

- mysql query

```
SELECT YEAR(cout) AS Years, MONTH(cout) AS Months, SUM(CASE WHEN deweyClass != '' THEN 1 ELSE 0 END) AS Dewey_Data
FROM spl_2016.outraw WHERE YEAR(cout) >= '2019' AND YEAR(cout) <= '2021' GROUP BY
YEAR(cout) , MONTH(cout);
```

```
SELECT YEAR(cout) AS Years, MONTH(cout) AS Months, SUM(CASE WHEN deweyClass >609 AND
deweyClass<620 THEN 1 ELSE 0 END) AS
Med_Health FROM spl_2016.outraw WHERE YEAR(cout) >= '2019' AND YEAR(cout)
<= '2021' GROUP BY YEAR(cout) , MONTH(cout);
```

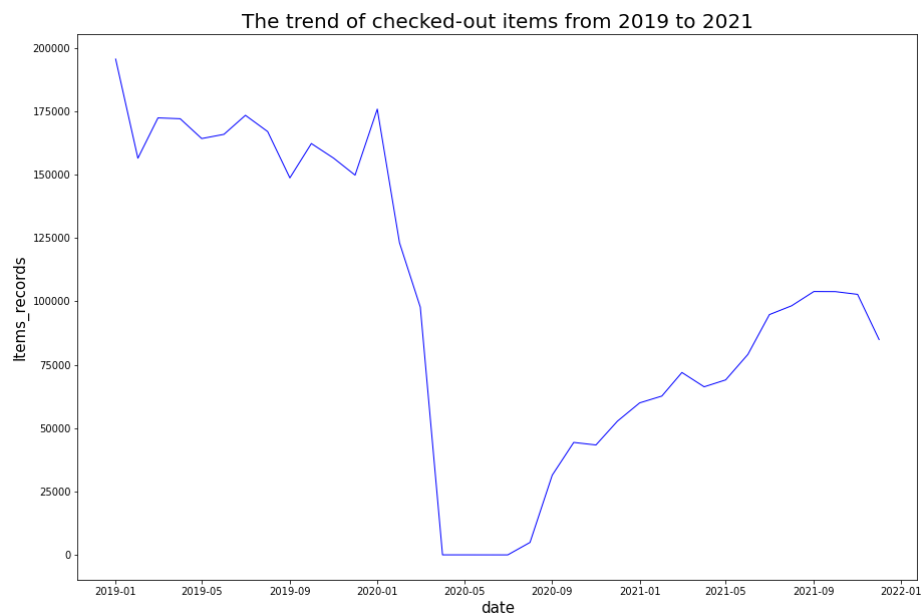
```
SELECT YEAR(cout) AS Years, MONTH(cout) AS Months, SUM(CASE WHEN title !=
'' THEN 1 ELSE 0 END) AS data_out FROM spl_2016.outraw WHERE title LIKE
'%COVID%' and YEAR(cout) >= '2019' AND YEAR(cout) <= '2021' GROUP BY
YEAR(cout) , MONTH(cout);
```

- Purpose

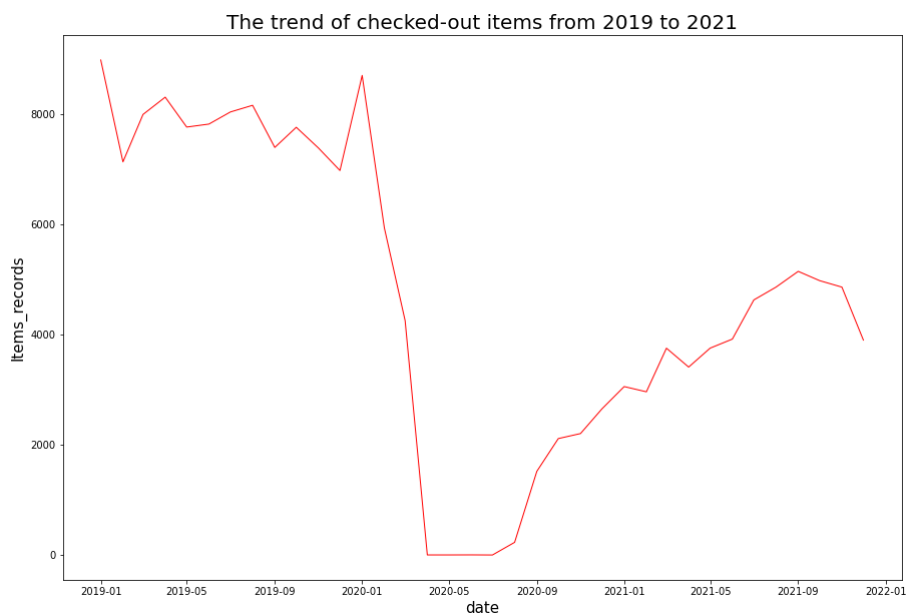
The major interest of this visualization project is to explore the influence of the pandemic on the volume of check-out items from the Seattle Public library from 2019 to 2021. Specifically, I extracted all check-out items, medicine & health category items, epidemic, and covid-19 related items during this period, and conduct some preliminary analysis.

- Data Visualization

All items check-out from library from 2019 to 2021

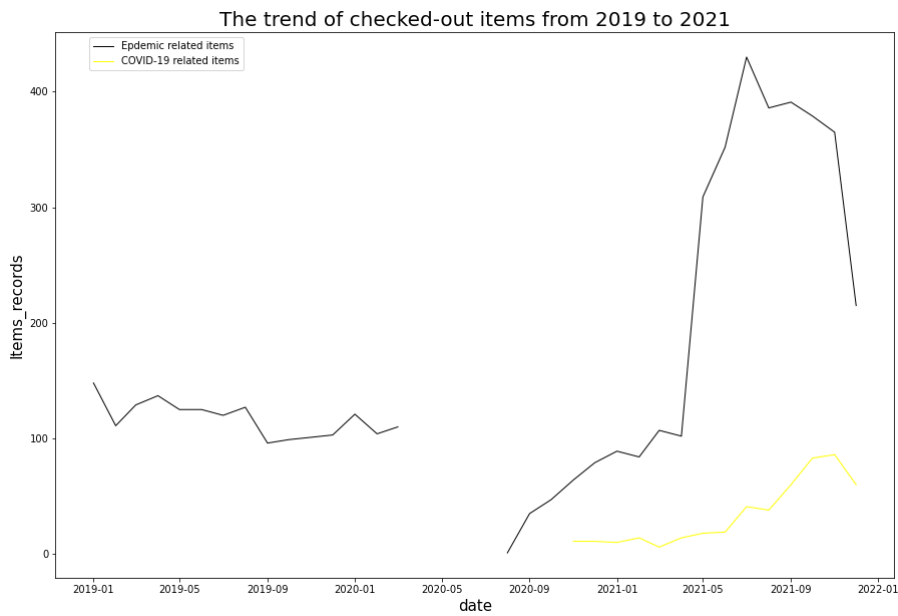


### Medicine & Health category check-out from library from 2019 to 2021



Epedemic related items check-out from libaray from 2019 to 2021

Covid-19 related items check-out from library from 2019 to 2021



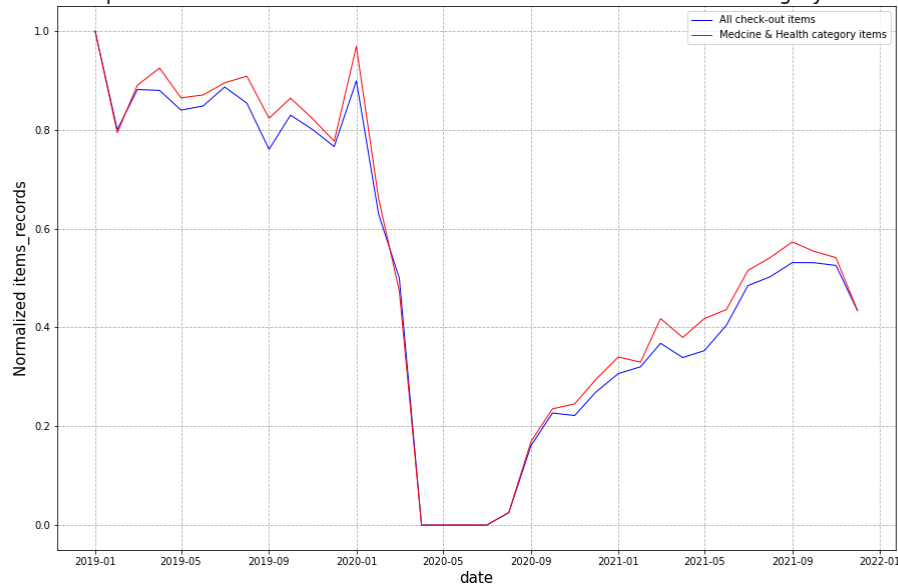
The linear interpolation is applied to refill the missing records in the Epidemic related check-out items.

To make a comparison between those data, normalization needs to be applied to transform those data into the same scale. Min-max normalization method is applied.

$$transformed_x = \frac{x - \min(x)}{\max(x) - \min(x)}$$

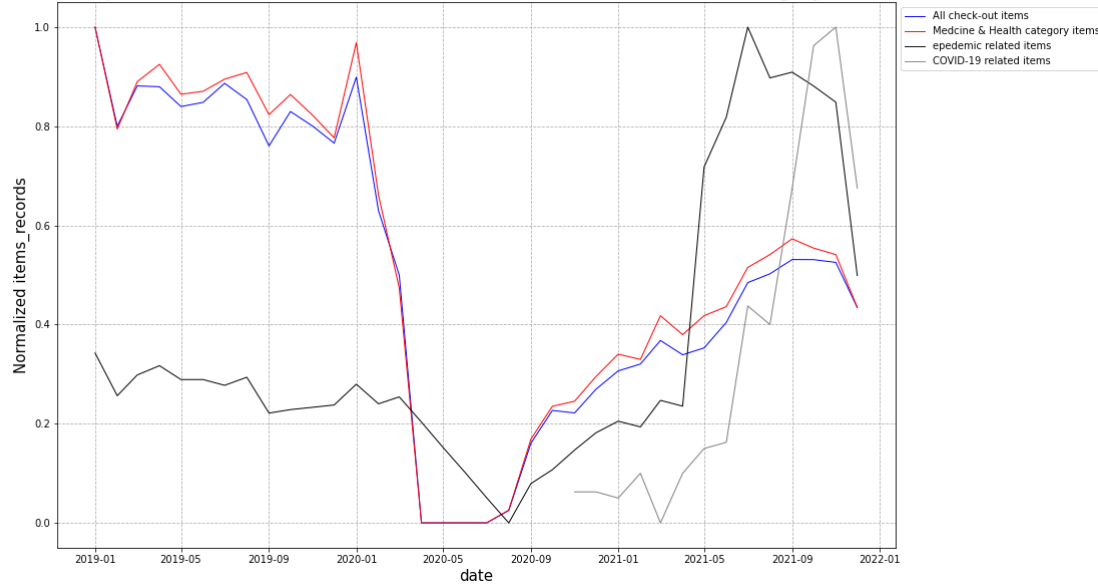
The Comparison between All check-out items and Medicine & Health category items after normalization.

The trend of comparison between normalized all checked-out items and health category from 2019 to 2021



The Comparison between All check-out items, Medicine & Health category items, Epidemic and COVID-19 related check-out items after normalization.

The trend of comparison between normalized all checked-out items and health category from 2019 to 2021



### The Conclusion:

1. From figure1, we can see that the pandemic did have a great influence on the number of check-out items from library. The peak of the check-out happened in 2019. During the pandemic, there are extremely low check-out volume (Probably because of the limitation of the in-person visit to the Library). After the reopening of the library, the monthly number of check-out is low than itself before the pandemic. But, we can see that there is an increasing trend in the number of check-out after the recovery from pandemic.
2. Figure2 &4, display the trend of medicine and health category check-out items, the trend is similar to the trend of total check-out items. After normalizing the data (transforming data into the same scale 0-1), the correlation between these two is as high as 0.99, which probably means that the pandemic did not influence people to borrow more medicine-related items from the library.
3. From figure3&5, we can see that there is a drastic increase in number of people who borrow epidemic and COVID-19 topic-related items, which probably indicates that people tend to read more books, papers, etc. about epidemic and COVID-19 after the pandemic. Under the situation that the total volume of medicine and health check-out did not increase compared with all check-out items. I can reasonably assume that people who is in medicine and health research field tend to spend more time on the epidemic and COVID-19 related readings than other subcategories under medicine and health.