Paula McCree Bailey
Final Project
August 16, 2020

My final project is on the effects of COVID19 on the crime rate in Chicago, Illinois so far in 2020. The ongoing COVID-19 pandemic began in Illinois on January 24, 2020, when a woman from Chicago returned from Wuhan, China and tested positive for the virus. Fast forward to August 14, 2020, Illinois has had 202,691 cases with 65,481 cases of COVID-19 identified as Chicago residents. Sadly, there are 2,882 deaths from the virus.

As a brief background, I struggled finding a data set. Originally, I was drawn to the effects of the pandemic on the migrant population in the United States. There is a similar article and discussion on MPI's website. Next, I was drawn towards an article on veterans and how they progress 1, 5, and 10 years after leaving the armed service. In both articles, data was used from the Census Bureau. After using queries and looking at recent CPS data, I was unable to create a useable dataset. Either the dataset was full of errors, did not have usable fields or the data did not have a good data dictionary (in the case of the veteran dataset). So, after 4 days of looking, I found the Chicago crime data site via Tableau. This is the same data set we used in R. This is not a first choice for this project, but time is running out.

This dataset reflects reported incidents of crime (except for murders where data exists for each victim) that occurred in the City of Chicago from 2001 to present, minus the most recent seven days. https://data.cityofchicago.org/Public-Safety/Crimes-2019/w98m-zvie This data is provided by the Chicago Police Department. The entire dataset contains 22 columns and over 260,000 rows of observation. Each row is data represents a unique incident.

Column Name	Description	Type
ID	Unique identifier for the record.	Number
Case Number	The Chicago Police Department RD Number.	Plain Text
Date	Date when the incident occurred.	Date & Time
Block	The partially redacted address where the incident occurred.	Plain Text
IUCR	The Illinois Uniform Crime Reporting code.	Plain Text
Primary Type	The primary description of the IUCR code.	Plain Text

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Description	The secondary description of the IUCR code.	Plain Text
Location Description	Description of the location where the incident occurred.	Plain Text
Arrest	Indicates whether an arrest was made.	Checkbox
Domestic	Indicates whether the incident was domestic-related.	Checkbox
Beat	Indicates the beat where the incident occurred.	Plain Text
District	Indicates the police district where the incident occurred.	Plain Text
Ward	The ward (City Council district) where the incident occurred.	Number
Community Area	Indicates the community area where the incident occurred.	Plain Text
FBI Code	Indicates the crime classification as outlined in the FBI's NIBRS	Plain Text
X Coordinate	The x coordinate of the location where the incident occurred.	Number
Y Coordinate	The y coordinate of the location where the incident occurred.	Number
Year	Year the incident occurred.	Number
Updated On	Date and time the record was last updated.	Date & Time
Latitude	The latitude of the location where the incident occurred.	Number
Longitude	The longitude of the location where the incident occurred.	Number
Location	The location where the incident occurred.	Location

Pulled from https://data.cityofchicago.org/

To analyze the data, I exported the entire 2019 criminal dataset and the 2020 data set from the Chicago Police site. In that file, I decided to only use the data from 1/1/2019 to 8/1/2019 and 1/1/2020 to 8/1/2020. For the project, I wanted to complete a comparison during this time frame.

Chicago also has a portal to export the 2020 COVID19 infections and deaths. This dataset also matched the death count as of August 14th. https://catalog.data.gov/dataset/covid-19-daily-cases-and-deaths After an initial review, I deleted a row with data but no label. After deletion, the data still had 2,822 deaths.

Using the Chicago criminal data, geospatial data from the same crime website and the COVID19 data set, I was unable to locate a unique item to create a relationship. This made it difficult to create a successful join (union) with the tables. I also using a technique called blending unsuccessfully. I wanted to create a line chart that displayed the 2019 crime results, 2020 crime results, and the 2020 COVID results. In addition, I wanted to use the geospatial data from https://data.cityofchicago.org/Public-Safety/Boundaries-Police-Districts-

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current-/fthy-xz3r to compare the individual districts within Chicago (2019 to 2020). The file contained a "shp" file, but I could not create the boundaries.

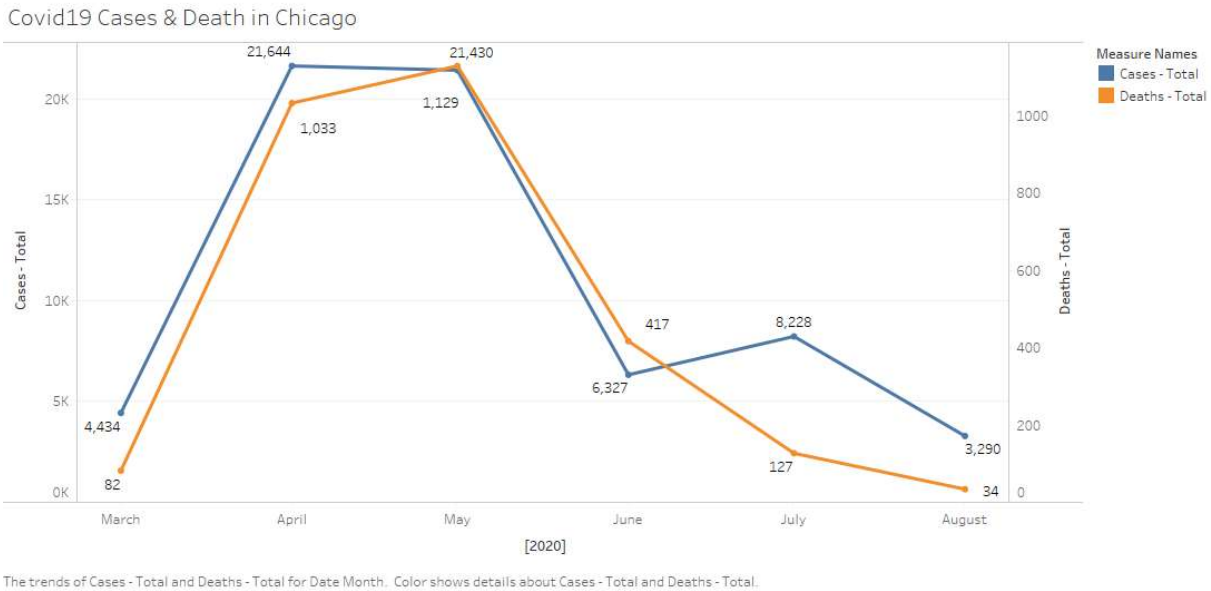
However, I used geospatial longitude and latitude for each incident to chart the unique IDs as they fall within in the District.

My final project is to explore the effects of COVID19 on the crime rate in Chicago, Illinois so far in 2020. Chicago has been known for having a high crime rate especially murder rate. In 2019, 492 individuals lost their lives and 567 were killed in 2018. So, in 2020 was there a significant effect on crime in general due to the pandemic, social distancing, and state government mandates?

Timeline of Covid19

Below is a COVID19 line graph of infections and deaths in the state. I think it is important to display the infections and deaths, so the observer can get an ideal how bad the situation is in the state. As I mentioned above, I was really trying to create a 2020-line graph that contained the number of infections and criminal incidents.

The chart created uses dual axis, so both the 2019 and 2020 data would appear in the same space. It shows how the virus spikes in May with 1,129 deaths and 21,430 infections and has been decreasing since.



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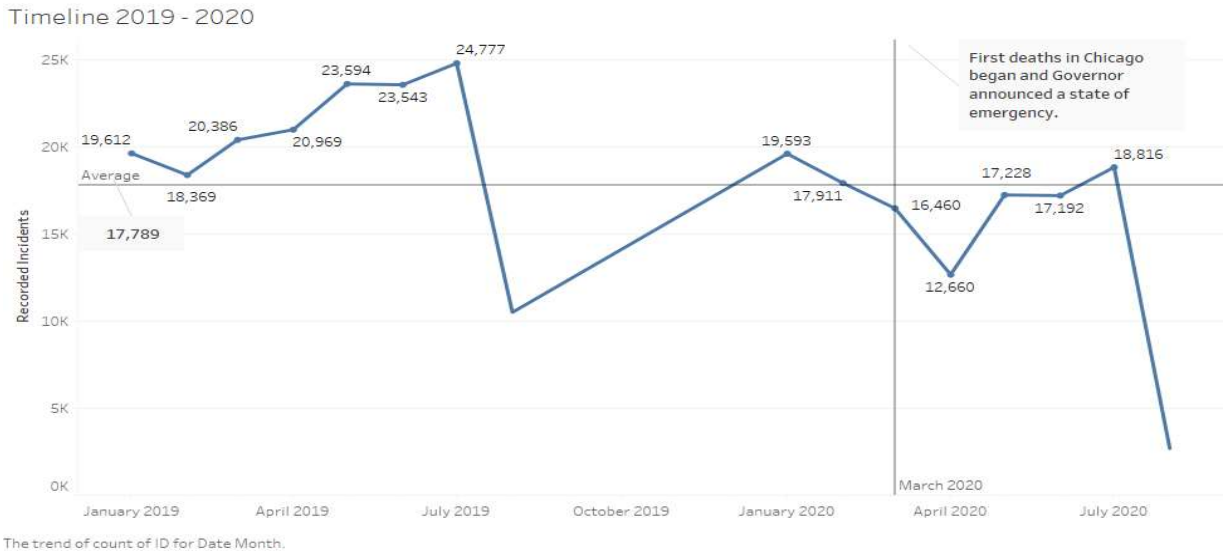
Timeline of Crime Rate

The best way to visualize the crime rate is with a line graph. The line graph below displays the criminal incidents from 1/1/2019 through 8/1/2020. The chart does indicate that the crime rate has been falling in 2020.

I did notice the crime rate declined drastically after July 2019 until the beginning of the year. I am curious if there is an annual drop in the crime rate after July. If I had more time, I would add this to my exploration.



To get a closer look, I created 2-line charts from January to July for both years. As notated, the crime rate in March 2019 was 20,368 and it declined in 2020 to 16,460. To make it easier to see the changes I kept the axis for both charts the same. A better option rather than a line chart would have been a simple bar chart with the month for 2019 and 2020 displayed side by side. I struggled with creating a chart in Tableau that contained the same data for two different periods of time. The closest creation had the information for the months grouped together for each year. This chart is on the next page.

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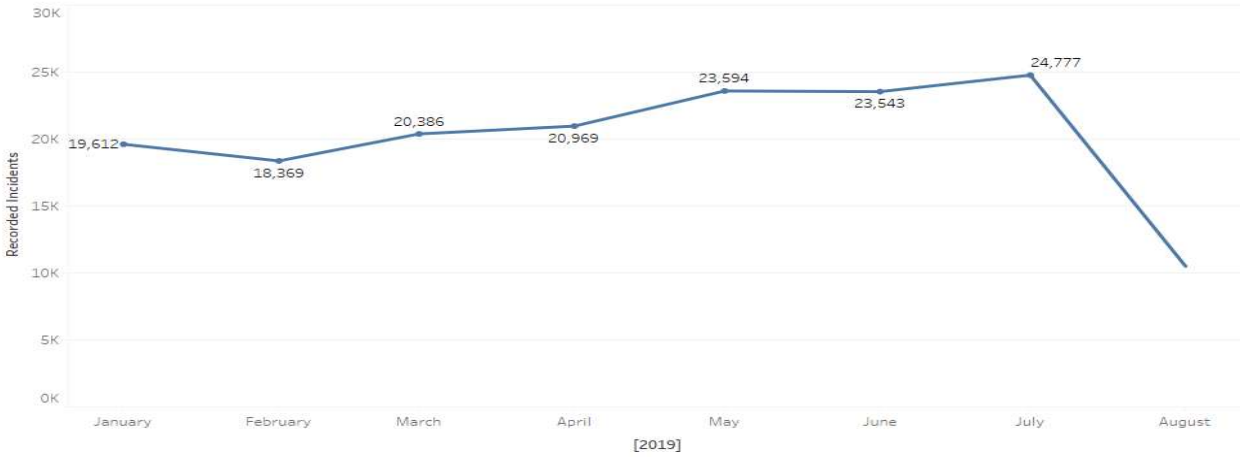
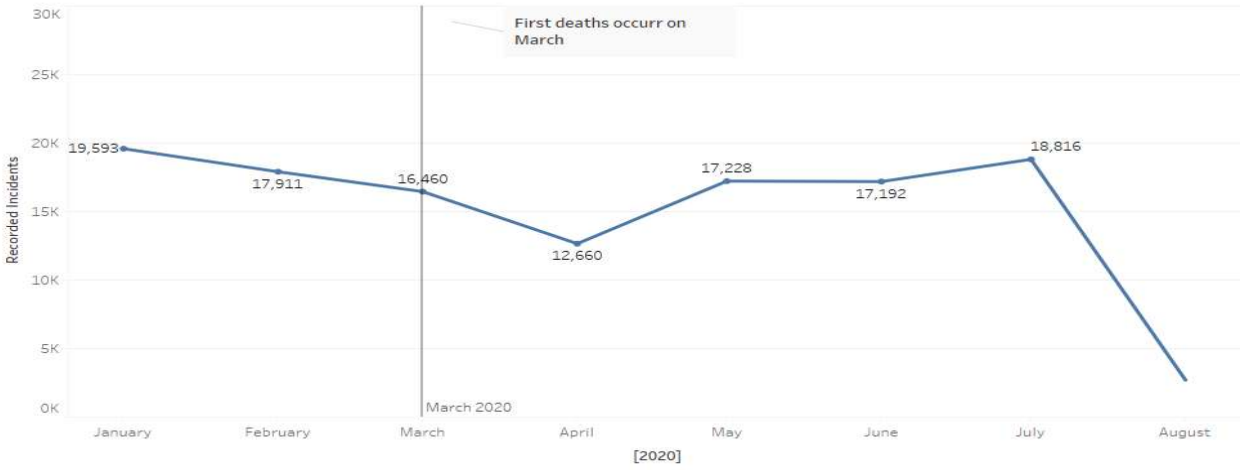
Crime 2019



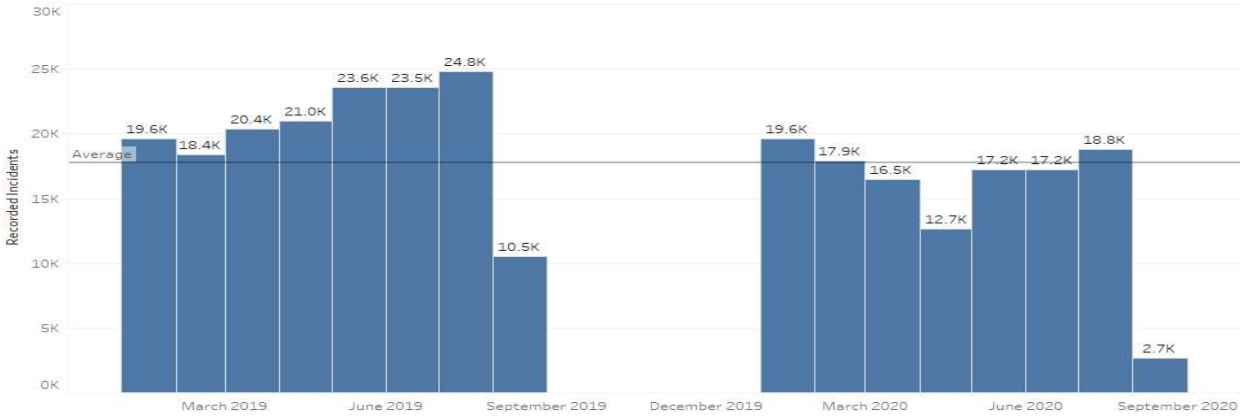
The trend of count of ID for Date Month. The view is filtered on Date Month, which ranges from January 2019 to August 2019.

Crime 2020



The trend of count of ID for Date Month. The view is filtered on Date Month, which ranges from January 2020 to August 2020.

Crime 2019,2020



The plot of count of ID for Date Month.

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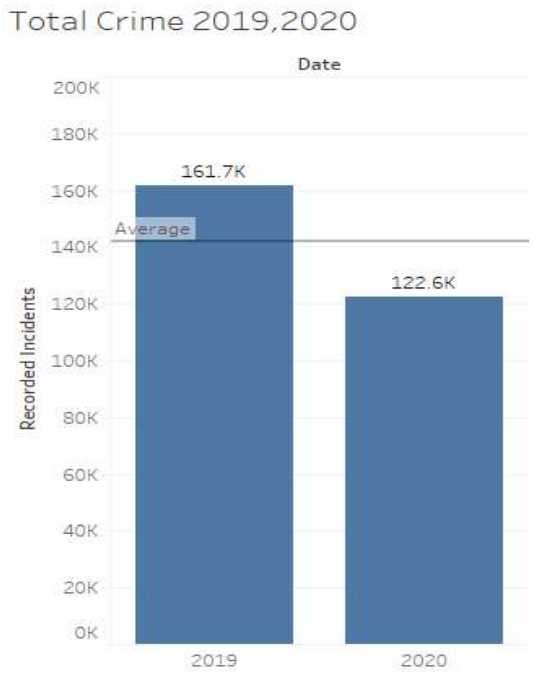

Count of ID for each Date Year. The data is filtered on Date Month, which ranges from January 2019 to August 2020.

So, it looks like there has been an approximately 39,000 decline in criminal activity from 2019 to 2020 for the months January 2019 to July 2020. Next, let us see if there is a certain area that is experiencing a reduction in criminal activity.

I started off by creating a text chart that listed the primary type alphabetical with the totals of 2019 and 2020. Based on the list, I would create 2 groups which contains the Primary "criminal" type with small quantities.

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Table: Primary Type

Primary Type	2019	2020
ARSON	223	328
ASSAULT	13,010	10,838
BATTERY	31,247	25,298
BURGLARY	5,757	5,297
CONCEALED CARRY LICENSE VIOLATION	129	88
CRIM SEXUAL ASSAULT	669	117
CRIMINAL DAMAGE	16,526	14,917
CRIMINAL SEXUAL ASSAULT	346	603
CRIMINAL TRESPASS	4,231	2,650
DECEPTIVE PRACTICE	11,392	7,840
GAMBLING	89	15
HOMICIDE	312	460
HUMAN TRAFFICKING	8	3
INTERFERENCE WITH PUBLIC OFFICER	1,002	449
INTIMIDATION	106	90
KIDNAPPING	111	69
LIQUOR LAW VIOLATION	151	81
MOTOR VEHICLE THEFT	5,635	5,307
NARCOTICS	9,507	4,351
NON-CRIMINAL	2	
OBSCENITY	36	31
OFFENSE INVOLVING CHILDREN	1,473	1,155
OTHER NARCOTIC VIOLATION	4	5
OTHER OFFENSE	10,788	7,426
PROSTITUTION	442	214
PUBLIC INDECENCY	4	4
PUBLIC PEACE VIOLATION	986	937
ROBBERY	4,796	4,344
SEX OFFENSE	775	549
STALKING	144	105
THEFT	37,864	24,599
WEAPONS VIOLATION	3,983	4,383

Year

Year for each Primary Type. The marks are labeled by count of Primary Type.

I started off by creating a text chart that listed the primary type alphabetical with the totals of 2019 and 2020.

Based on the list, I would create two groups which contain the Primary "criminal" type with small quantities.

Group 1 contains Arson, Assault, Concealed carry license, Gambling, Human Trafficking, Intimidating, Kidnapping, Liquor law violation, non-criminal, obscenity, other narcotic violation, public indecency, and stalking.

Group 2 contains crim sexual assault, criminal sexual assault, prostitution, and sexual offense.

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Primarty Type Group - Slope Chart

The trend of count of ID for Date Year broken down by Primary Type (group).

This chart provides the absolute values for the 2019 and 2020 criminal incidents.

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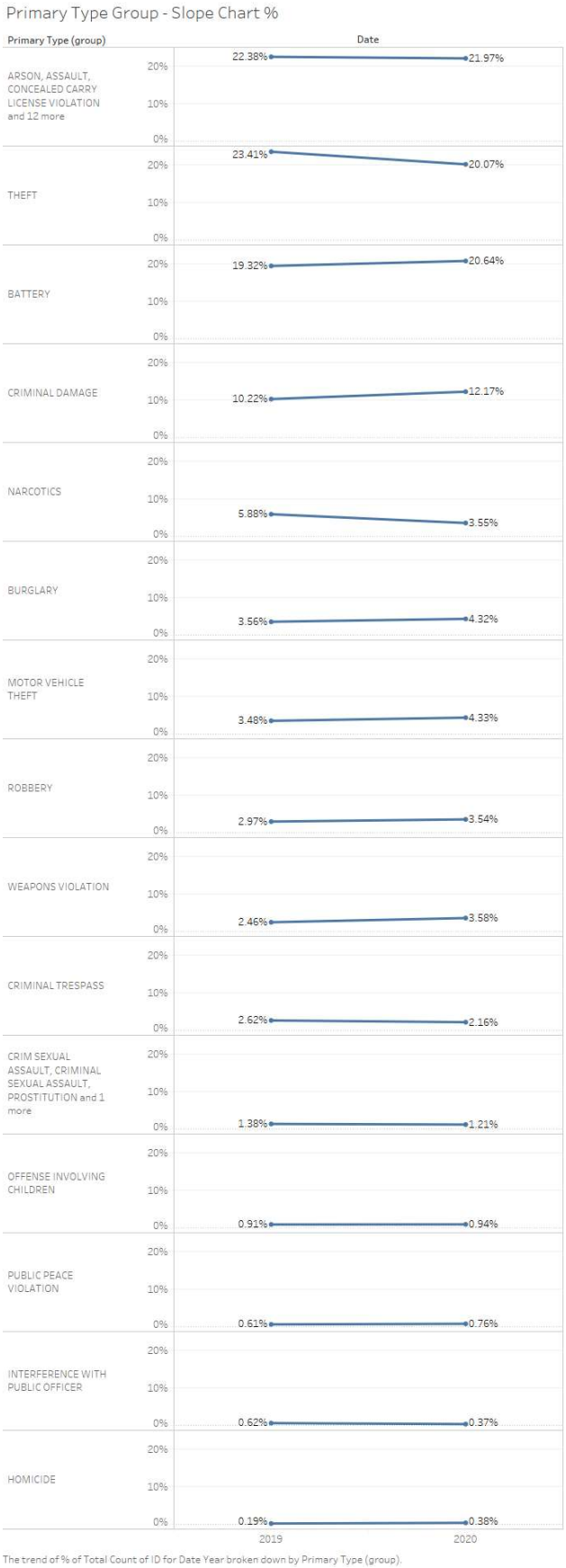

A better way to determine the change in criminal incidents is with percentage change.

As noted on the slope chart to the left, Chicago's crime in general remained either constant or decrease in 2020.

Some noted exceptions are in the areas of Weapon violation and Homicide which experienced at least an 10% increase.

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Table: Primary Type % (group)

Primary Type (group)	2019	2020
ARSON, ASSAULT, CONCEALED CARRY LICENSE..	22.38%	21.97%
BATTERY	19.32%	20.64%
BURGLARY	3.56%	4.32%
CRIM SEXUAL ASSAULT, CRIMINAL SEXUAL AS..	1.38%	1.21%
CRIMINAL DAMAGE	10.22%	12.17%
CRIMINAL TRESPASS	2.62%	2.16%
HOMICIDE	0.19%	0.38%
INTERFERENCE WITH PUBLIC OFFICER	0.62%	0.37%
MOTOR VEHICLE THEFT	3.48%	4.33%
NARCOTICS	5.88%	3.55%
OFFENSE INVOLVING CHILDREN	0.91%	0.94%
PUBLIC PEACE VIOLATION	0.61%	0.76%
ROBBERY	2.97%	3.54%
THEFT	23.41%	20.07%
WEAPONS VIOLATION	2.46%	3.58%

Year

Year for each Primary Type (group). The marks are labeled by % of Total Count of Primary Type.

Table: Primary Type diff % (group)

Primary Type (group)	2019	2020
HOMICIDE		47.4%
WEAPONS VIOLATION		10.0%
PUBLIC PEACE VIOLATION		-5.0%
MOTOR VEHICLE THEFT		-5.8%
BURGLARY		-8.0%
ROBBERY		-9.4%
CRIMINAL DAMAGE		-9.7%
BATTERY		-19.0%
OFFENSE INVOLVING CHILDREN		-21.6%
ARSON, ASSAULT, CONCEALED CARRY LICENSE..		-25.6%
CRIM SEXUAL ASSAULT, CRIMINAL SEXUAL AS..		-33.6%
THEFT		-35.0%
CRIMINAL TRESPASS		-37.4%
NARCOTICS		-54.2%
INTERFERENCE WITH PUBLIC OFFICER		-55.2%

Year

Year for each Primary Type (group). The marks are labeled by % Difference in Count of Primary Type.

This percentage chart does a good job pointing out the areas with an increase in criminal activity.

This is a case where you do not need a fancy chart to make a point.

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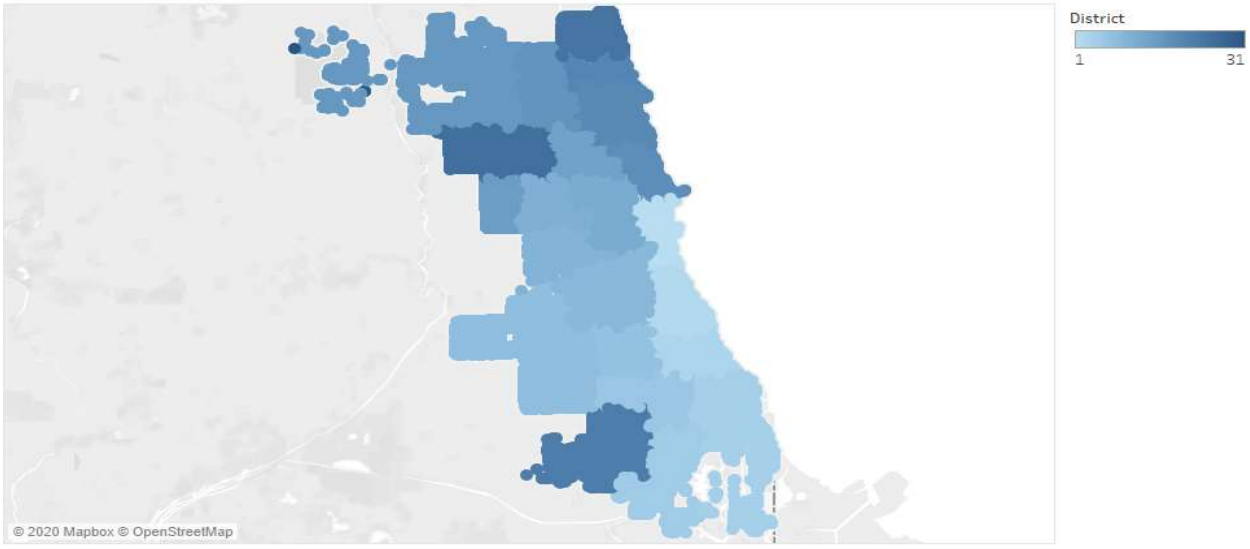
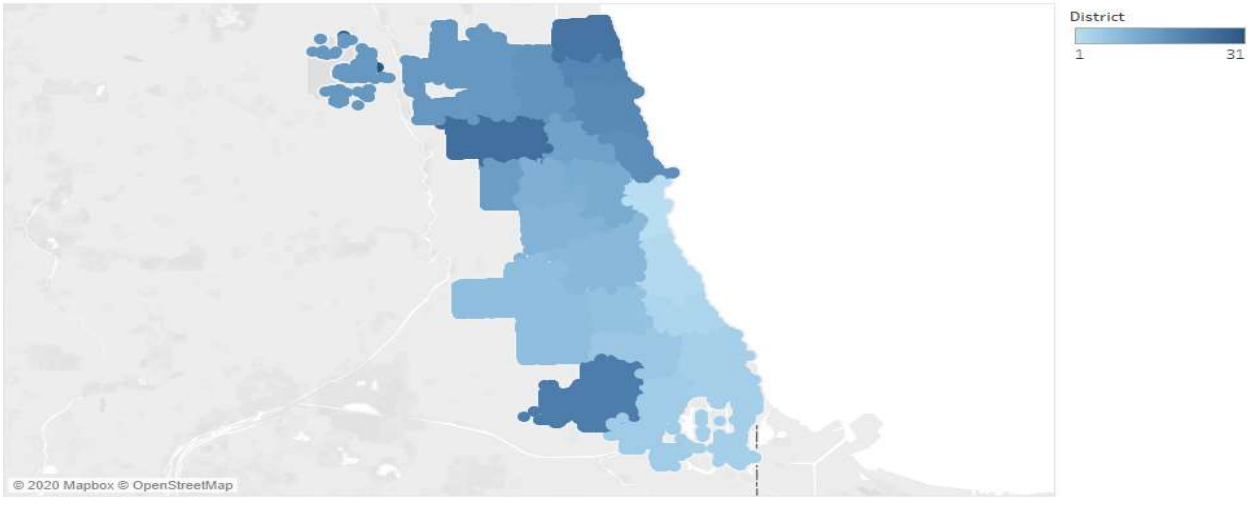
Lastly, a more visual way to see the data is with geospatial. I used the geospatial locations to chart the sum of the IDs based on the district in Chicago. Looking at the charts, you see little changes. There are some changes in the upper left. The intention was the sum of IDs, but it looks like the location for each incident. Since I was not able to properly rank the district or providing labels like the sum of ID within a district, or even a standard label for the district, I debated if I should use it in this report.

Geospatial 2019



Map based on Longitude and Latitude. Color shows District. Details are shown for ID.

Geospatial 2020



Map based on Longitude and Latitude. Color shows District. Details are shown for ID.

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In conclusion, the data does hold true that the pandemic has affected the criminal activity in Chicago. It is interesting that homicides experienced an increase from 2019 to 2020 of almost 50%.