Intensive Care in Germany

Data Source

[DIVI-Intensivregister](#) monitors the ICU capacities of 1,300 hospitals in Germany.

Setup

```python
In [21]:  # standard library
          import datetime
          import math
```

```python
In [22]:  # third party
          import numpy as np
          import pandas as pd
          import matplotlib.pyplot as plt
          import requests
```

Date this Notebook was run

```python
In [23]:  today = datetime.datetime.today().strftime('%Y-%m-%d')
          today
```

```
Out[23]:  '2021-04-26'
```

```python
In [24]:  # style like ggplot in R
          plt.style.use('ggplot')
```

```python
In [25]:  # Avoid cutting off part of the axis labels, see:
          # https://stackoverflow.com/questions/6774086/why-is-my-xlabel-cut-off-in-my-matplotlib-plot
          plt.rcParams.update({'figure.autolayout': True})
```

Get Data

```python
In [26]:  timeline_data = "https://diviexchange.blob.core.windows.net/%24web/bundesland-zeitreihe.csv"
```

In [27]:
```python
timeline_df = pd.read_csv(timeline_data)
```

In [28]:
```python
timeline_df.tail(3)
```

Out[28]:

	Datum	Bundesland	Anzahl_Meldebereiche_Erwachsene	Aktuelle_COVID_Faelle_Erwachsene_ITS	Belegte_Intensivbetten_Erwachsene
6848	2021-04-26T12:15:00+02:00	BERLIN	53	327	1022
6849	2021-04-26T12:15:00+02:00	HESSEN	99	471	1751
6850	2021-04-26T12:15:00+02:00	DEUTSCHLAND	1332	5107	20716

Rename Columns

Convert datatype of date column

In [29]:
```python
timeline_df["Datum"] = timeline_df["Datum"].str[:10]
timeline_df.head()
```

Out[29]:

	Datum	Bundesland	Anzahl_Meldebereiche_Erwachsene	Aktuelle_COVID_Faelle_Erwachsene_ITS	Belegte_Intensivbetten_Erwachsen
0	2020-03-20	SACHSEN	20	3	∠
1	2020-03-20	BREMEN	3	2	
2	2020-03-20	MECKLENBURG_VORPOMMERN	10	1	
3	2020-03-20	SAARLAND	4	1	
4	2020-03-20	HAMBURG	11	6	∠

In [30]:
```python
timeline_df.iloc[ : , [0]] = timeline_df.iloc[ : , [0]].apply(pd.to_datetime)
```

In [31]:
```python
timeline_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 6851 entries, 0 to 6850
Data columns (total 13 columns):
 #   Column                                    Non-Null Count  Dtype
---  ------                                    --------------  -----
 0   Datum                                     6851 non-null   datetime64[ns]
 1   Bundesland                                6851 non-null   object
 2   Anzahl_Meldebereiche_Erwachsene           6851 non-null   int64
 3   Aktuelle_COVID_Faelle_Erwachsene_ITS      6851 non-null   int64
 4   Belegte_Intensivbetten_Erwachsene         6851 non-null   int64
 5   Freie_Intensivbetten_Erwachsene           6851 non-null   int64
 6   7_Tage_Notfallreserve_Erwachsene          6851 non-null   int64
 7   Freie_IV_Kapazitaeten_Gesamt              6851 non-null   int64
 8   Freie_IV_Kapazitaeten_Davon_COVID         6851 non-null   int64
 9   Betriebssituation_Regulaerer_Betrieb      6851 non-null   int64
 10  Betriebssituation_Teilweise_Eingeschraenkt 6851 non-null   int64
 11  Betriebssituation_Eingeschraenkt          6851 non-null   int64
 12  Betriebssituation_Keine_Angabe            6851 non-null   int64
dtypes: datetime64[ns](1), int64(11), object(1)
memory usage: 695.9+ KB
```

In [32]:
```python
federal_level = timeline_df[timeline_df.Bundesland=='DEUTSCHLAND']
federal_level.tail()
```

Out[32]:

	Datum	Bundesland	Anzahl_Meldebereiche_Erwachsene	Aktuelle_COVID_Faelle_Erwachsene_ITS	Belegte_Intensivbetten_Erwachsene	Freie_Inte
6782	2021-04-22	DEUTSCHLAND	1332	5034	21109	
6799	2021-04-23	DEUTSCHLAND	1332	5037	21072	
6816	2021-04-24	DEUTSCHLAND	1332	5008	20787	
6833	2021-04-25	DEUTSCHLAND	1332	5040	20494	
6850	2021-04-26	DEUTSCHLAND	1332	5107	20716	

Used Beds (Adults)

In [33]:
```python
used_beds = federal_level.loc[ : , ['Datum', 'Belegte_Intensivbetten_Erwachsene']]
used_beds.columns = ['date', 'ICU beds in use (adults)']
used_beds.info()
```
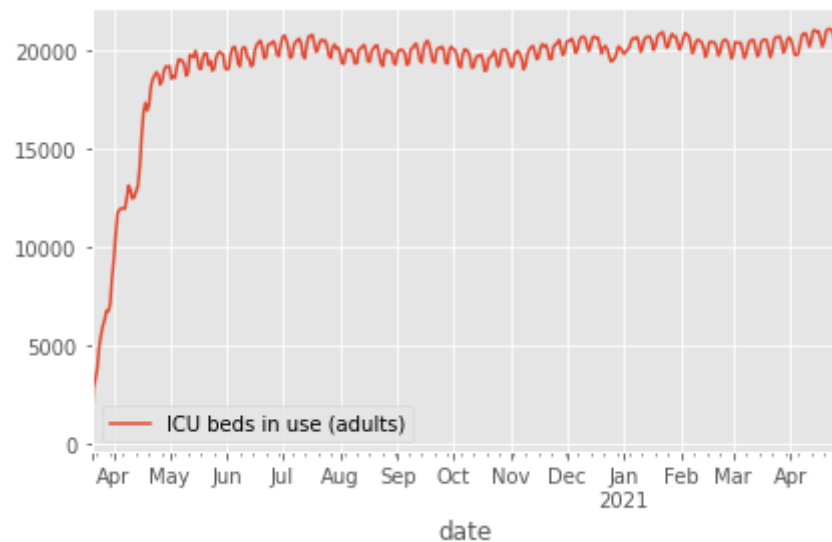
```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 403 entries, 16 to 6850
Data columns (total 2 columns):
 #   Column                    Non-Null Count  Dtype
---  ------                    --------------  -----
 0   date                      403 non-null    datetime64[ns]
 1   ICU beds in use (adults)  403 non-null    int64
dtypes: datetime64[ns](1), int64(1)
memory usage: 9.4 KB
```

In [34]:
```python
used_beds.set_index('date', inplace=True)
```

In [35]:
```python
used_beds.plot()
```

Out[35]: <AxesSubplot:xlabel='date'>

Covid-19 patients in ICU

In [36]:
```python
icu = federal_level.loc[ : , ['Datum', 'Aktuelle_COVID_Faelle_Erwachsene_ITS']]
```
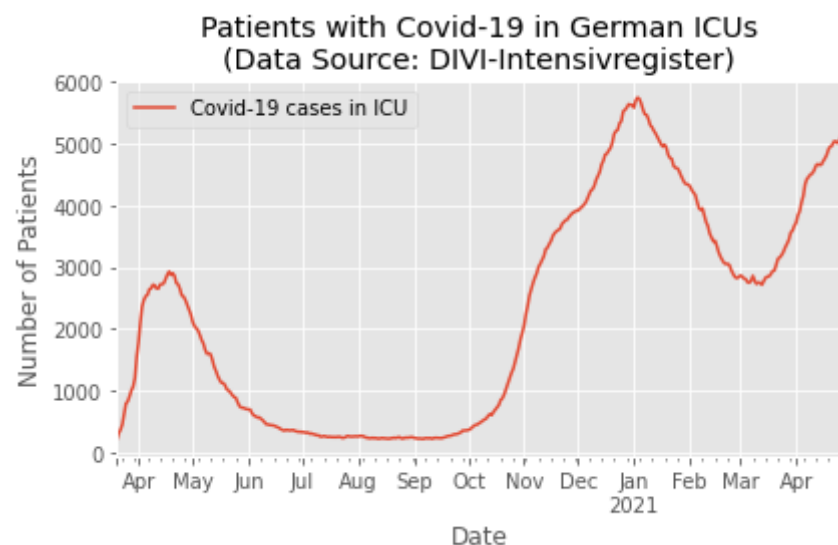
In [37]:
```python
icu.columns = ['date', 'Covid-19 cases in ICU']
```

```
icu.set_index('date', inplace=True)
icu.info()
```

```
<class 'pandas.core.frame.DataFrame'>
DatetimeIndex: 403 entries, 2020-03-20 to 2021-04-26
Data columns (total 1 columns):
 #   Column               Non-Null Count  Dtype
---  ------               --------------  -----
 0   Covid-19 cases in ICU  403 non-null    int64
dtypes: int64(1)
memory usage: 6.3 KB
```

In [38]:
```python
icu_cases = icu.plot(
    title='Patients with Covid-19 in German ICUs\n(Data Source: DIVI-Intensivregister)',
    xlabel='Date',
    ylabel='Number of Patients')
```


In [39]:
```python
fig = icu_cases.get_figure()
fig.savefig('img/covid-19-patients-in-icu-germany.png')
```

In [ ]: