

# BAN 140 (ZAA) – INTRODUCTION TO DATA VISUALIZATION

PROJECT MILESTONE 4 – DATA REPORT

GROUP 3

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## Target Audience

This data analysis is meant for the senior management of the Toronto police department. It will help them in analyzing the crime rate in Toronto and they will also gain insights into the type of crimes that have occurred. For instance, the trend of crime rates over the years, most frequent types of offenses occurred in Toronto, etc. Moreover, it is also meant for the public to create safety awareness among them and educate them regarding the crimes happening in their neighborhoods.

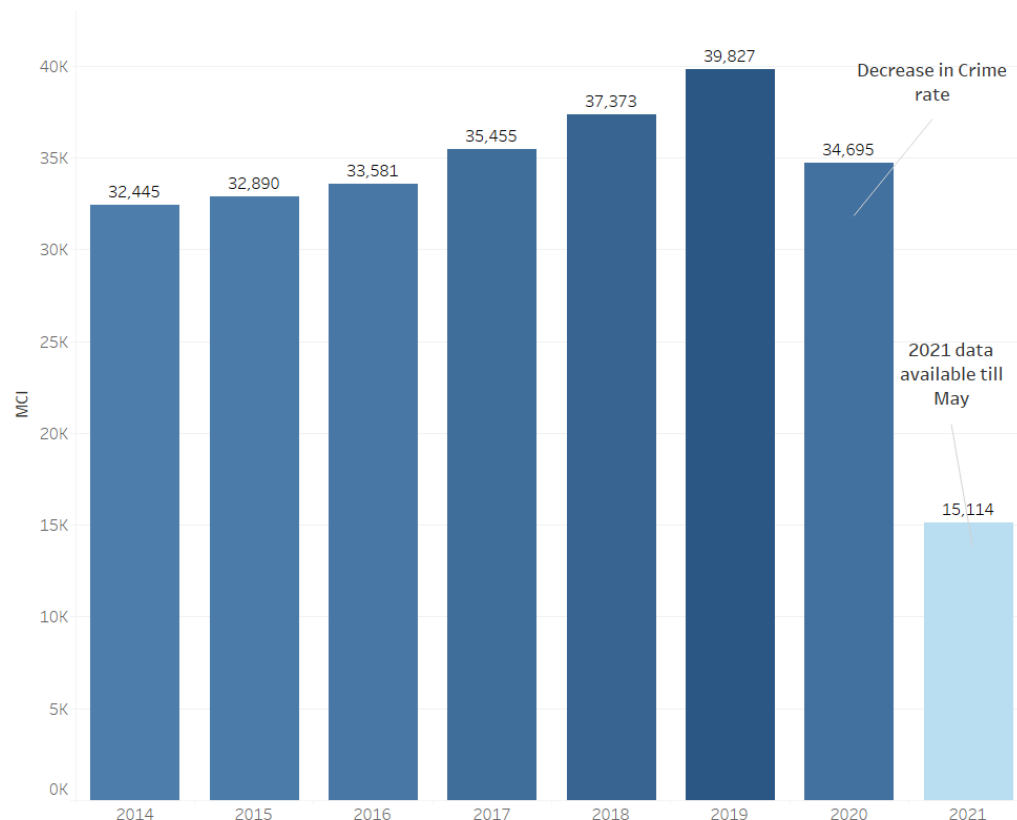
## Key Findings

Some of the key findings from the Major Crime Indicator (MCI) dataset are:

- For the period between 2009-2014, the community crime reported to the police decreased by 26% while for the period between 2014 and 2017 it increased by 14%<sup>3</sup>.
- Fire-arm related crime committed by people greater than 18 years of age doubled between the year 2013 to 2017.
- The crime rates in the neighborhoods that are well settled with good education, employment status, the house was 2.6 times more than the neighborhoods which were not well-off.

### 1. Crime Rate over the years

#### Major Crime by Year (2014-2021)



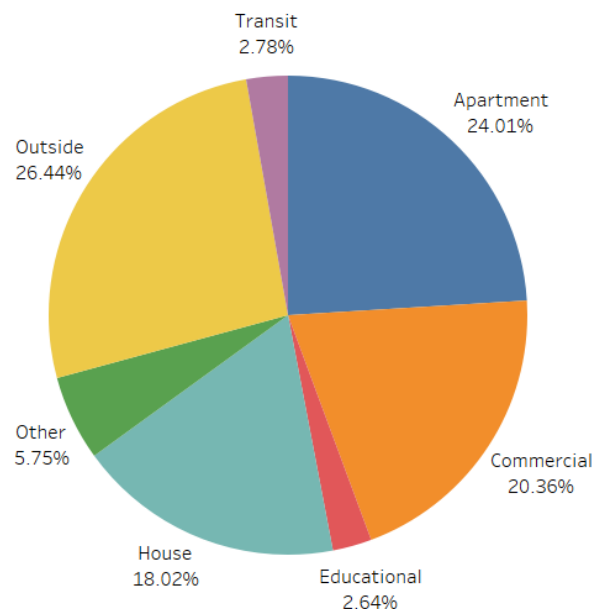
Count of Major\_Crime\_Indicators for each Occurrenceyear. Color shows count of Major\_Crime\_Indicators. The marks are labeled by count of Major\_Crime\_Indicators. The view is filtered on Occurrenceyear, which keeps 8 of 23 members.

Our first major key finding is the rate of crimes that occurred over the years in Toronto, particularly from 2014 till 2021. With the help of the vertical bar chart, we can see that from 2014 till 2019 the crime rate experiences an upward trend which means there has been a steady increase in the number of crime cases reported. Reaching from around 3200 cases in 2014 to 40,000 by 2019.

However, from 2020 onwards the chart follows a downward trend which shows that there has been a sudden decrease in crime rate by cases falling to around 35000 in 2020. This sudden decrease in the crime rate can be attributed to the onset of Covid 9 pandemic.

## 2. Crimes by Premise type

### Crime by Premise type



Premisetype and % of Total Count of Major\_Crime\_Indicators. Color shows details about Premisetype. Size shows count of Major\_Crime\_Indicators. The marks are labeled by Premisetype and % of Total Count of Major\_Crime\_Indicators.

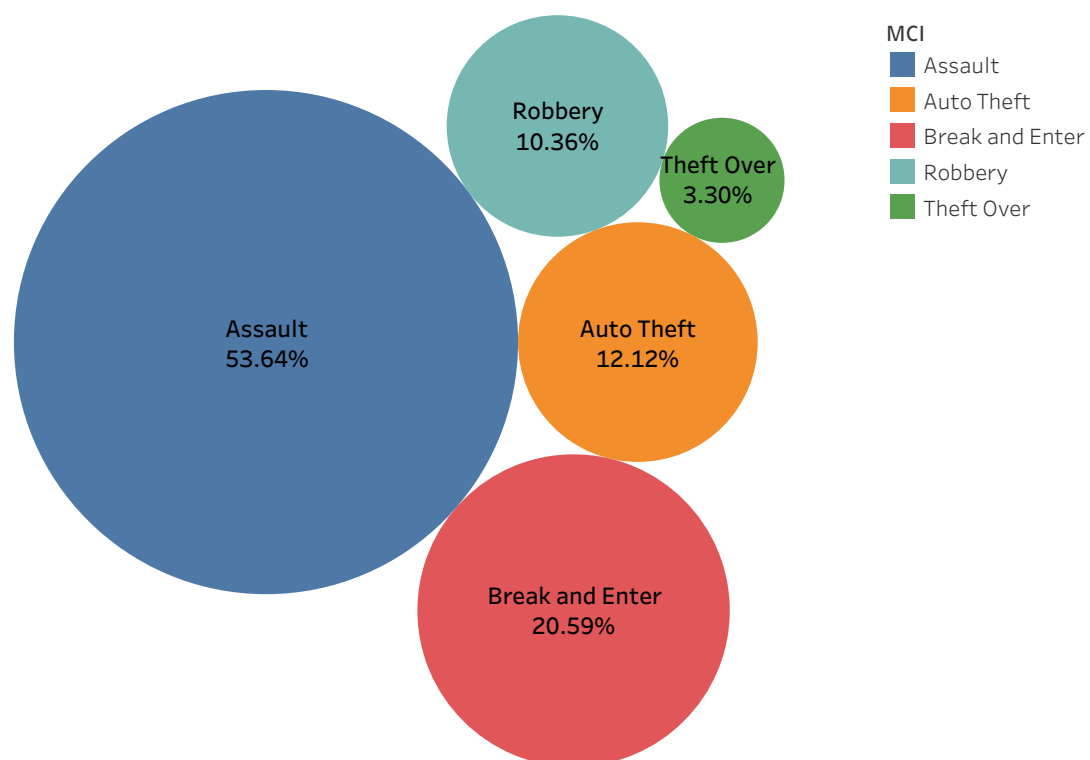
The above chart gives information about the number of crimes that occurred in various premises or places in Toronto. This includes transit, apartment, outside, other, house, educational and commercial. It is clear from the above chart that the educational premise is the safest place for the citizens of Toronto as it constitutes only 2.64 percent of total crime occurred. Hence, crimes are least likely to occur there. The same is true for people in transit premise type where only 2.78 percent of total crimes were committed. However, Outside and Apartment premise types are the places where crimes mostly happened. Around 26 and

24 percent respectively criminal cases were reported there. Therefore, people should exercise more caution when allowing someone to their apartment and get installed alarm systems. Similarly, they should take precautions when late outside and have their safety device within reaching distance. House and Commercial premise types follow the same pattern with 18 and 20 percent of crimes occurring there respectively. Therefore, the people of Toronto must invest in safety devices for protection in their houses and must be more mindful of their surroundings.

### 3. Crimes by Offense Type

## Crime by Offense type (2014-2020)

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The above Bubble chart represents the major crimes occurred in Toronto and classified based on offense type. We used bubble chart for this interpretation as the bubble chart presents the relationship between the measuring variables and the trends can be visualised clearly, it also makes the content easy to read.

'Assault' offense type with more than 50% (50.85%) is the major contributor for the crimes occurred in Toronto. This is a region to be focused, though the world is advancing rapidly and people are acting more matured, but still physical harm/attack or unwanted violent threats are the major offense in a world class city according to the report. Next comes, 'Break and Enter' offense category with 20.37%, where an individual is accused for trespassing a private property, which is considered to be one of the most common property offences in the whole country which has some serious consequences judicially <sup>1</sup>.

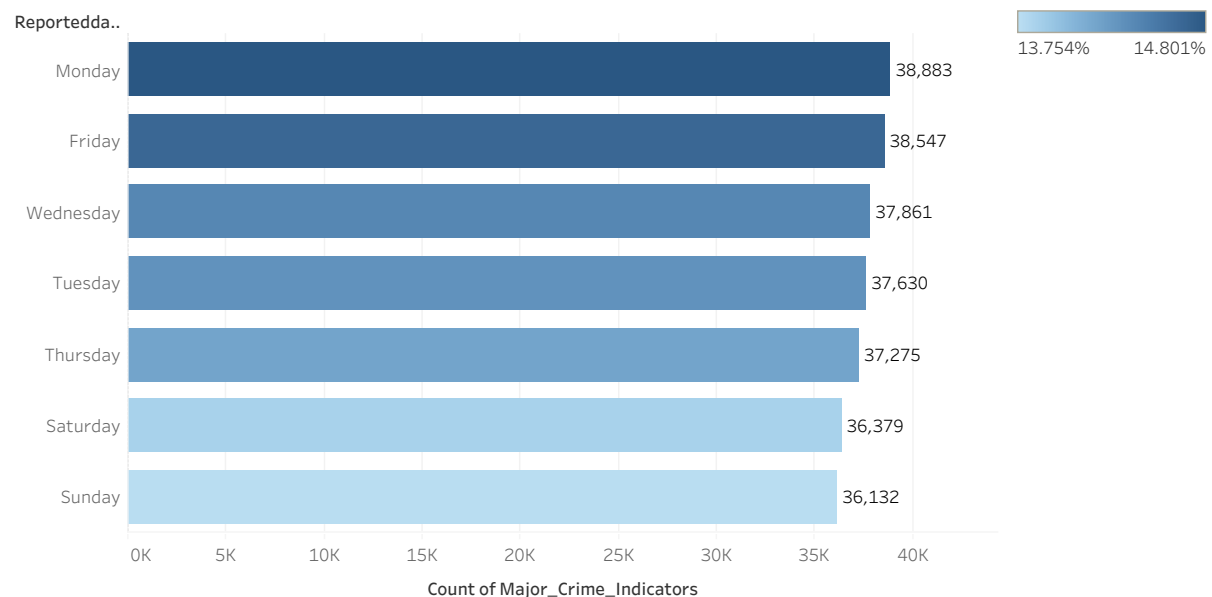
'Auto Theft and Robbery' offense type contribute to 12.39% and 10.08% individually, according to a report by Toronto CTV a car theft occurs in Ontario for every 48 minutes

Last comes the 'Theft Over' offense category with 3.31%, which has a huge penalty and serious charges and can be easily controlled with good awareness programs<sup>2</sup>.

#### 4. Crimes Reported by DoW

Count of MCI's reported on day of week

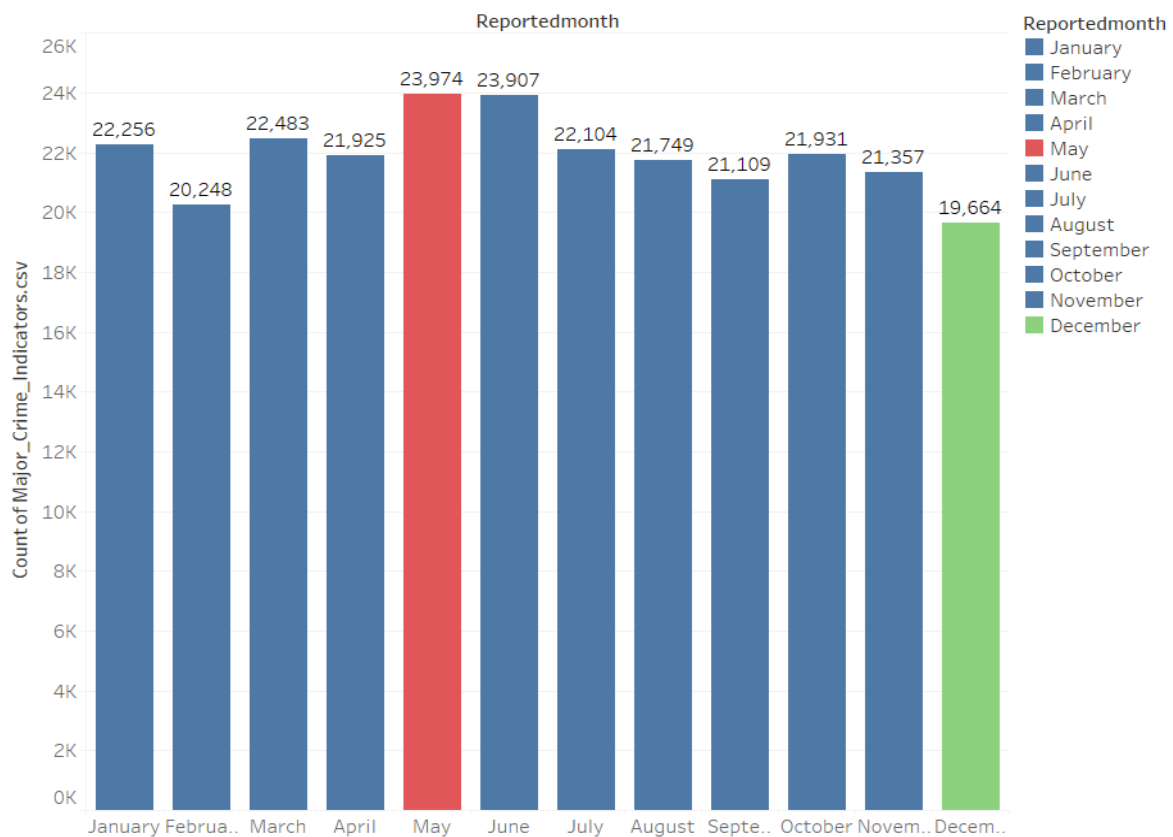
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The above bar chart represents the count of MCI's occurred on particular days of week, we can see that according to the reported date on the data more than 35,000 crimes are reported every day on an average. Where, Monday and Friday have the highest number of cases reported followed by Wednesday Tuesday and Thursday. It's surprising that the weekends i.e. Saturday and Sunday have less reported cases than the other weekdays, which is unexpected because most of the people in and around Toronto have strict weekend culture where more public interactions and socialisation occurs.

## 5. Crimes Reported by Month

### Crimes by Reported Month



Count of Major\_Crime\_Indicators.csv for each Reportedmonth. Color shows details about Reportedmonth.

The bar chart shows the count of major crime indicators versus the different months of the year when they are occurring. There are about seven types of premises highlighted in the chart. The different months in the chart have been sorted in ascending order. This gives the clear idea that the least number of crimes were committed in the month of December while the highest number of crimes were committed in the month of May. Overall, we can see that the crime rate has **decreased towards year-end**.

### Recommendations

The aim of this report is to go in-depth on the community violence in Toronto. For this, the Toronto public health has analyzed the trends and the demographic pattern of different crimes that are committed across Toronto. Data used in this report are from the crimes that have been reported to the police. The crimes that have been reported include homicide, physical assault, sexual assault, and robbery.

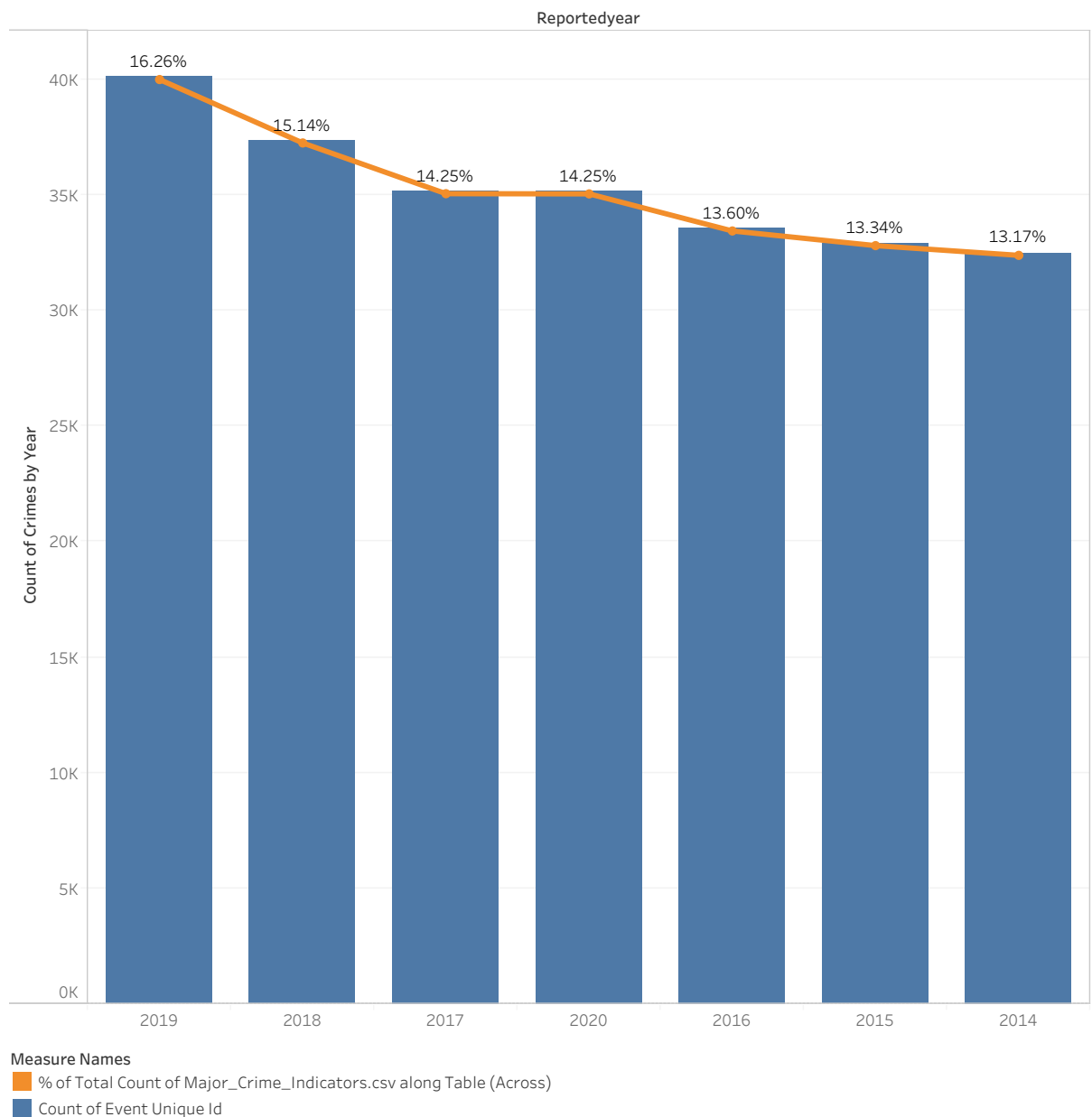
The recommended actions to be taken as a result of this analysis are:

1. As is evident from the charts, the crimes reported have been steadily increasing at a constant pace over the past years until 2019.

### Next Action items:

- a) Understand the reason behind the steady increase in crimes – Split the crime numners by neighbourhood and zero in on those neighbourhoods where a particuar crime has been noticed to increase over the past years.
- b) Reach out to community helpers in the neighbourhoods where the crimes have increased by more than 20% and get feedback on possible reasons. Engaging the community has great benefits in that they will feel involved and a sense of ownership. This is crucial to impart tranparency and send the message across that the responsibility lies with them also to get to the root cause of the issue.

Crimes recorded in Toronto from 2014 to 2020



2. Why did the crime rate drop drastically in 2020? Was it a consequence of the Covid-19 pandemic or was it something else?

**Next action items:**

- a) It is important to understand the reason behind the lesser numbers in 2020 to differentiate between whether it resulted as a result of Covid or was there a lack of reporting during that period. If it was the former, additional measures should be put in place to ensure that there is no rebound to the crime rates. If it is the latter, the issue should be further analysed in detail to understand where things went wrong. Did the general public fail to report the incidents or did members of the police force fail to record the incidents in the system since almost every office function went offline.
  - b) Understanding of the reason is also crucial to ensure that the trend observed during previous years does not return to pre-pandemic levels. With the pandemic resulting in job losses and increased financial burden, it is more likely for crime rates to increase. Hence it is even more important to understand the reason behind the increasing trend over the past years.
  - c) Specific community programs to address this issue with the support of community helpers have to be designed. Public engagement is crucial for the success of these programs without which the measure will go to waste.
3. Increase over night patrolling and make access to police stations easier over the coming period.

**Next action items:**

- a) To discourage crime tendency, over night patrolling in areas where the crime rates are significant, needs to be stepped up.
- b) With the pandemic and as a result of subsequent lockdowns, access to police stations and community health and safety centres, have come down. With the decrease in restrictions, the general public needs to be informed about the return of access to these centres so that they feel protected. With all the safety measures in place, the operating timings of these centres need to be increased, at least for a short period of time, to ensure public can reach out in person even during late nights or early mornings.

## External References

1. <https://www.celinedostaler.ca/faq/what-is-break-and-enter/> - describes what constitutes break and enter.
2. <https://toronto.ctvnews.ca/car-theft-occurs-every-48-minutes-in-ontario-and-a-new-report-is-revealing-the-models-most-commonly-stolen-1.5744468> - analysis on increasing car theft cases.
3. <https://www.toronto.ca/legdocs/mmis/2019/hl/bgrd/backgroundfile-139316.pdf> - analysis on increasing crime rates in Toronto.
4. <https://vilkhovlaw.ca/toronto-crime-rates/> - a law firm's analysis on increasing crime rates in Toronto.