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

In [2]:
```
df = pd.read_csv('Global_COVID_Vaccination_Tracker.csv')
df
```

Out[2]:

	Countries and regions	Doses administered	Enough for % of people	Percentage of population with 1+ dose	Percentage of population fully vaccinated	Daily rate of doses administered
0	Global Total	5.663213e+09	NaN	NaN	NaN	33380378.0
1	Mainland China	2.129833e+09	76.1	NaN	69.3	6454714.0
2	India	7.303371e+08	26.7	40.3	12.4	7616167.0
3	EU	5.469671e+08	61.6	66.0	61.5	1394444.0
4	U.S.	3.785697e+08	59.2	62.9	53.6	721844.0
...	...	...	...	...	...	...
202	Nauru	1.479000e+04	56.9	58.6	55.2	NaN
203	St. Helena	7.892000e+03	65.8	72.7	58.9	8.0
204	Falkland Islands	4.407000e+03	73.5	87.7	59.2	202.0
205	Montserrat	2.837000e+03	28.4	29.3	27.4	NaN
206	Eritrea	NaN	NaN	NaN	NaN	NaN

207 rows × 6 columns

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 207 entries, 0 to 206
Data columns (total 6 columns):
 #   Column                                  Non-Null Count  Dtype  
---  ------                                  --------------  -----  
 0   Countries and regions                   207 non-null    object 
 1   Doses administered                      206 non-null    float64
 2   Enough for % of people                  202 non-null    float64
 3   Percentage of population with 1+ dose   200 non-null    float64
 4   Percentage of population fully vaccinated  197 non-null    float64
 5   Daily rate of doses administered        203 non-null    float64
dtypes: float64(5), object(1)
memory usage: 9.8+ KB
```

```
In [4]: df.isna().sum()
```

```
Out[4]: Countries and regions                         0
        Doses administered                            1
        Enough for % of people                        5
        Percentage of population with 1+ dose         7
        Percentage of population fully vaccinated    10
        Daily rate of doses administered              4
        dtype: int64
```

```
In [5]: df.columns
```

```
Out[5]: Index(['Countries and regions', 'Doses administered', 'Enough for % of people',
               'Percentage of population with 1+ dose',
               'Percentage of population fully vaccinated',
               'Daily rate of doses administered'],
              dtype='object')
```

In [6]:

```
df.mean(axis = 0)
```

Out[6]:

```
Doses administered                           5.763783e+07
Enough for % of people                       3.559505e+01
Percentage of population with 1+ dose        3.966600e+01
Percentage of population fully vaccinated    3.194061e+01
Daily rate of doses administered             3.357373e+05
dtype: float64
```

In [7]:

```
df['Doses administered'].fillna(value=df['Doses administered'].mean(), inplace=True)
df['Enough for % of people'].fillna(value=df['Enough for % of people'].mean(), inplace=True)
df['Percentage of population with 1+ dose'].fillna(value=df['Percentage of population with 1+ dose'].mean(), inp
df['Percentage of population fully vaccinated'].fillna(value=df['Percentage of population fully vaccinated'].mea
df['Daily rate of doses administered'].fillna(value=df['Daily rate of doses administered'].mean(), inplace=True)
```

In [8]:

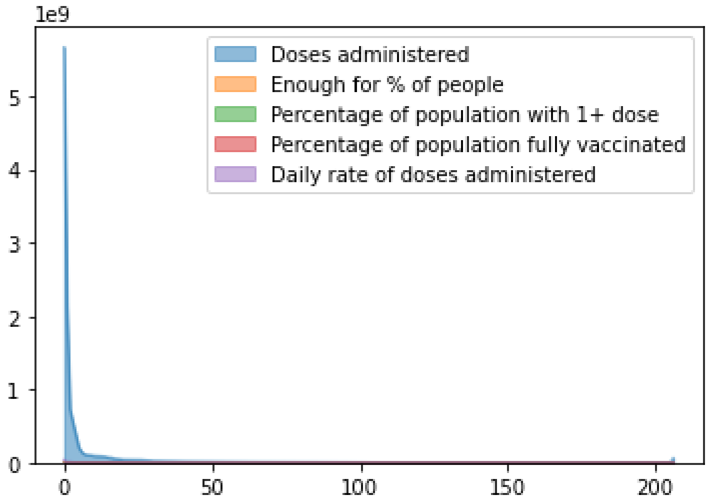
```
df.head(5)
```

Out[8]:

	Countries and regions	Doses administered	Enough for % of people	Percentage of population with 1+ dose	Percentage of population fully vaccinated	Daily rate of doses administered
0	Global Total	5.663213e+09	35.59505	39.666	31.940609	33380378.0
1	Mainland China	2.129833e+09	76.10000	39.666	69.300000	6454714.0
2	India	7.303371e+08	26.70000	40.300	12.400000	7616167.0
3	EU	5.469671e+08	61.60000	66.000	61.500000	1394444.0
4	U.S.	3.785697e+08	59.20000	62.900	53.600000	721844.0

In [9]:
```
df.plot.area(stacked=False)
```

Out[9]:
```
<AxesSubplot:>
```

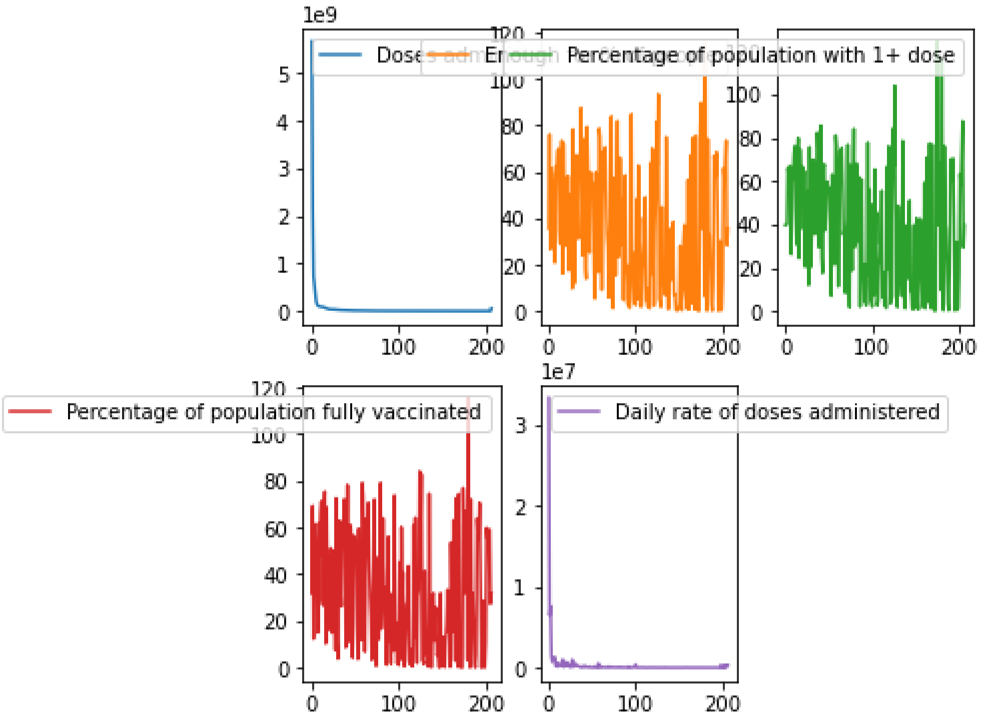


In [10]:

```
df.plot(subplots=True, layout=(2, 3), figsize=(6, 6), sharex=False)
```

Out[10]:

```
array([[<AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>],
       [<AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>]], dtype=object)
```



In [11]:

```
india = df[df['Countries and regions']=='India']
india
```

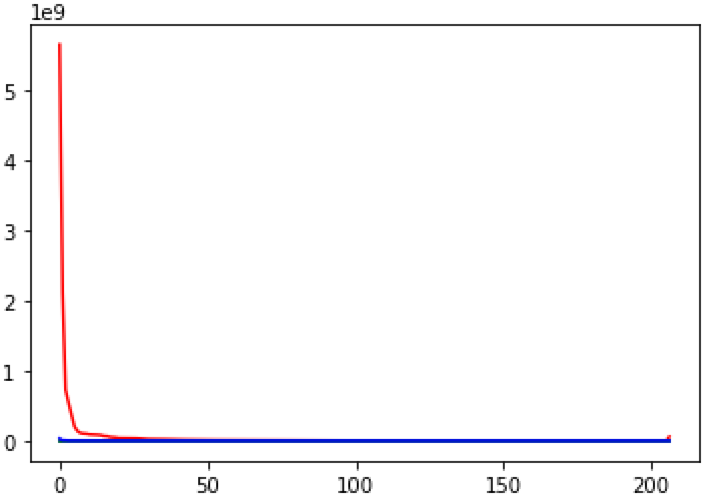
Out[11]:

	Countries and regions	Doses administered	Enough for % of people	Percentage of population with 1+ dose	Percentage of population fully vaccinated	Daily rate of doses administered
2	India	730337116.0	26.7	40.3	12.4	7616167.0

In [12]:

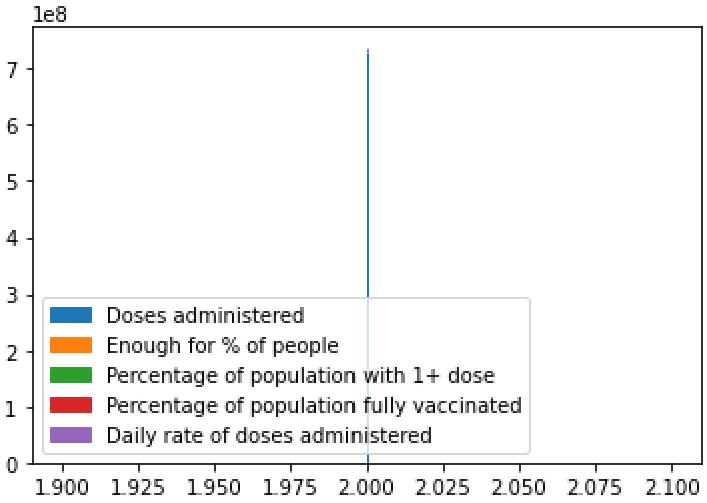
```
plt.figure()

with pd.plotting.plot_params.use("x_compat", True):
    df["Doses administered"].plot(color="r")
    df["Enough for % of people"].plot(color="g")
    df["Percentage of population with 1+ dose"].plot(color="b")
    df["Percentage of population fully vaccinated"].plot(color="g")
    df["Daily rate of doses administered"].plot(color="b")
```



In [13]:
```
india.plot.area()
```

Out[13]:
```
<AxesSubplot:>
```



In [14]:
```
df.rename({'Countries and regions': 'location', 'Percentage of population fully vaccinated': '%_population_fully
df
```

Out[14]:

	location	Doses administered	Enough for % of people	Percentage of population with 1+ dose	%_population_fully_vaccinated	Daily rate of doses administered
0	Global Total	5.663213e+09	35.59505	39.666	31.940609	3.338038e+07
1	Mainland China	2.129833e+09	76.10000	39.666	69.300000	6.454714e+06
2	India	7.303371e+08	26.70000	40.300	12.400000	7.616167e+06
3	EU	5.469671e+08	61.60000	66.000	61.500000	1.394444e+06
4	U.S.	3.785697e+08	59.20000	62.900	53.600000	7.218440e+05
...	...	...	...	...	...	...
202	Nauru	1.479000e+04	56.90000	58.600	55.200000	3.357373e+05
203	St. Helena	7.892000e+03	65.80000	72.700	58.900000	8.000000e+00
204	Falkland Islands	4.407000e+03	73.50000	87.700	59.200000	2.020000e+02
205	Montserrat	2.837000e+03	28.40000	29.300	27.400000	3.357373e+05
206	Eritrea	5.763783e+07	35.59505	39.666	31.940609	3.357373e+05

207 rows × 6 columns

In [15]:

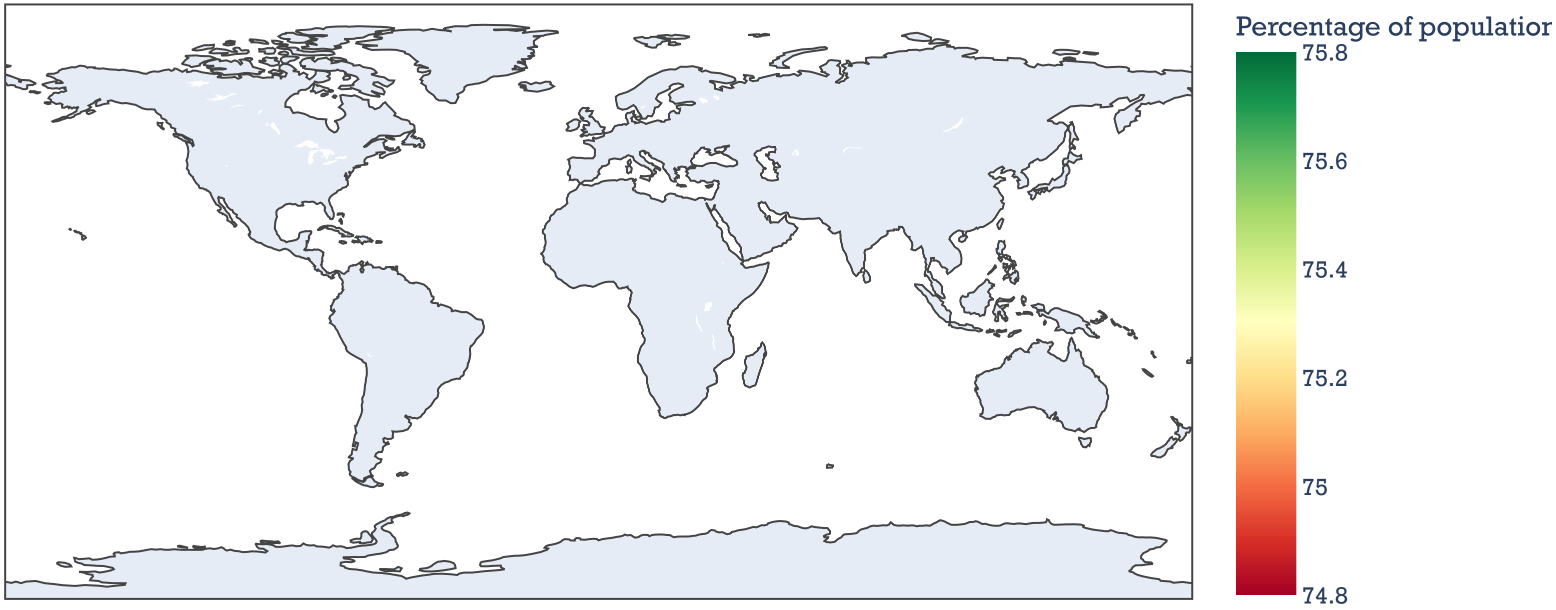
```
def plot_net_conv(scope,title):
 fig = px.choropleth(
 df,
 locations ="location",
 color ="Percentage of population with 1+ dose",
 hover_name ="%_population_fully_vaccinated",
 scope=scope,
 color_continuous_scale='RdYlGn',
 animation_frame ="Enough for % of people")

 fig.update_layout(title_text=title,
 font_family="Rockwell",
 title_font_size=20,
 coloraxis_colorbar=dict(
 title='Percentage of population fully vaccinated'))

 fig.show()
```

```
In [16]: plot_net_conv('world','Percentage of population fully vaccinated')
```

Percentage of population fully vaccinated



Enough for % of people=70.6

In [17]:

```
ind = df[df['location']=='India']
ind
```

Out[17]:

	location	Doses administered	Enough for % of people	Percentage of population with 1+ dose	%_population_fully_vaccinated	Daily rate of doses administered
2	India	730337116.0	26.7	40.3	12.4	7616167.0

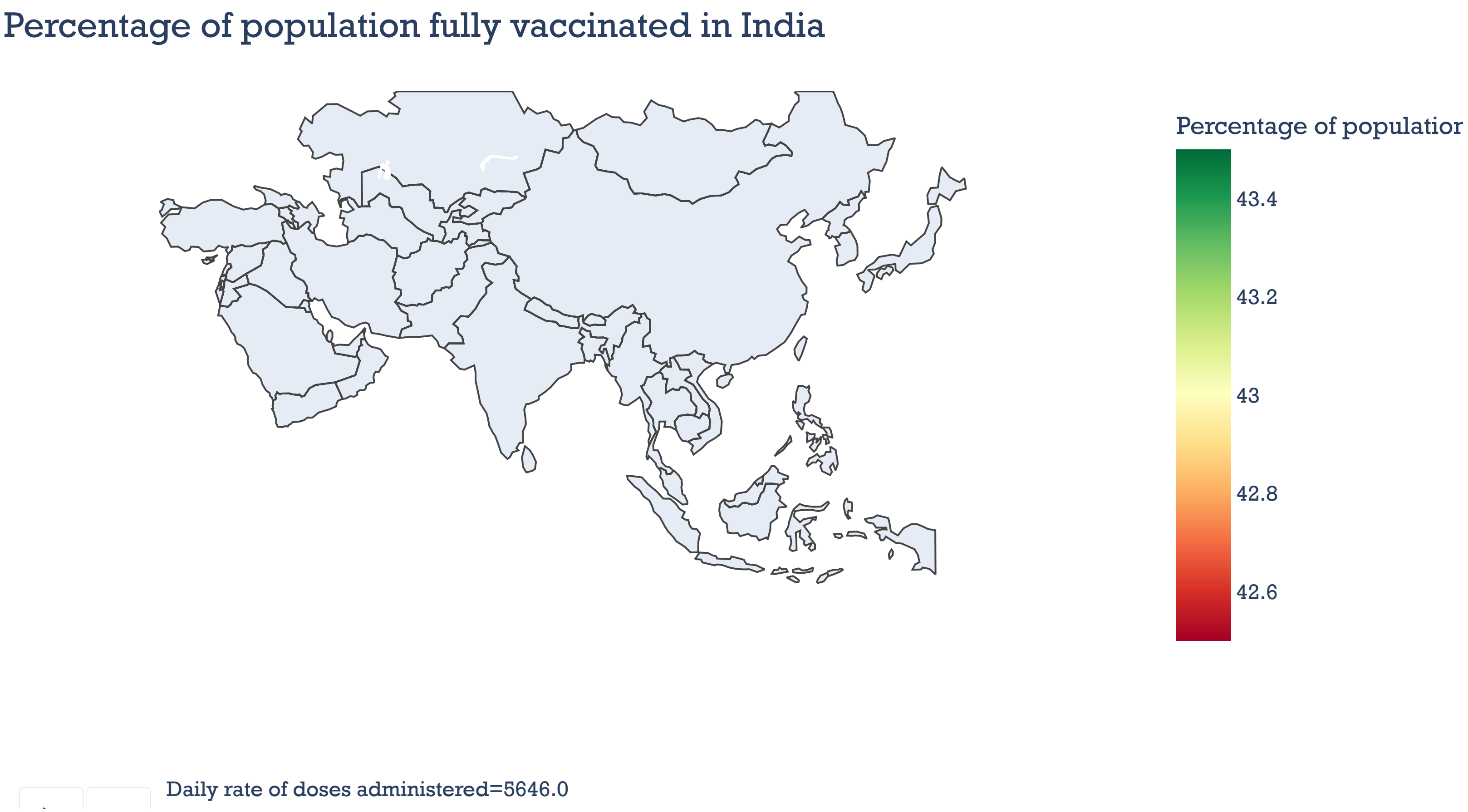
In [18]:

```
def plot_net_conv(scope,title):
 fig = px.choropleth(
 df,
 locations ="location",
 color ="Percentage of population with 1+ dose",
 hover_name ="%_population_fully_vaccinated",
 scope=scope,
 color_continuous_scale='RdYlGn',
 animation_frame ="Daily rate of doses administered")

 fig.update_layout(title_text=title,
 font_family="Rockwell",
 title_font_size=20,
 coloraxis_colorbar=dict(
 title='Percentage of population fully vaccinated'))

 fig.show()
```

```
In [19]: plot_net_conv('asia','Percentage of population fully vaccinated in India')
```


Percentage of population fully vaccinated in India
Percentage of populatior
43.4
43.2
43
42.8
42.6
Daily rate of doses administered=5646.0

```
In [20]: df.rename({'Doses administered': 'Doses_administered', 'Daily rate of doses administered': 'Daily_rate_of_doses_
```

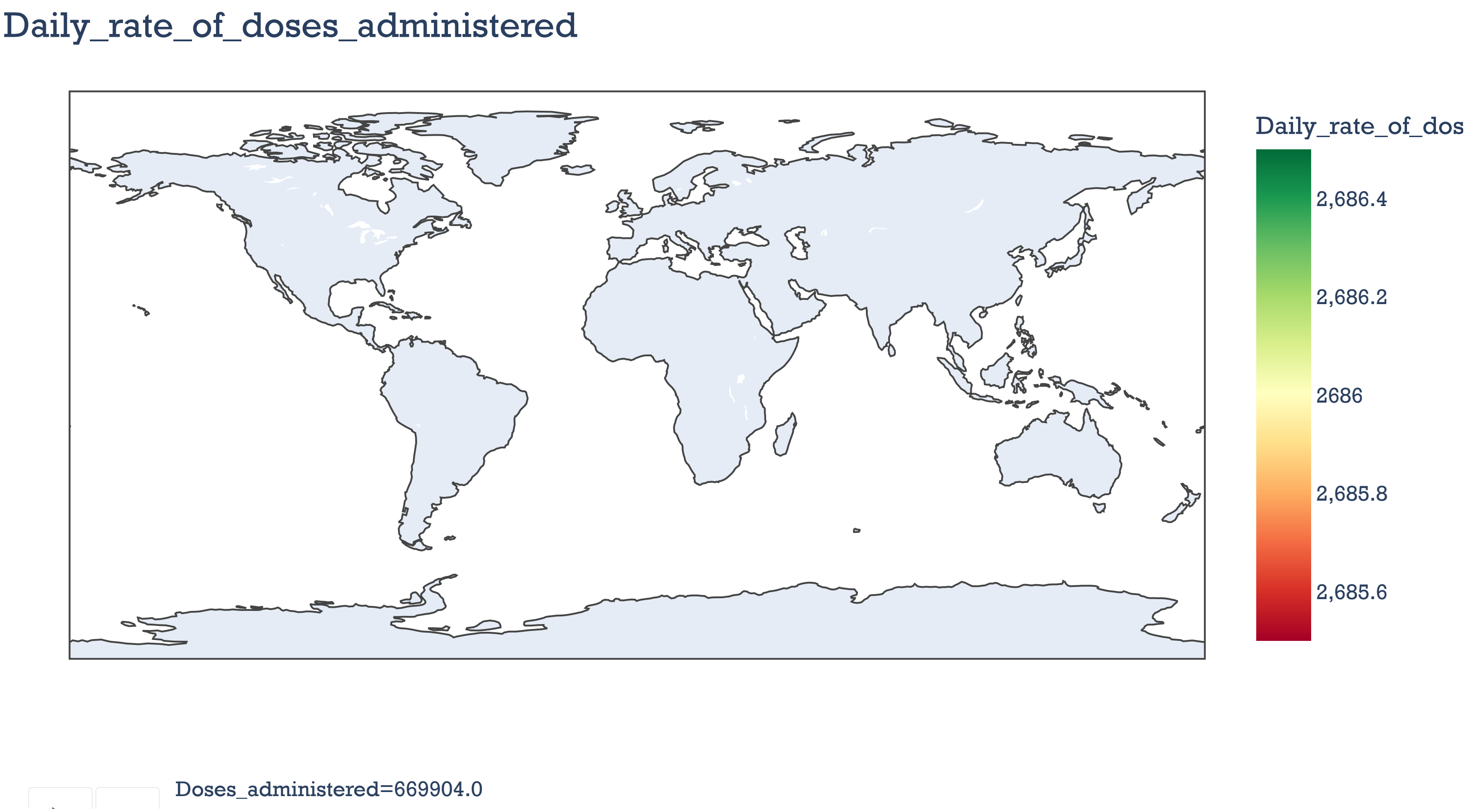
In [21]:

```
def plot_net_conv(scope,title):
 fig = px.choropleth(
 df,
 locations ="location",
 color ="Daily_rate_of_doses_administered",
 hover_name ="Daily_rate_of_doses_administered",
 scope=scope,
 color_continuous_scale='RdYlGn',
 animation_frame ="Doses_administered")

 fig.update_layout(title_text=title,
 font_family="Rockwell",
 title_font_size=20,
 coloraxis_colorbar=dict(
 title='Daily_rate_of_doses_administered'))

 fig.show()
```

In [22]:
```
plot_net_conv('world','Daily_rate_of_doses_administered')
```



In [ ]:
```
```