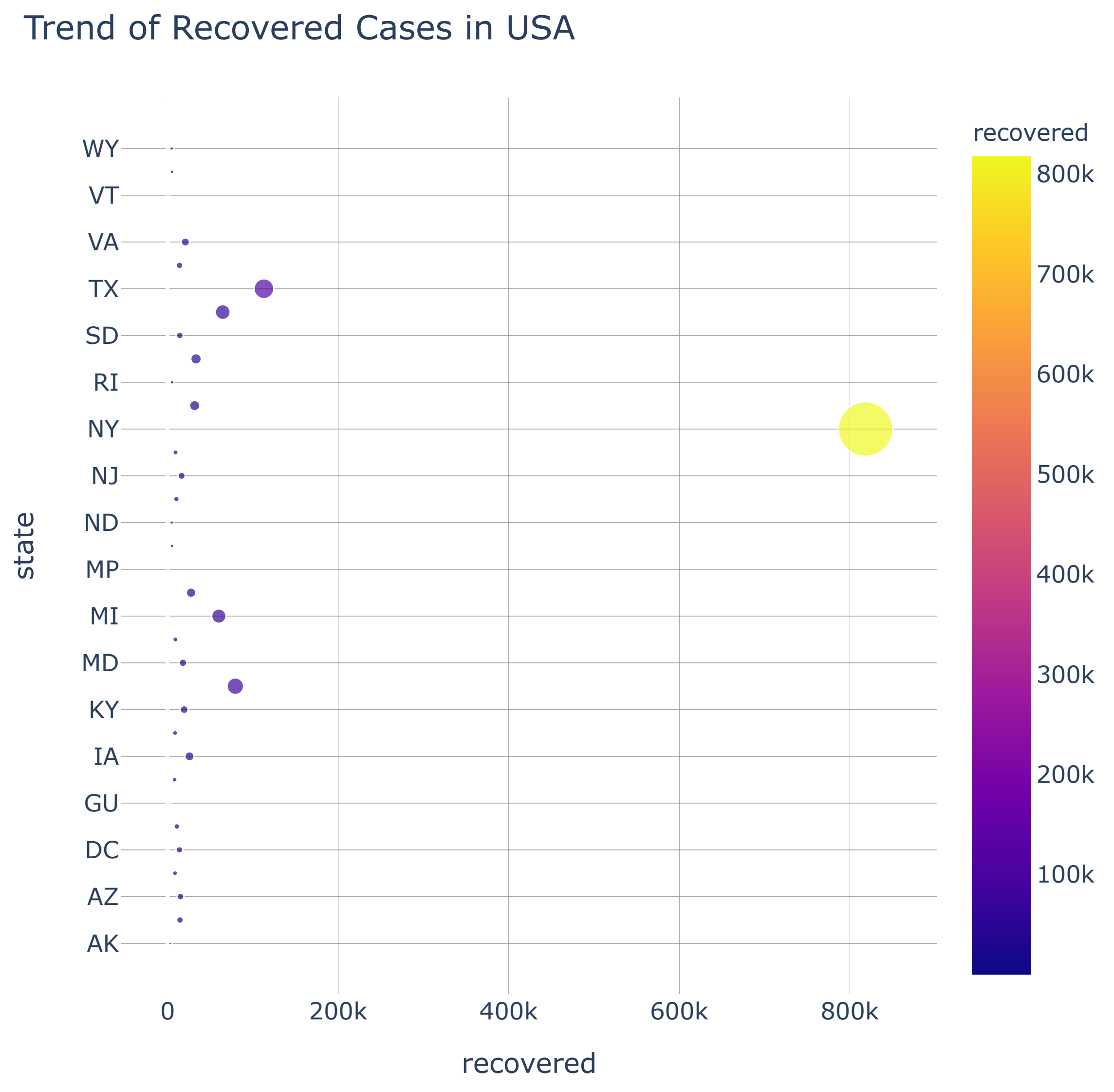
In [50]:

```
cases_counts
cases_counts=usa_state_level.groupby('state')['totaltestresults','positive','negative'].max().reset_index()
cases_counts
import plotly.express as ex

fig=px.bar(cases_counts,x='totaltestresults',y='state',color='state',
             title='State Wise Testing', orientation='h', text='totaltestresults',
             height=900,color_discrete_sequence = ex.colors.cyclical.Edge)
fig.update_layout(plot_bgcolor='rgb(275, 270, 273)')
#fig.update_layout(template = 'plotly_white')
fig.show()
```



In [51]:

```
time_date=usa_state_level.groupby('state')['totaltestresults','death','recovered','hospitalized'].sum().reset_index()
time_date

fig=px.scatter(time_date,x='recovered',y='state',color='recovered',size='recovered', hover_data=['recovered'],
                 color_discrete_sequence = ex.colors.cyclical.IceFire)
fig.update_layout(title_text='Trend of Recovered Cases in USA',
                  plot_bgcolor='rgb(275, 270, 273)',width=600, height=600)
fig.show()
```



In [52]:

```
usa_filter=covid_19_data[covid_19_data['Country/Region']=='US']
usa_filter
```

Out[52]:

	SNo	ObservationDate	Province/State	Country/Region	Last Update	Confirmed	Deaths	Recovered
31	32	2020-01-22	Washington	US	1/22/2020 17:00	1	0	0
69	70	2020-01-23	Washington	US	1/23/20 17:00	1	0	0
117	118	2020-01-24	Washington	US	1/24/20 17:00	1	0	0
118	119	2020-01-24	Chicago	US	1/24/20 17:00	1	0	0
158	159	2020-01-25	Washington	US	1/25/20 17:00	1	0	0
...	...	...	...	...	...	...	...	...
25572	25573	2020-05-16	Virginia	US	2020-05-17 02:32:32	29683	1003	0
25573	25574	2020-05-16	Washington	US	2020-05-17 02:32:32	18288	999	0
25574	25575	2020-05-16	West Virginia	US	2020-05-17 02:32:32	1470	64	0
25576	25577	2020-05-16	Wisconsin	US	2020-05-17 02:32:32	12187	453	0
25577	25578	2020-05-16	Wyoming	US	2020-05-17 02:32:32	741	7	0

4816 rows × 8 columns

In [53]:

```
usa_filter['ObservationDate']=pd.to_datetime(usa_filter['ObservationDate'])
united_states=usa_filter.groupby([usa_filter['ObservationDate'].dt.month,'Province/State'])['Deaths'].sum().reset_index()
united_states
```

```
C:\Users\grees\Anaconda3\lib\site-packages\ipykernel_launcher.py:1: SettingWithCopyWarning:


A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (http://pandas.pydata.org/pandas-docs/
stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
```

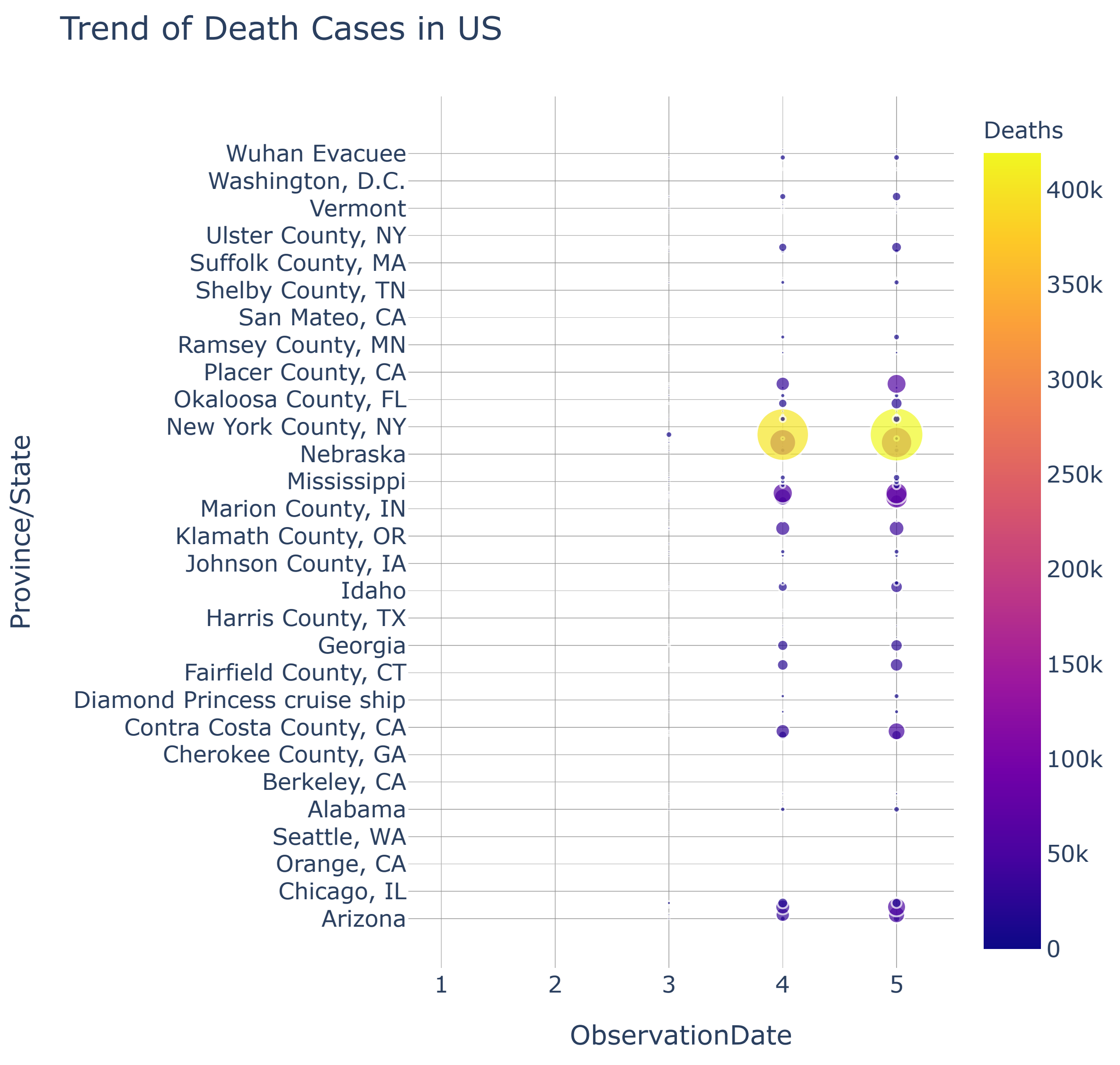
Out[53]:

	ObservationDate	Province/State	Deaths
0	1	Arizona	0
1	1	California	0
2	1	Chicago	0
3	1	Illinois	0
4	1	Washington	0
...	...	...	...
333	5	Virginia	12822
334	5	Washington	14563
335	5	West Virginia	855
336	5	Wisconsin	6191
337	5	Wyoming	112

338 rows × 3 columns

In [54]:

```
fig = px.scatter(united_states, x="ObservationDate", y="Province/State", color="Deaths",
                 size='Deaths', hover_data=['Deaths'],
                 color_discrete_sequence = ex.colors.cyclical.IceFire)
fig.update_layout(title_text='Trend of Death Cases in US',
                  plot_bgcolor='rgb(275, 270, 273)',width=600, height=600)
fig.show()
```



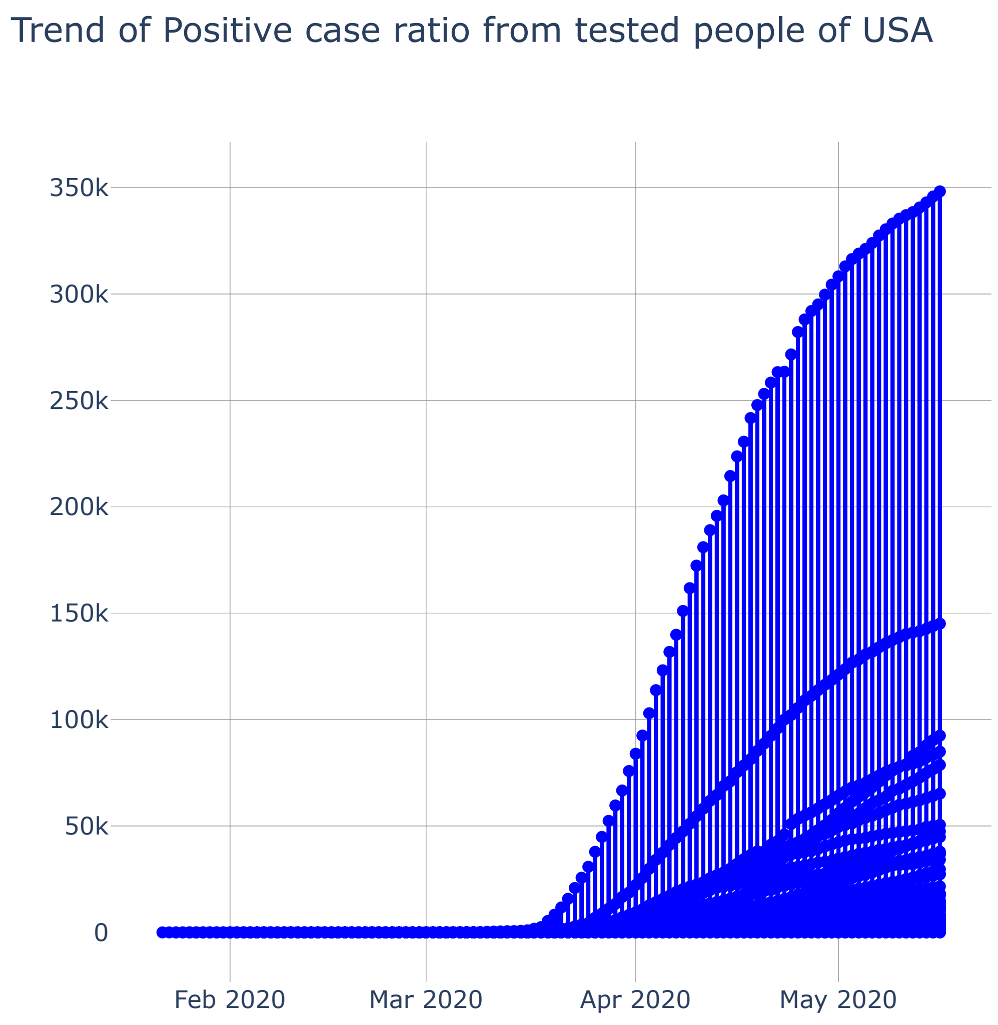
In [55]:
```
positive_cases_trend=usa_filter.groupby('ObservationDate')['Confirmed'].sum().reset_index()
positive_cases_trend
```

Out[55]:

	ObservationDate	Confirmed
0	2020-01-22	1
1	2020-01-23	1
2	2020-01-24	2
3	2020-01-25	2
4	2020-01-26	5
...	...	...
111	2020-05-12	1369574
112	2020-05-13	1390406
113	2020-05-14	1417774
114	2020-05-15	1442824
115	2020-05-16	1467820

116 rows × 2 columns

In [56]:
```
fig = go.Figure()
fig.add_trace(go.Scatter(x=usa_filter['ObservationDate'].dt.date, y=usa_filter['Confirmed'],
                    mode='lines+markers',marker_color='blue'))
fig.update_layout(title_text = 'Trend of Positive case ratio from tested people of USA')
fig.update_layout(plot_bgcolor='rgb(275, 270, 273)',width=600, height=600)
fig.show()
```



In [57]:
```
usa_filter
```

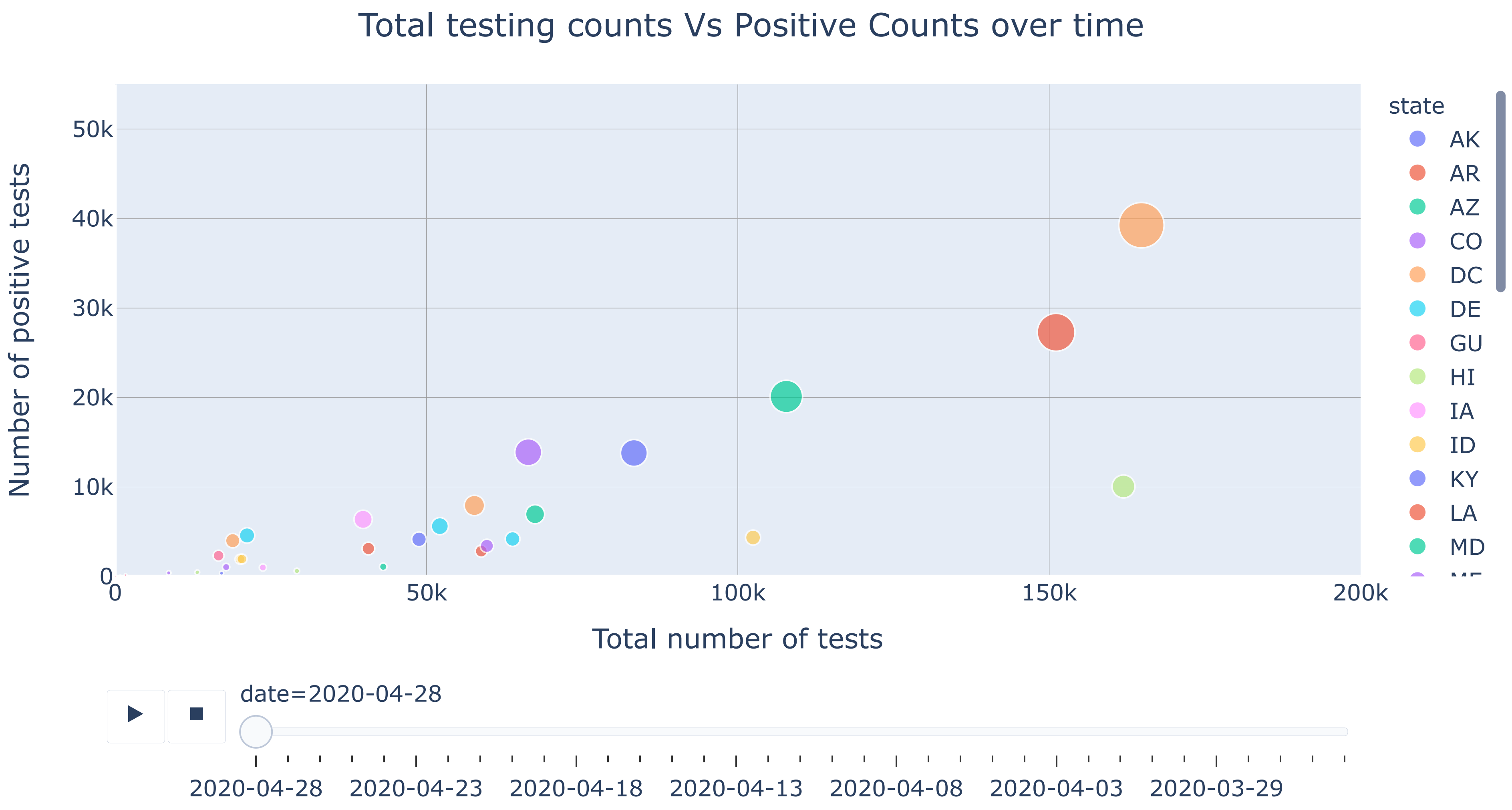
Out[57]:

	SNo	ObservationDate	Province/State	Country/Region	Last Update	Confirmed	Deaths	Recovered
31	32	2020-01-22	Washington	US	1/22/2020 17:00	1	0	0
69	70	2020-01-23	Washington	US	1/23/20 17:00	1	0	0
117	118	2020-01-24	Washington	US	1/24/20 17:00	1	0	0
118	119	2020-01-24	Chicago	US	1/24/20 17:00	1	0	0
158	159	2020-01-25	Washington	US	1/25/20 17:00	1	0	0
...	...	...	...	...	...	...	...	...
25572	25573	2020-05-16	Virginia	US	2020-05-17 02:32:32	29683	1003	0
25573	25574	2020-05-16	Washington	US	2020-05-17 02:32:32	18288	999	0
25574	25575	2020-05-16	West Virginia	US	2020-05-17 02:32:32	1470	64	0
25576	25577	2020-05-16	Wisconsin	US	2020-05-17 02:32:32	12187	453	0
25577	25578	2020-05-16	Wyoming	US	2020-05-17 02:32:32	741	7	0

4816 rows × 8 columns

In [58]:

```
usa_state_level['date']=usa_state_level['date'].astype(str)
fig = px.scatter(usa_state_level, x="total", y="positive", animation_frame="date", animation_group="state",
           size="positive", color="state", hover_name="state",
           log_x=False, size_max=55, range_x=[0,200000], range_y=[0,55000])

layout = go.Layout(
    title=go.layout.Title(
        text="Total testing counts Vs Positive Counts over time ",
        x=0.5
    ),
    font=dict(size=14),
#     width=800,
#     height=500,
    xaxis_title = "Total number of tests",
    yaxis_title = "Number of positive tests"
)

fig.update_layout(layout)
fig.show()
```



In [61]:

```
usa_country=covid_19_data[covid_19_data['Country/Region']=='US']
usa_country
```

Out[61]:

	SNo	ObservationDate	Province/State	Country/Region	Last Update	Confirmed	Deaths	Recovered
31	32	2020-01-22	Washington	US	1/22/2020 17:00	1	0	0
69	70	2020-01-23	Washington	US	1/23/20 17:00	1	0	0
117	118	2020-01-24	Washington	US	1/24/20 17:00	1	0	0
118	119	2020-01-24	Chicago	US	1/24/20 17:00	1	0	0
158	159	2020-01-25	Washington	US	1/25/20 17:00	1	0	0
...	...	...	...	...	...	...	...	...
25572	25573	2020-05-16	Virginia	US	2020-05-17 02:32:32	29683	1003	0
25573	25574	2020-05-16	Washington	US	2020-05-17 02:32:32	18288	999	0
25574	25575	2020-05-16	West Virginia	US	2020-05-17 02:32:32	1470	64	0
25576	25577	2020-05-16	Wisconsin	US	2020-05-17 02:32:32	12187	453	0
25577	25578	2020-05-16	Wyoming	US	2020-05-17 02:32:32	741	7	0

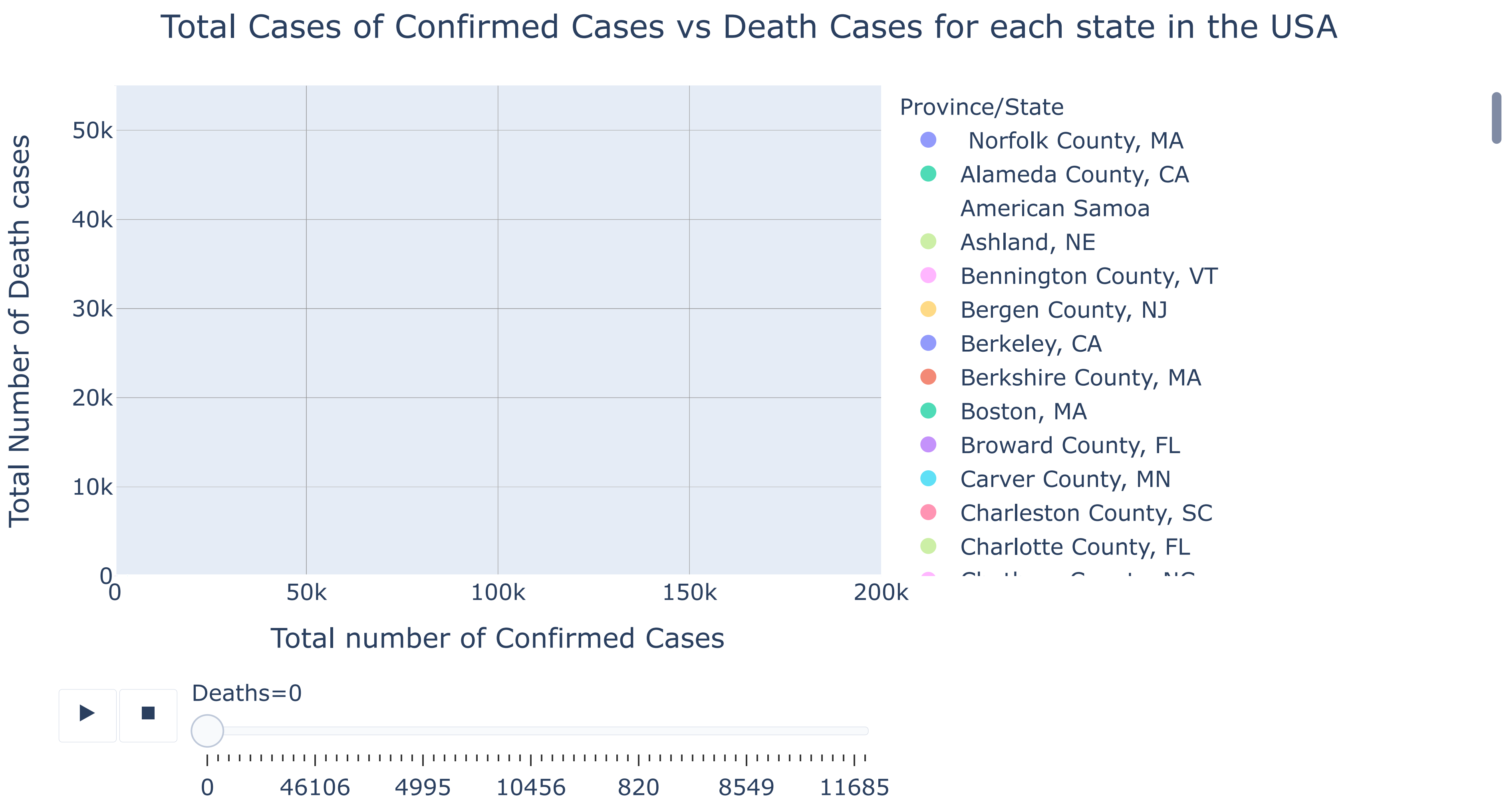
4816 rows × 8 columns

In [ ]:

In [62]:

```
usa_country['ObservationDate']=usa_country['ObservationDate'].astype(str)


usa_country_deathvsconfirmed=usa_country.groupby('Province/State')['Deaths','Confirmed'].sum().reset_index()
usa_country_deathvsconfirmed

fig = px.scatter(usa_country_deathvsconfirmed, x="Confirmed", y="Deaths", animation_frame="Deaths", animation_group="Province/State",
           size="Confirmed", color="Province/State", hover_name="Province/State",
           log_x=False, size_max=55, range_x=[0,200000], range_y=[0,55000])

layout = go.Layout(
    title=go.layout.Title(
        text="Total Cases of Confirmed Cases vs Death Cases for each state in the USA ",
        x=0.5
    ),
    font=dict(size=14),
#     width=800,
#     height=500,
    xaxis_title = "Total number of Confirmed Cases",
    yaxis_title = "Total Number of Death cases"
)

fig.update_layout(layout)
fig.show()
```

```
C:\Users\grees\Anaconda3\lib\site-packages\ipykernel_launcher.py:1: SettingWithCopyWarning:


A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (http://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
```



Continent wise analysis on the data

In [63]:

```
continent_data=pd.read_csv('current-data-on-the-geographic-distribution-of-covid-19-cases-worldwide.csv')
continent_data.isnull().sum()
```

Out[63]:

```
daterep                     13623
day                             0
month                           0
year                            0
cases                           0
deaths                          0
countriesandterritories         0
geoid                          45
countryterritorycode          152
popdata2018                   126
continentexp                    0
dtype: int64
```

In [64]:

```
continent_data.drop(columns='daterep',inplace=True)
```

In [65]:

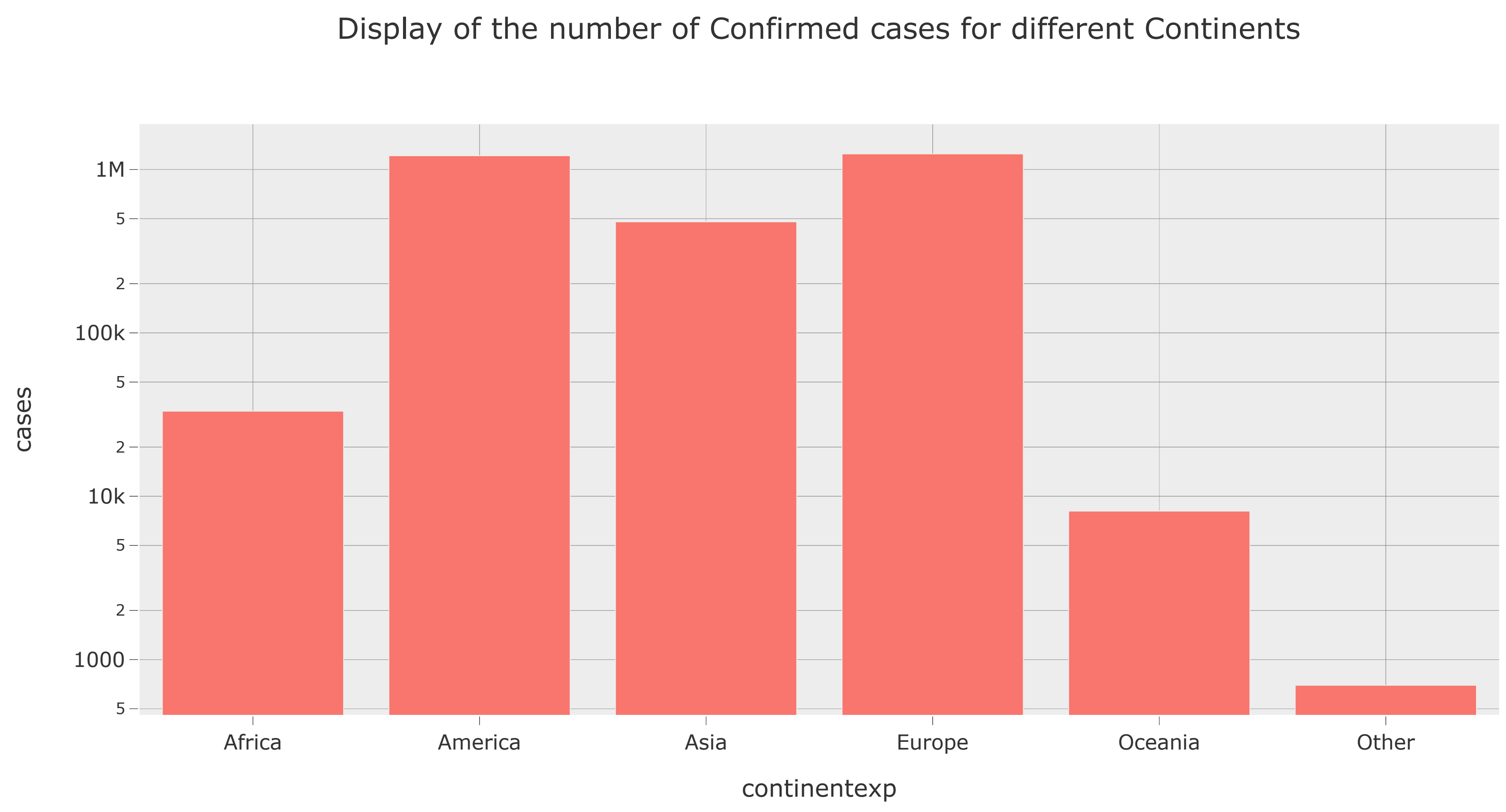
```
continent_data
```

Out[65]:

	day	month	year	cases	deaths	countriesandterritories	geoid	countryterritorycode	popdata2018	continentexp
0	28	4	2020	172	0	Afghanistan	AF	AFG	37172386.0	Asia
1	27	4	2020	68	10	Afghanistan	AF	AFG	37172386.0	Asia
2	26	4	2020	112	4	Afghanistan	AF	AFG	37172386.0	Asia
3	25	4	2020	70	1	Afghanistan	AF	AFG	37172386.0	Asia
4	24	4	2020	105	2	Afghanistan	AF	AFG	37172386.0	Asia
...	...	...	...	...	...	...	...	...	...	...
13618	25	3	2020	0	0	Zimbabwe	ZW	ZWE	14439018.0	Africa
13619	24	3	2020	0	1	Zimbabwe	ZW	ZWE	14439018.0	Africa
13620	23	3	2020	0	0	Zimbabwe	ZW	ZWE	14439018.0	Africa
13621	22	3	2020	1	0	Zimbabwe	ZW	ZWE	14439018.0	Africa
13622	21	3	2020	1	0	Zimbabwe	ZW	ZWE	14439018.0	Africa

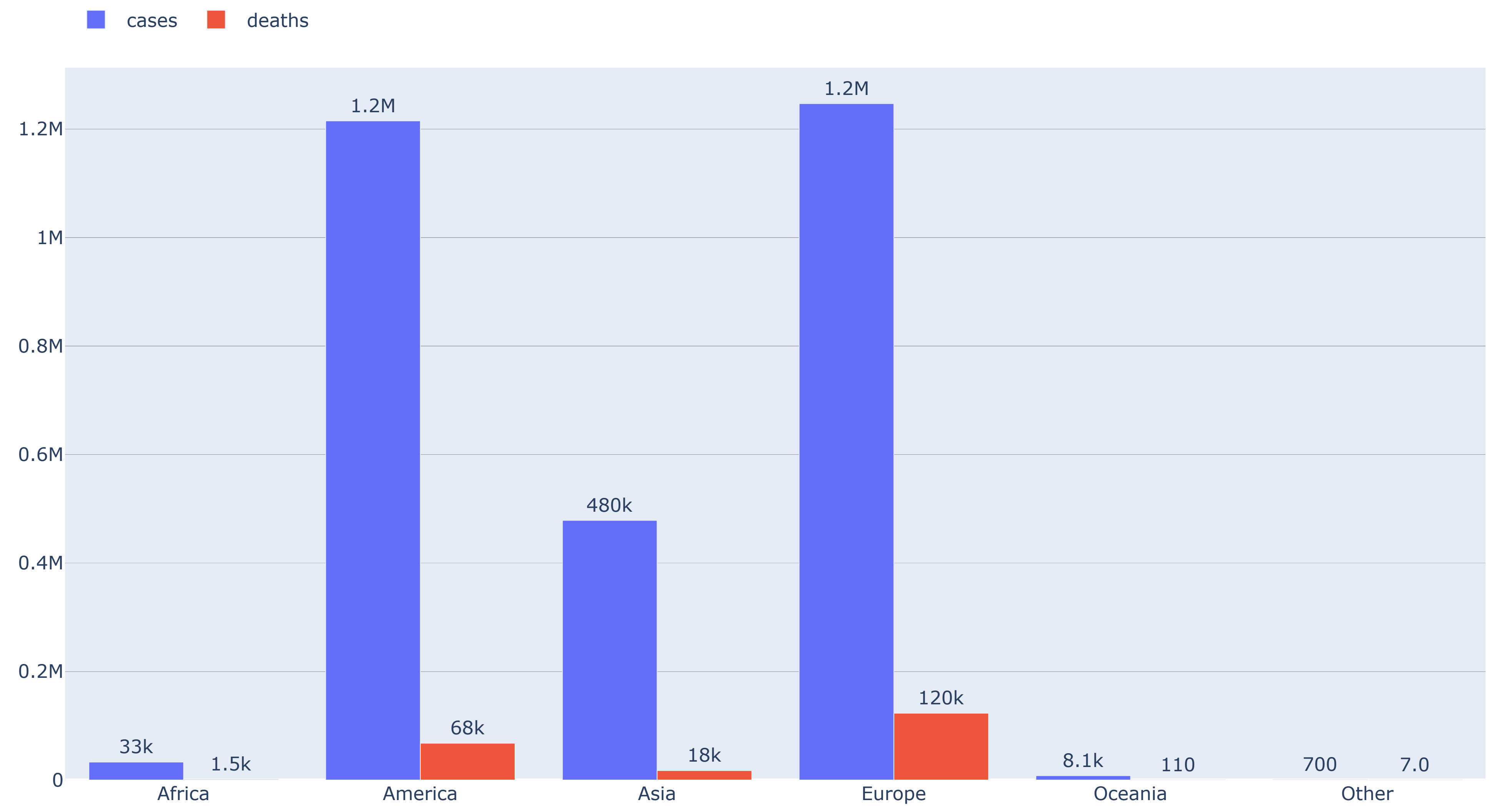
13623 rows × 10 columns

In [66]:
```
continent_cases=continent_data.groupby('continentexp')['cases'].sum()
continent_cases=continent_cases.reset_index()


fig=px.bar(continent_cases,x='continentexp',y='cases',
             log_y=True, template='ggplot2', title='Display of the number of Confirmed cases for different Continents')
fig.show()
```



Display of the death and confirmed cases in different continents

In [67]:
```
continent_cases=continent_data.groupby('continentexp')['cases','deaths'].sum()
continent_cases=continent_cases.reset_index()

fig = go.Figure(data=[
    go.Bar(name='cases', x=continent_cases['continentexp'], y=continent_cases['cases'],
           text=continent_cases['cases'], texttemplate='%{text:.2s}', textposition='outside'),
    go.Bar(name='deaths', x=continent_cases['continentexp'], y=continent_cases['deaths'],
           text=continent_cases['deaths'], texttemplate='%{text:.2s}', textposition='outside'),

])
# Change the bar mode
fig.update_layout(barmode='group')
fig.update_layout(legend_orientation="h", legend=dict(x=0, y=1.1))
fig.update_layout(margin={"r":0,"l":0,"b":0, "t":0})
fig.show()
```



In [68]:
```
continent_data['mortality_rate']=continent_data['deaths']/(continent_data['cases']+1)*100
```

In [69]:
```
continent_data
```

Out[69]:

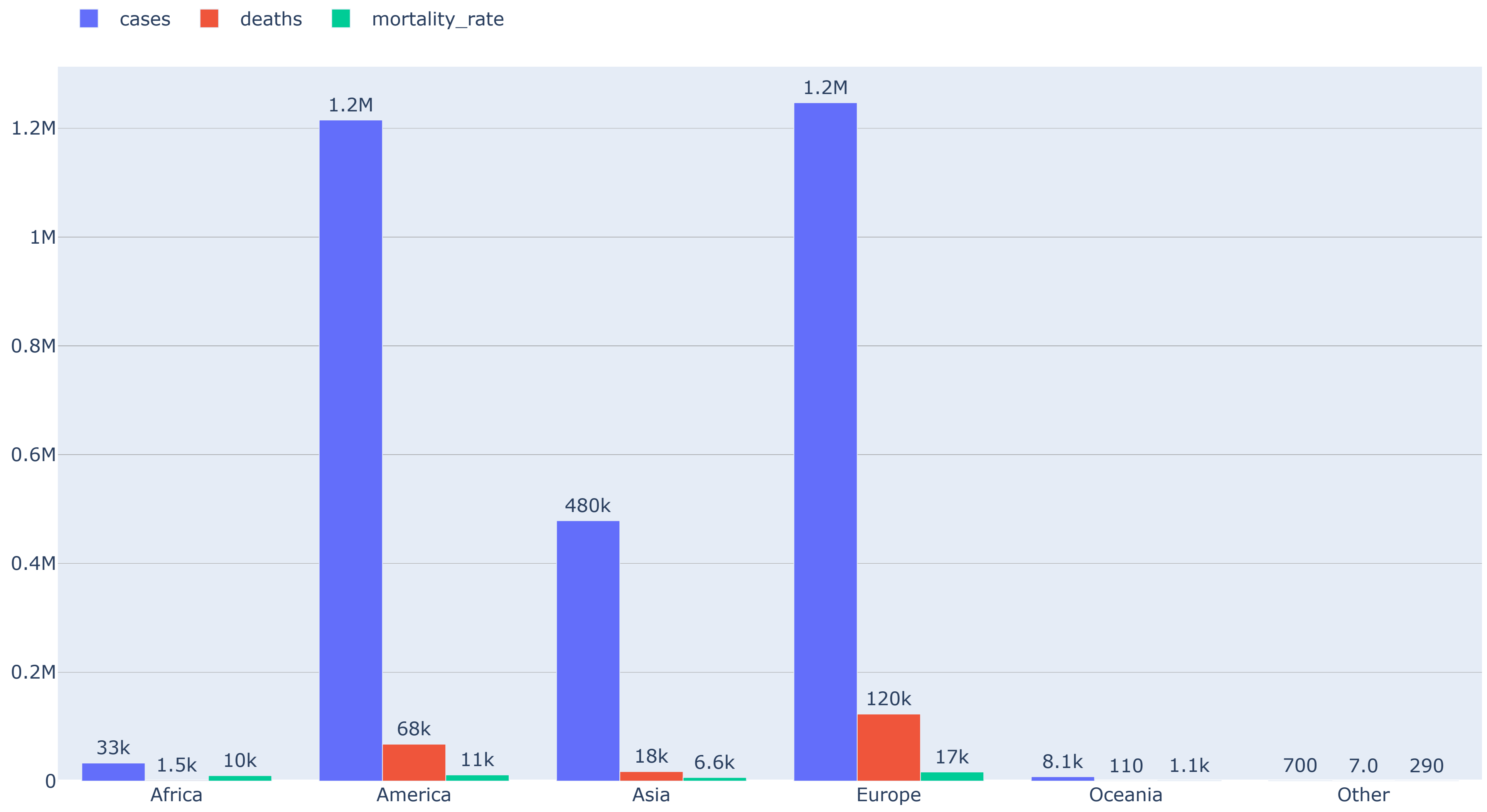
	day	month	year	cases	deaths	countriesandterritories	geoid	countryterritorycode	popdata2018	continentexp	mortality_rate
0	28	4	2020	172	0	Afghanistan	AF	AFG	37172386.0	Asia	0.000000
1	27	4	2020	68	10	Afghanistan	AF	AFG	37172386.0	Asia	14.492754
2	26	4	2020	112	4	Afghanistan	AF	AFG	37172386.0	Asia	3.539823
3	25	4	2020	70	1	Afghanistan	AF	AFG	37172386.0	Asia	1.408451
4	24	4	2020	105	2	Afghanistan	AF	AFG	37172386.0	Asia	1.886792
...	...	...	...	...	...	...	...	...	...	...	...
13618	25	3	2020	0	0	Zimbabwe	ZW	ZWE	14439018.0	Africa	0.000000
13619	24	3	2020	0	1	Zimbabwe	ZW	ZWE	14439018.0	Africa	100.000000
13620	23	3	2020	0	0	Zimbabwe	ZW	ZWE	14439018.0	Africa	0.000000
13621	22	3	2020	1	0	Zimbabwe	ZW	ZWE	14439018.0	Africa	0.000000
13622	21	3	2020	1	0	Zimbabwe	ZW	ZWE	14439018.0	Africa	0.000000

13623 rows × 11 columns

This plot is to determine the mortality rate,deaths and cases in each Continent

In [70]:

```
continent_cases=continent_data.groupby('continentexp')['cases','deaths','mortality_rate'].sum()
continent_cases=continent_cases.reset_index()

fig = go.Figure(data=[
    go.Bar(name='cases', x=continent_cases['continentexp'], y=continent_cases['cases'],
           text=continent_cases['cases'], texttemplate='%{text:.2s}', textposition='outside'),
    go.Bar(name='deaths', x=continent_cases['continentexp'], y=continent_cases['deaths'],
           text=continent_cases['deaths'], texttemplate='%{text:.2s}', textposition='outside'),
    go.Bar(name='mortality_rate', x=continent_cases['continentexp'], y=continent_cases['mortality_rate'],
           text=continent_cases['mortality_rate'], texttemplate='%{text:.2s}', textposition='outside'),

])
# Change the bar mode
fig.update_layout(barmode='group')
fig.update_layout(legend_orientation="h", legend=dict(x=0, y=1.1))
fig.update_layout(margin={"r":0,"l":0,"b":0, "t":0})
fig.show()
```



In [71]:

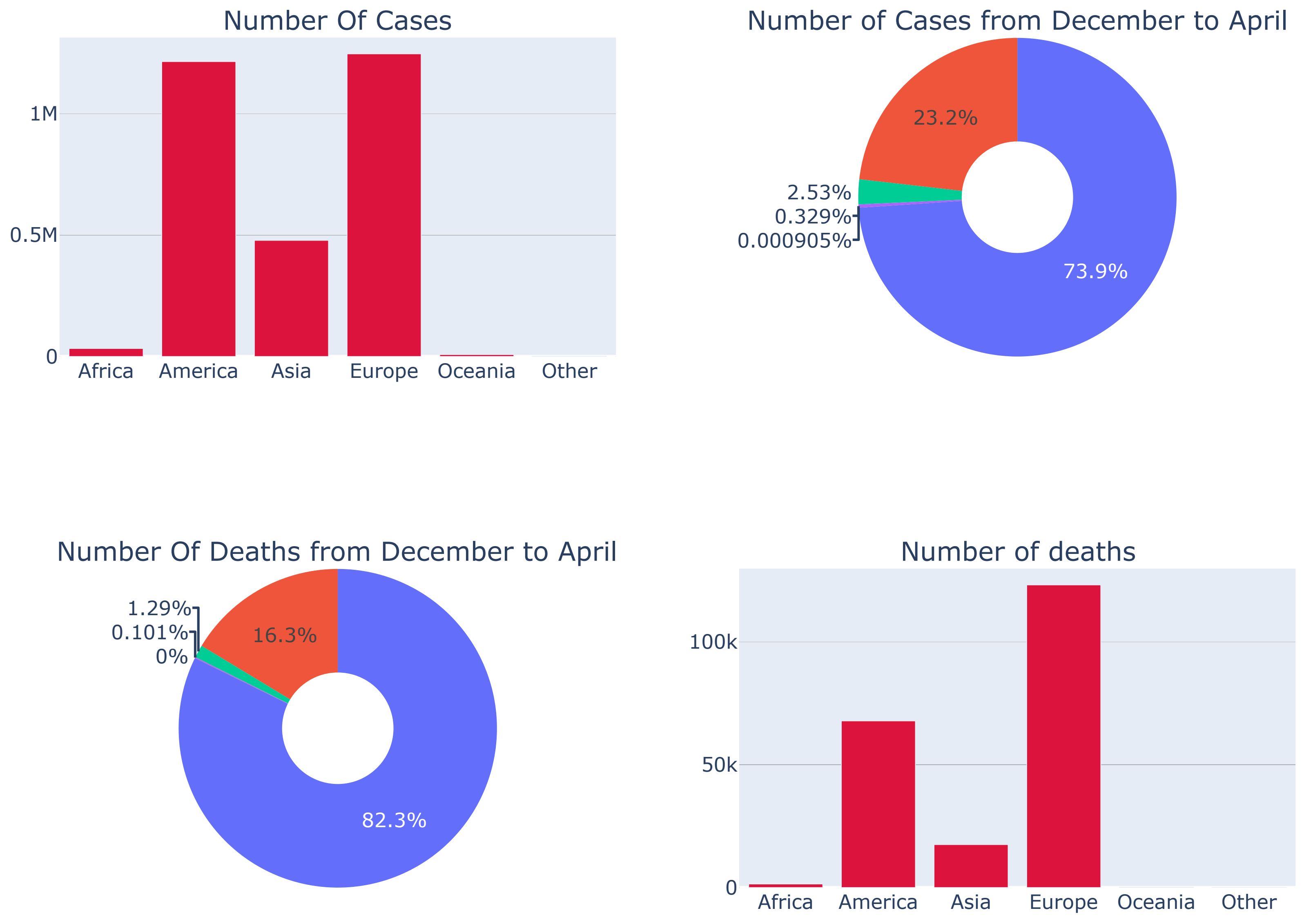
```
cases_increases=continent_data.groupby('month')['cases'].sum().reset_index()
cases_increases
death_increases=continent_data.groupby('month')['deaths'].sum().reset_index()
death_increases
```

Out[71]:

	month	deaths
0	1	213
1	2	2708
2	3	34355
3	4	172917
4	12	0

In [72]:

```
import plotly.graph_objects as go
from plotly.subplots import make_subplots

fig = make_subplots(
    rows=2, cols=2,
    specs=[[{"type": "bar"}, {"type": "pie"}],
           [{"type": "pie"}, {"type": "bar"}]],
    subplot_titles=("Number Of Cases","Number of Cases from December to April","Number Of Deaths from December to April","Number of deaths"))


fig.add_trace(
    go.Bar(x=continent_cases['continentexp'],y=continent_cases['cases'], marker=dict(color="crimson"), showlegend=False)
)

fig.add_trace(go.Pie(labels=cases_increases['month'],values=cases_increases['cases'],hole=.35),
              row=1, col=2)

fig.add_trace(go.Pie(labels=death_increases['month'],values=death_increases['deaths'],hole=.35),
              row=2, col=1)

fig.add_trace(
    go.Bar(x=continent_cases['continentexp'],y=continent_cases['deaths'], marker=dict(color="crimson"), showlegend=False),
    row=2, col=2
)
fig.update_layout(height=700, showlegend=False)

fig.show()
```



The analysis done here are inspired by various resources on the internet.Thanks :)

In [ ]:

```

```