```python
import pandas as pd
c=pd.read_csv("https://covid.ourworldindata.org/data/owid-covid-data.csv")
c.head()
```

Out[6]:

	iso_code	continent	location	date	total_cases	new_cases	new_cases_smoothed	total_deaths	new_deaths	new_dea
0	AFG	Asia	Afghanistan	2020-02-24	1.0	1.0	NaN	NaN	NaN	
1	AFG	Asia	Afghanistan	2020-02-25	1.0	0.0	NaN	NaN	NaN	
2	AFG	Asia	Afghanistan	2020-02-26	1.0	0.0	NaN	NaN	NaN	
3	AFG	Asia	Afghanistan	2020-02-27	1.0	0.0	NaN	NaN	NaN	
4	AFG	Asia	Afghanistan	2020-02-28	1.0	0.0	NaN	NaN	NaN	

5 rows × 59 columns

Now as this a very big data we will focus on the dataset of united states. As a result we will filter out all other data

```python
dat_USA = c[c['iso_code']=="USA"]
dat_USA.shape
dat_USA.head()
```

Out[21]:

	iso_code	continent	location	date	total_cases	new_cases	new_cases_smoothed	total_deaths	new_deaths	new_dea
69738	USA	North America	United States	2020-01-22	1.0	NaN	NaN	NaN	NaN	
69739	USA	North America	United States	2020-01-23	1.0	0.0	NaN	NaN	NaN	
69740	USA	North America	United States	2020-01-24	2.0	1.0	NaN	NaN	NaN	
69741	USA	North America	United States	2020-01-25	2.0	0.0	NaN	NaN	NaN	
69742	USA	North America	United States	2020-01-26	5.0	3.0	NaN	NaN	NaN	

5 rows × 59 columns

```python
#We will convert date to index for variations with time
dat_USA['date'] = pd.to_datetime(dat_USA['date'], utc=True)
dat_USA_index = dat_USA.set_index('date')
dat_USA_index.head()
```

```
C:\Users\shams\AppData\Local\Continuum\anaconda3\lib\site-packages\ipykernel_launcher.py:2: S
ettingWithCopyWarning:
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
```

Out[33]:

	iso_code	continent	location	total_cases	new_cases	new_cases_smoothed	total_deaths	new_deaths	new_d
date									
2020-01-22 00:00:00+00:00	USA	North America	United States	1.0	NaN	NaN	NaN	NaN	
2020-01-23 00:00:00+00:00	USA	North America	United States	1.0	0.0	NaN	NaN	NaN	
2020-01-24 00:00:00+00:00	USA	North America	United States	2.0	1.0	NaN	NaN	NaN	
2020-01-25 00:00:00+00:00	USA	North America	United States	2.0	0.0	NaN	NaN	NaN	
2020-01-26 00:00:00+00:00	USA	North America	United States	5.0	3.0	NaN	NaN	NaN	

5 rows × 58 columns

```python
import seaborn as sns
import matplotlib.pyplot as plt
import warnings
warnings.filterwarnings("ignore")
dat_USA_index.dropna()
plt.figure(figsize=(14,6))
plt.ylim([0,2000])
plt.title("Variation in new cases per million, total_deaths per million with time")
sns.lineplot(data = dat_USA_index[['new_cases_per_million', 'total_deaths_per_million', 'peo
ple_fully_vaccinated_per_hundred']])
```

Out[53]: <matplotlib.axes._subplots.AxesSubplot at 0x2c1616c23c8>
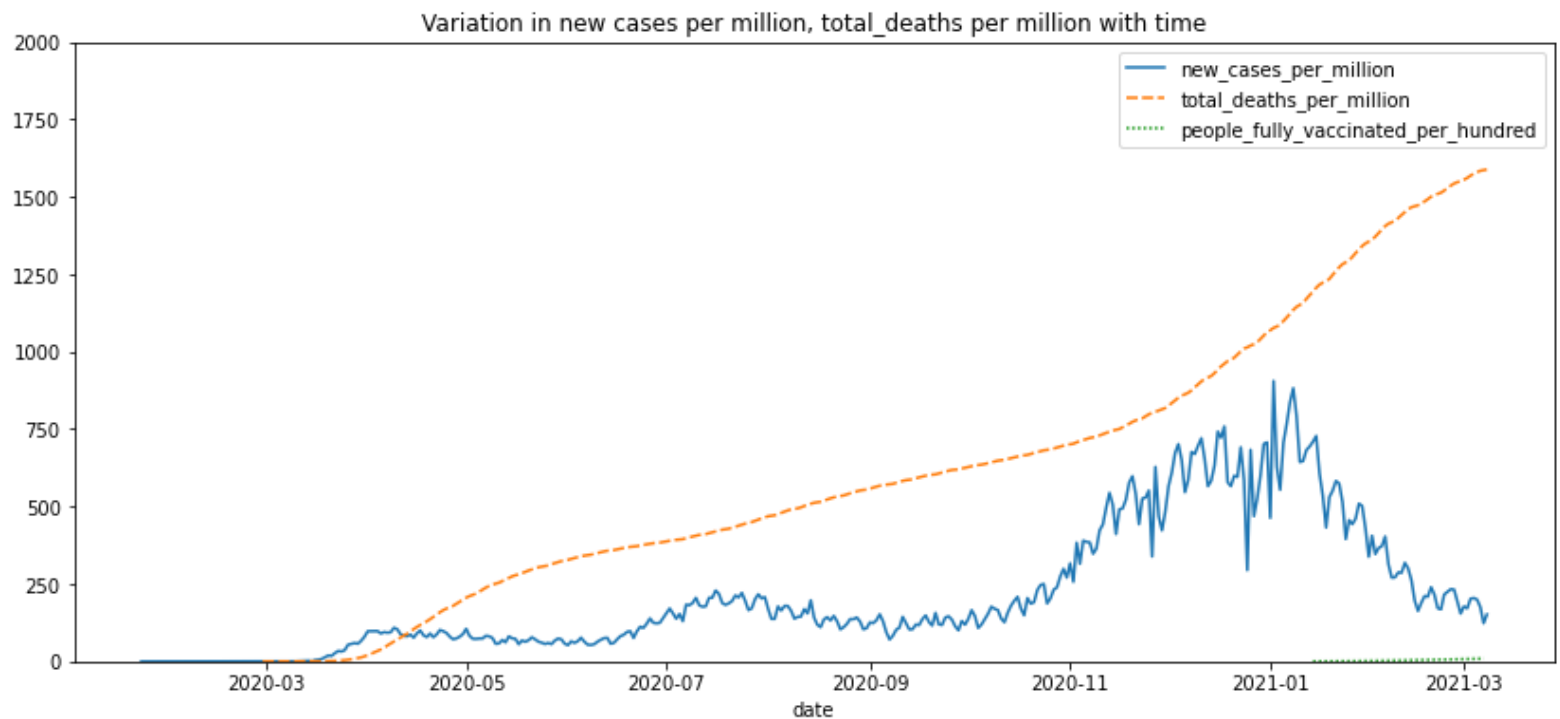
Also we can see that during 2021 people started to get vaccinated and the death rate started to decrease.

```python
import matplotlib.dates as mdates
from datetime import datetime
plt.figure(figsize=(14,6))
plt.ylim([0,1000])
plt.title("Variation in new cases per million with vaccination rate")
sns.lineplot(data=dat_USA_index.loc['2021-01-01':'2021-03-01','new_cases_per_million'], labe
l = 'date')
sns.lineplot(data=dat_USA_index.loc['2021-01-01':'2021-03-01','people_fully_vaccinated_per_h
undred'], label = 'vaccination rate')
```

Out[80]: <matplotlib.axes._subplots.AxesSubplot at 0x2c160ebc588>
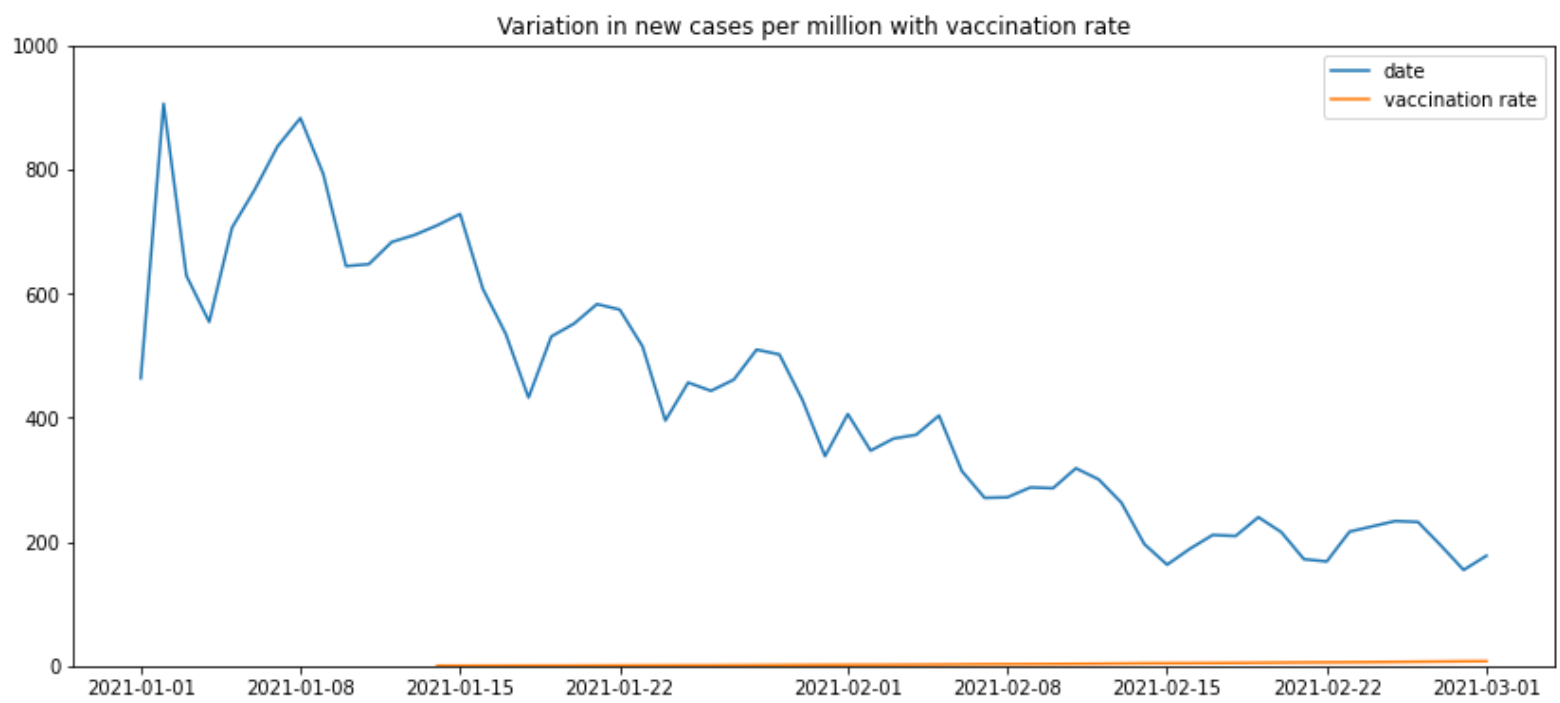
We can see a decline in new cases with vaccination dose rate whose supply increase during 2021.