In [34]:

```python
import statsmodels.api as sm
import matplotlib.pyplot as plt
import pandas as pd
from pandas import read_csv
import numpy as np
```

In [35]:

```python
url = 'https://raw.githubusercontent.com/Jneny/Hospitalcapacity/main/Data/icu_beds.csv'
data = read_csv(url, header=0, parse_dates=[0], index_col=0)
data = data.asfreq('d')
adultcrit = pd.DataFrame(data, columns=['adult_icu_crci_patients'])
sadultcrit = pd.Series(adultcrit.adult_icu_crci_patients)
```

In [36]:

```python
size = 571
adtrain = adultcrit.iloc[:size]
adtest = adultcrit.iloc[size:]
```

In [37]:

```python
adtest.head()
```

Out[37]:

date	adult_icu_crci_patients
2021-11-23	133
2021-11-24	135
2021-11-25	135
2021-11-26	138
2021-11-27	132

In [38]:

```python
model_whole = sm.tsa.ARIMA(adtrain, order = (1,1,1))
result_whole = model_whole.fit()
```

In [40]:

```python
fig, ax = plt.subplots()
ax = adtrain.loc['2020-05-02':].plot(ax=ax)
fig = result_whole.plot_predict(start = '2021-11-23', end = "2022-02-14", dynamic=True, ax=ax, plot_insample=False)
plt.show()
```
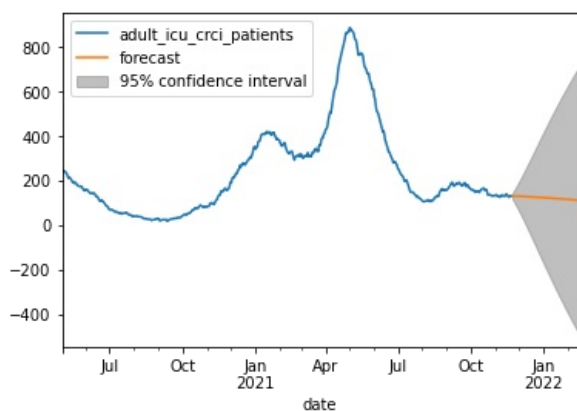

In [41]:

```python
from sklearn.metrics import r2_score, median_absolute_error, mean_absolute_error
from sklearn.metrics import median_absolute_error, mean_squared_error, mean_squared_log_error
```

In [42]:

```python
# calculate root mean squared error
from sklearn.metrics import mean_squared_error
import math
from math import sqrt
```

In [46]:

```python
# calculate mean absolute percentage error MAPE
def mape(actual, pred):
    actual, pred = np.array(actual), np.array(pred)
    return np.mean(np.abs((actual - pred) / actual)) * 100
```

In [47]:

```python
predictions = result_whole.predict(start = '2021-11-23', end = "2022-02-14")
rmse= math.sqrt(mean_squared_error(adtest['adult_icu_crci_patients'], predictions))
print(rmse)
mape = mape(adtest['adult_icu_crci_patients'], predictions)
print(mape)
```

```
376.4515983316768
100.0836908528111
```

In [48]:

```python
print(f'Mean Absolute Error = {mean_absolute_error(adtest,predictions)}')
print(f'Mean Squared Error = {mean_squared_error(adtest,predictions)}')
```

```
Mean Absolute Error = 330.35427825668523
Mean Squared Error = 141715.80588647412
```