What is novel coronavirus?

2019 Novel Coronavirus (2019-nCoV) is a virus (more specifically, a coronavirus) identified as the cause of an outbreak of respiratory ill
first detected in Wuhan, China. Early on, many of the patients in the outbreak in Wuhan, China reportedly had some link to a large seafo
animal market, suggesting animal-to-person spread. However, a growing number of patients reportedly have not had exposure to anima
markets, indicating person-to-person spread is occurring. At this time, it's unclear how easily or sustainably this virus is spreading betw
people - CDC

Questions that will be answered through the analysis are:

1. Which date has recorded the highest single-day coronavirus death so far?
2. What is the Biggest one-day recovery in Covid-19 cases worldwide?
3. What is the current total number of active cases worldwide?
4. Which Country has hight Covid-19 positive cases?
5. How many countries have recorded zero death case?

Data Overview

- In order to be able to answer these questions, a more convenient data set is necessary.
- Data Sources: https://github.com/datasets/covid-19
- This dataset includes time series data tracking the number of people affected by COVID-19 worldwide, including:
    - confirmed tested cases of Coronavirus infection
    - the number of people who have reportedly died while sick with Coronavirus
    - the number of people who have reportedly recovered from it
- The data is available from 22 Jan, 2020.

Importing libraries

```
import pandas as pd
import numpy as np

#plotting lib
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
import plotly.express as px
import plotly.graph_objects as go

#Read Data
df = pd.read_csv("countries-aggregated.csv")
```

```
/usr/local/lib/python3.6/dist-packages/statsmodels/tools/_testing.py:19: FutureWarning: pandas.util.testing is deprecate
  import pandas.util.testing as tm
```

```
df.columns
```

```
Index(['Date', 'Country', 'Confirmed', 'Recovered', 'Deaths'], dtype='object')
```

```
df.head(2)
```

	Date	Country	Confirmed	Recovered	Deaths
0	2020-01-22	Afghanistan	0	0	0
1	2020-01-22	Albania	0	0	0

```
df.tail(2)
```

April 17 2020, reported **8858** coronavirus deaths, highest in one day so far.

Q2: What is the Biggiest one-day recovery in Covid-19 cases worldwide?

```
fig=go.Figure()
fig.add_trace(go.Scatter(x= date_index_df.index, y= date_index_df["Recovered"].diff().fillna(0),mode='lines+markers', name='
fig.update_layout(title="Daily increase Cases", xaxis_title="Date", yaxis_title="Number of Cases", legend=dict(x=0,y=1,trace
fig.show()
```

Q5: Howmany countries has recorded zero death case?

```
#making a new df with 0 death countries
Zero_death_Country = country_index_df.loc[country_index_df['Deaths'] == 0]
```

```
Zero_death_Country
```

	Date	Country	Confirmed	Recovered	Deaths
24250	2020-05-29	Zambia	1057	779	7

Understanding the data

- Print the number of rows and columns in this dataset.

```
#Print the number of rows and columns in this dataset.
print(f"There are total {df.shape[0]} rows and {df.shape[1]} columns in the dataset.")
```

```
There are total 24252 rows and 5 columns in the dataset.
```

- check the data type of Dataset Columns.

```
print(df.dtypes)
```

```
Date           object
Country        object
Confirmed       int64
Recovered       int64
Deaths          int64
dtype: object
```

Clean data

- Which columns had no missing values?

```
#Provide a set of column names that have no missing values.
no_nulls = set(df.columns[df.isnull().mean()==0]) #Provide a set of columns with 0 missing values.
no_nulls
```

```
no_nulls
```

```
{'Confirmed', 'Country', 'Date', 'Deaths', 'Recovered'}
```

Observation: Hence there are no NAN value in the dataset.

- Find the unique Counties.

```
#List unique values in the df['Country'] column
print(f"We have total {len(df.Country.unique())} Countries data.")
```

```
We have total 188 Countries data.
```

- Grouping different types of cases as per the date.

```
date_index_df = df.groupby(["Date"]).agg({"Confirmed":'sum',"Recovered":'sum',"Deaths":'sum'})
date_index_df.head()
```

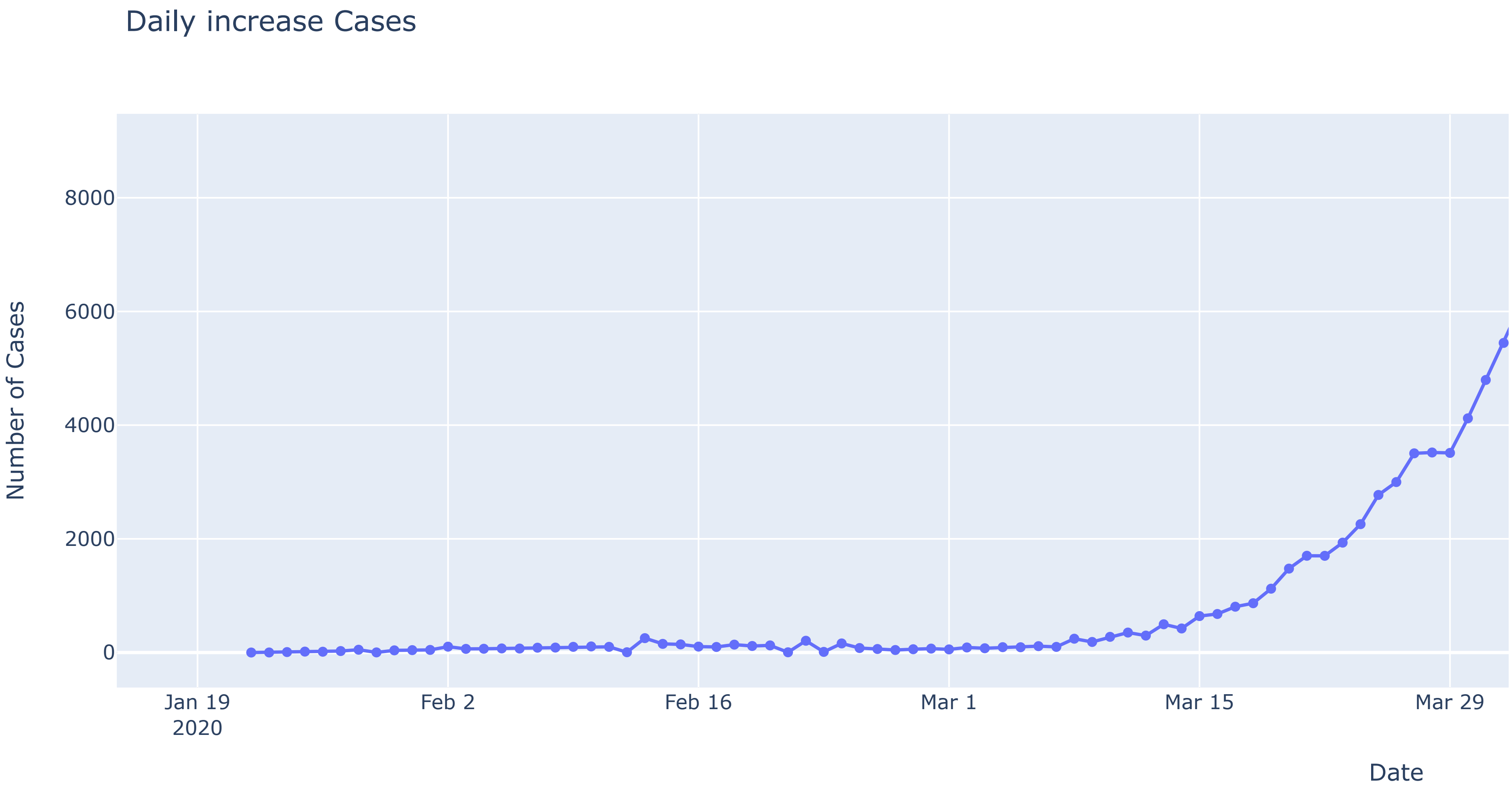
	Confirmed	Recovered	Deaths
Date			
2020-01-22	555	28	17
2020-01-23	654	30	18
2020-01-24	941	36	26
2020-01-25	1434	39	42
2020-01-26	2118	52	56

Q1: Which date has the highest single-day coronavirus death?

reference: https://plotly.com/python/line-and-scatter/#line-and-scatter-plots

```
fig=go.Figure()
fig.add_trace(go.Scatter(x= date_index_df.index, y= date_index_df["Deaths"].diff().fillna(0),mode='lines+markers', name='Dea

fig.update_layout(title="Daily increase Cases", xaxis_title="Date", yaxis_title="Number of Cases", legend=dict(x=0,y=1,trace
fig.show()
```



Observation:

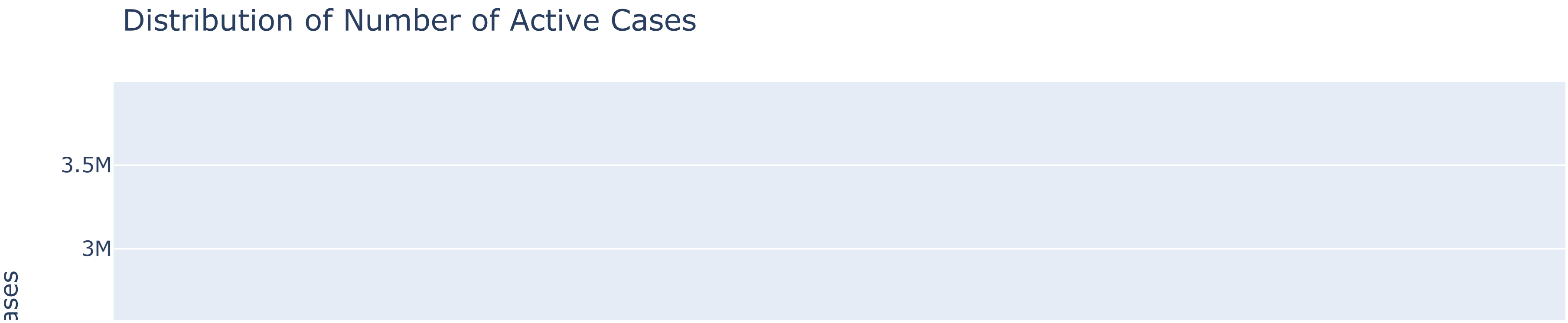
Observation:

Biggiest one-day jump in Covid-19 cases on **May 22 2020**, reported **108.245k** number of patients recovered.

Q3: What is the current total number of active cases worldwide?

> By removing deaths and recoveries from total cases, we can get the "current infected cases" or "active cases".
>
> Active Cases = Number of Confirmed Cases - (Number of Recovered Cases - Number of Death Cases)

```
fig=px.bar(x=date_index_df.index,y=date_index_df["Confirmed"]-(date_index_df["Recovered"]-date_index_df["Deaths"]))
fig.update_layout(title="Distribution of Number of Active Cases", xaxis_title="Date",yaxis_title="Number of Active Cases")
fig.show()
```



Observation:

We are having total **3.795607M** active cases worldwide.

Q4: What are the top 10 countries that have the highest active cases so far?

```
#Calculating countrywise positive cases
country_index_df =df[df["Date"]==df["Date"].max()].groupby(["Country"]).agg({"Confirmed":'sum',"Recovered":'sum',"Deaths":'su
country_index_df.head()
```

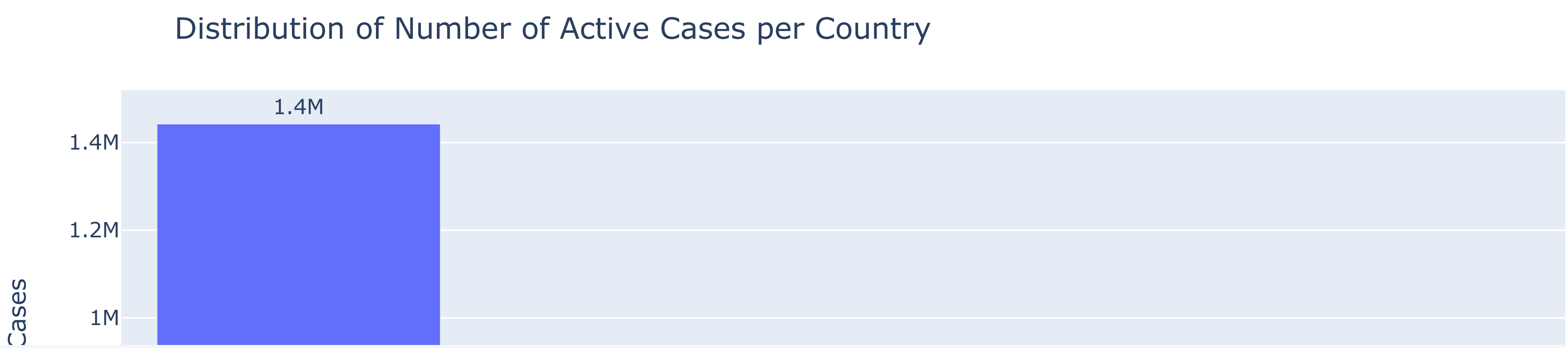
	Confirmed	Recovered	Deaths
Country			
US	1746019	406446	102809
Brazil	465166	189476	27878
Russia	387623	159257	4374
United Kingdom	272607	1172	38243
Spain	238564	150376	27121

```
#creating a new column for Active Cases
# Active Cases = Number of Confirmed Cases - (Number of Recovered Cases - Number of Death Cases)
country_index_df["Active"] = country_index_df["Confirmed"]-(country_index_df["Recovered"]-country_index_df["Deaths"])
```

```
country_index_df['Active'] = country_index_df['Confirmed']-(country_index_df['Recovered']-country_index_df['Deaths'])
country_index_df.head()
```

	Confirmed	Recovered	Deaths	Active
Country				
US	1746019	406446	102809	1442382
Brazil	465166	189476	27878	303568
Russia	387623	159257	4374	232740
United Kingdom	272607	1172	38243	309678
Spain	238564	150376	27121	115309

```
#plotting to 10 Countries
fig = px.bar(country_index_df.head(10), y='Active', x=country_index_df.head(10).index, text='Active')
fig.update_traces(texttemplate='%{text:.2s}', textposition='outside')
fig.update_layout(title="Distribution of Number of Active Cases per Country", xaxis_title="Country",yaxis_title="Number of A
fig.show()
```



```
#print top 10 active cases countries with the active cases
list(zip(country_index_df.head(10).index, country_index_df.head(10).Active))
```

Observation:

Top 10 active cases countries:

('US', 1442382),

('Brazil', 303568),

('Russia', 232740),

('United Kingdom', 309678),

('Spain', 115309),

('Italy', 112633),

('France', 147719),

('Germany', 27181),

('India', 95844),

('Turkey', 40646)

Country	Confirmed	Recovered	Deaths	Active
Rwanda	355	247	0	108
Vietnam	328	279	0	49
Eritrea	39	39	0	0
Namibia	23	14	0	9
Laos	19	16	0	3
Saint Lucia	18	18	0	0
Fiji	18	15	0	3
Dominica	16	16	0	0
Saint Kitts and Nevis	15	15	0	0
Holy See	12	2	0	10
Seychelles	11	11	0	0
Papua New Guinea	8	8	0	0
Lesotho	2	1	0	1

Observation

```
print(f"There are total {len(Zero_death_Country.index.values)} countries with no Death Cases.")
```

```
There are total 20 countries with no Death Cases.
```

Conclusion:

Analysis like these is useful because they help us understand the most likely outcomes as well as best- and worst-case possibilities. I h find it convenient and helpful to gain a better understanding of the recent coronavirus pandemic.