Analysis of Crime Rates Near University of Toronto St.George Campus*

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Abstract

"A prevelent belief of crime rates in downtown Toronto has been extremely high in recent years is spreading among the Chinese community. This belief leads to concerns regarding the safety problem of studying in University of Toronto St. George campus. This paper will investigate in the changing of four types of crime rates near University of Toronto St. George campus area from 2014 to 2023, ascertain the validity of such belief."

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*Code and data are available at: https://github.com/JayCao2048/ZongchengCaoCrimeRate.git

1 Introduction

Media, is a powerful tool that has the power to affect and change one's mindset, the effect of media can even spread across various communities. In this era of information, acquiring news is becoming more accessible than ever before. With the growing of media, news about violence and crime in downtown Toronto is reaching the public eye more frequently in the past. There are countless reports transmitting speeches about several crime events in downtown Toronto, and claiming that Toronto's crime rate has the "highest jumps of any census metropolitan area" (CP24 2023).

As a Chinese immigrant who moved to Canada approximately ten years ago, I have had innumerable interactions with the Chinese community in Ontario. In recent years, a belief become much more popular across the Chinese community, about the safety issue of studying at University of Toronto St. George (UTSG) campus currently. UTSG is a university campus geometrically located in downtown Toronto, there are many students live and activities around the campus area. I have heard numerous statements from Chinese parents and Chinese students, expressing their concerns regarding the heightened risk of living and studying in the UTSG campus in recent years. This concern has arisen from the large amount of reports of media, stating the increment of crimes happening in the downtown Toronto area.

This paper aims to investigate the fluctuation of crime rate in the vicinity of the UTSG campus from the year 2014 to 2023, focusing on four typical types of crime frequently reported in the media, namely assault, robbery, shooting, and homicide. In the Data Section, a detailed analysis is dedicated to the four types of crime rates within the proximity of the UTSG campus area, containing various graphs to demonstrate the variations of these crime rates over time visually, facilitating a thorough examination of their trends. The Result section of this paper will include the patterns and results unearthed through the data analysis. Finally, the Discussion section will deliberate the conflict between the data outcome and the belief about danger in study on campus in UTSG, furthermore explore how such phenomenon occurred.

2 Data

2.1 Data Source

The data utilized in this paper has been sourced from the database of the Open Data portal of Toronto (*Opendatatoronto: An r Package for Accessing Open Data from Toronto*, n.d.), and it is published by the Toronto Police Services. The official source from the Police department can ensure the credibility of the crime rate data that is essential for this paper.

The data recorded nine distinct types of crime from 2014 to the present time, with regular updates from the Toronto Police Services. Each type of crime rate includes two specific data categories. The first category comprises the count of a type of crime that occurs in a given

year, while the second category denotes the crime rate of a specific crime within the same year. The crime rates in the data is calculated as "the crime count per 100,000 population" (City of Toronto 2024).

As a separation of geometric areas within Toronto, the data has divided the Toronto neighborhood into 158 "small areas", independently recorded the crime counts and crime rates for each of these designated areas.

The data used in this paper is from the database of the Open Data portal of Toronto (*Opendatatoronto: An r Package for Accessing Open Data from Toronto*, n.d.), R language (R Core Team 2021) has been employed to process and analyze the dataset. Various packages are also used to generate this paper, including tidyverse (Wickham, Averick, et al. 2021), dplyr (Wickham, François, et al. 2021), ggplot2 (Wickham 2016). Also, ChatGPT (OpenAI 2023) has been employed for generating some R code in the paper.

2.2 Data Analysis

This paper will be dedicated to the analysis of four types of crimes that were mentioned in the media the most, and widely discussed among the Chinese community in Ontario. These crimes include assault, robbery, shooting, and homicide.

Moreover, the paper will utilize the crime rate data rather than crime count due to the unstable population of a specific area. Within a larger population, the likelihood of concurrent criminal incidents increases, and conversely decreases in areas with smaller populations. For this reason, employing the crime rate to exhibit the alterations of crime over nine years is in a logically coherent manner, given the expected variations in population over this time period.

Since the primary focus of this research is on the safety around the UTSG campus, then among the 158 areas, three areas will be analyzed through this paper. These three geometric places encompass the campus itself, and where most UTSG students reside, namely "Bay-Cloverhill", "Church-Wellesley", and "University". Among these three places, "University" is the precise location of the campus, while "Bay-Cloverhill" and "Church-Wellesley" are the residential areas where the majority of UTSG students live.

Figure 1: Change in Assault Rate from 2014 to 2023

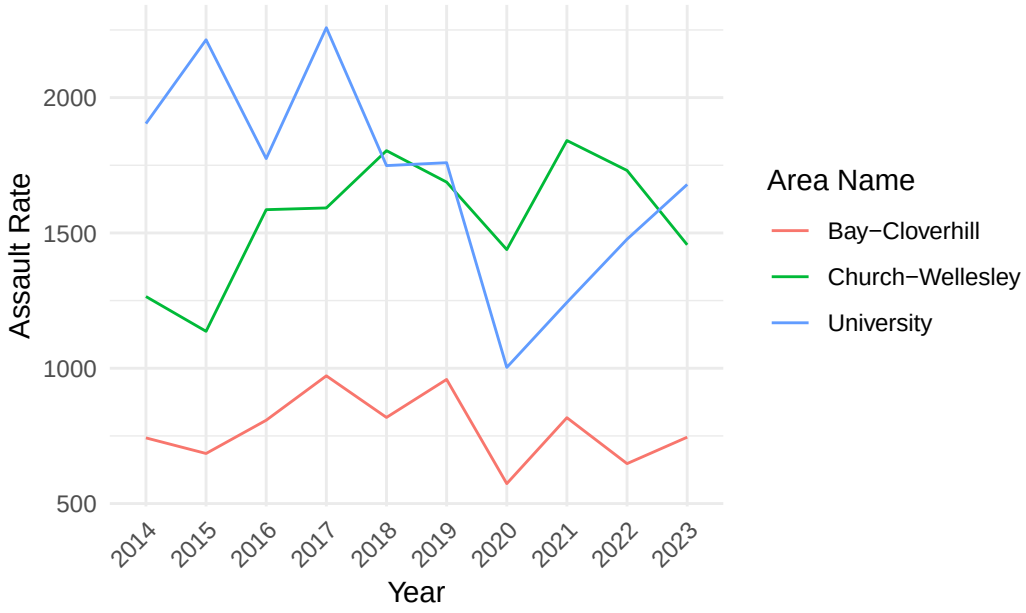

Figure 1 shows the change in assault rate from 2014 to 2023. There are three lines with distinct colors illustrating three different area names, where red represents "Bay-Cloverhill", green represents "Church-Wellesley", and blue represents "University".

From the figure, it is obvious that within the two residential areas, "Church-Wellesley" consistently exhibits a higher assault rate than "Bay-Cloverhill". This disparity can be attributed to the varying facilities available in these two regions. "Church-Wellesley" boasts a higher number of establishments such as bars, homeless shelters, cannabis shops, etc, which potentially contributes to a higher likelihood of assaults. Conversely, "Bay-Cloverhill" is characterized by predominantly residential and commercial buildings, thereby reducing the probability of assault incidents.

Interestingly, the assault rate of "University" surpasses the other two residential areas from 2014 to 2019. After 2019, the average assault rate had a sudden drop, followed by an increment that had not surpass the assault rate before 2019. The unexpected decline can be explained by the incident of COVID-19 pandemic. During that special period, most in-person classes are canceled, transitioning to online education, which leads to a minimum number of people on campus. When the pandemic gradually fades out, more people start to return to the campus, causing the assault rate to rise again.

Figure 2: Change in Robbery Rate from 2014 to 2023

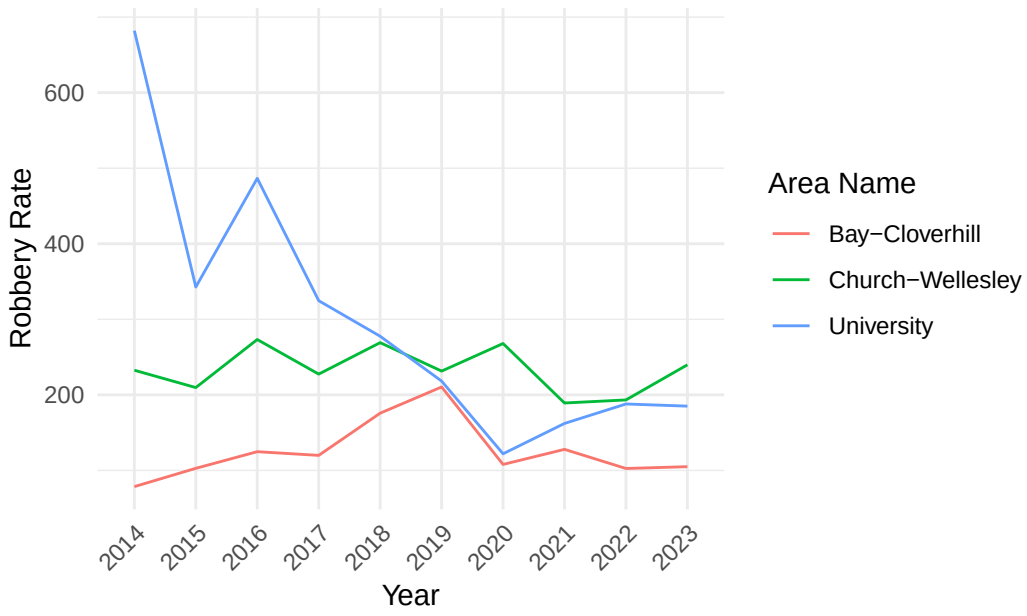

Figure 2 displays the robbery rate of the three selected areas. The color symbolization is the same as in Figure 1. Robbery is a more serious crime than assault, so comparing Figure 2 with Figure 1, without a doubt, the robbery rate is much lower than the assault rate.

From 2014 to 2019, "University" area has a higher robbery rate than the other two areas unquestionably, indicating a greater propensity for robberies on the campus compared to the residential areas. However, the extremely high robbery rate in 2014 scales down rapidly, even becoming lower than "Church-Wellesley" area after 2018. Similar to Figure 1, the robbery rate experiences a severe drop during the pandemic and starts to rise after 2020. Nevertheless, in contrast to the high robbery rate in 2014, which approached 700, the post-pandemic robbery rate never exceeded 200, and even demonstrated a slight decrease from 2022 to 2023.

Figure 3: Change in Shooting Rate from 2014 to 2023

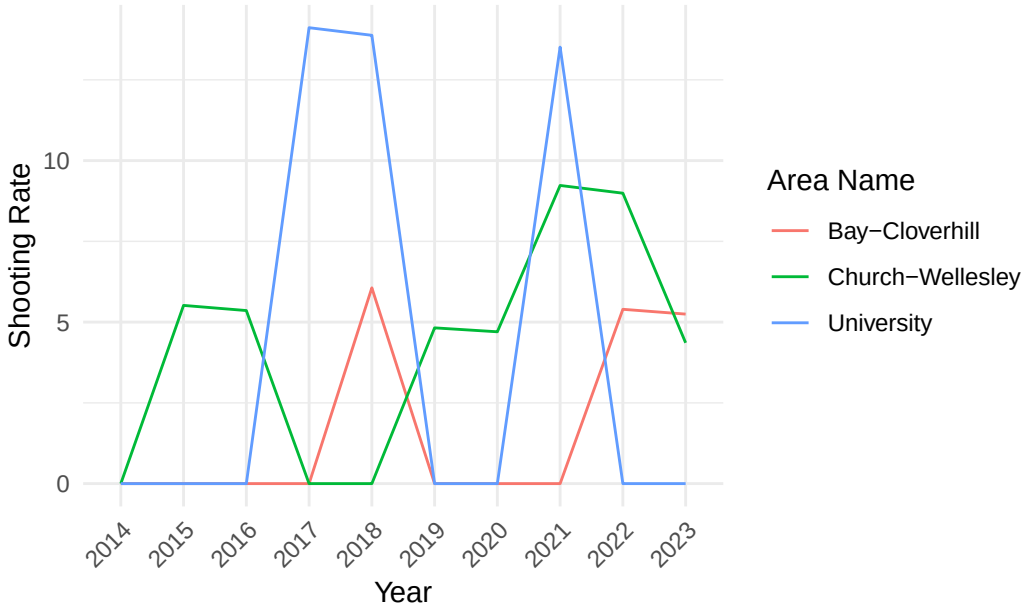

Figure 4: Change in Homicide Rate from 2014 to 2023

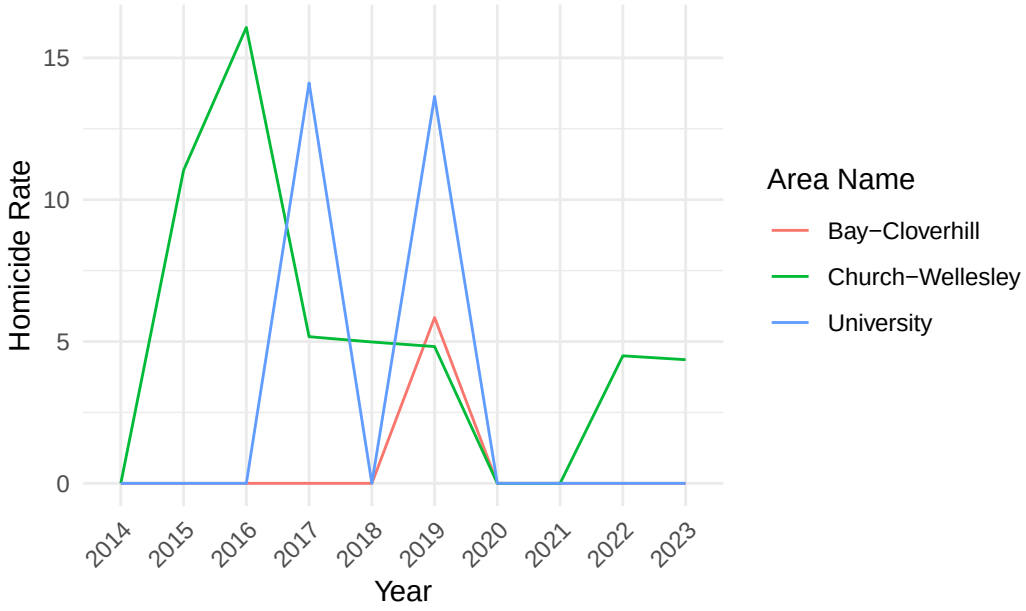

Figure 3 presents the shooting rate around the selected areas, while Figure 4 illustrates the homicide rate. These two crimes transpire significantly less frequently than assault and robbery due to their more severe consequences. For that reason, there are instances in which the shooting and homicide rates equal zero for certain years, indicating no reported shootings in the "University" area from 2014 to 2016, for example. Also, no clear pattern can be detected through the line graphs due to the zero inputs, each line is fluctuating in different kinds of

amplitudes. Nevertheless, some phenomena can be identified through a comparison of the three different areas, and the overall trend from 2014 to present time.

In Figure 3, it is obvious that when shootings happen, the shooting rate of "University" area is much higher than the residential areas. The most recent shooting incident in the "University" area was recorded in 2021. However, shootings in the residential area happened more often than on the UTSG campus, but with a lower shooting rate.

In Figure 4, the fluctuation is more random than in Figure 3. This unpredictability can be attributed to the inherent difficulty in preventing homicides, as they tend to occur randomly. For example, shootings can be prevented by regulating requirements for carrying firearms, assaults and robberies can be prevented by increasing police patrols, etc. Unlikely, homicides cannot be prohibited before wards like the other crimes. Nevertheless, based on Figure 4, it is evident that over the past four years, "Church-Wellesley" area experienced only a minimal number of homicides, whereas both the "University" and "Bay-Cloverhill" areas recorded zero homicides.

3 Results

Regarding the assault rate, the "University" area is experiencing an increment of assaults after the sudden drop in the pandemic. However, it's noteworthy that the assault rate has not exceeded 1750, which is significantly lower than the assault rate observed from 2014 to 2018. On the other hand, the assault rates in the other two residential areas are more stabilized, where the "Church-Wellesley" area's assault rate oscillates around 1500, and the "Bay-Cloverhill" area's assault rate oscillates around 750. Therefore, there are no clear shreds of evidence pointing to the increment of assault near the UTSG campus in recent years.

For the robbery rate, a constant decrease can be witnessed in the robbery rate in the "University" area starting in 2014, where the robbery rate is around 700. In the recent five years, the robbery rate has been stable at around 150 in the "University" area. The residential areas have constant robbery rate since 2014, where "Church-Wellesley" area's robbery rate oscillates around 250, and "Bay-Cloverhill" area's robbery rate oscillates around 150. These observations indicate that there has not been a notable increase in robberies in recent years.

In the case of the shooting rate, the graph varies in different amplitude. Both the "University" and "Bay-Cloverhill" areas have maintained a consistent frequency and quantity of shootings. While "Church-Wellesley" has a slight increment of shooting from 2022 to 2023, it is crucial to note that this area is the furthest from the UTSG campus in this study, minimizing its impact.

Similarly, for the homicide rate, the graph fluctuates a lot just like the graph for shooting rate. Nonetheless, the homicide rate are extremely low in the past four years, contrasting the high homicide rate around 10 from 2014 to 2019. The "University" and "Bay-Cloverhill" areas even

maintain zero homicide rates after 2020. These trends indicate that homicide rates have not increased in recent years.

From above, despite the effect of the variation of the overall crime rates in downtown Toronto, the available evidence does not strongly support the notion that the crime rate near the UTSG campus has been experiencing a significant increase in recent years. In fact, some crime rates are even undergoing a downsizing near the three selected areas. Thus, the belief of studying on campus at UTSG is becoming more dangerous than before lacks substantial evidence. The study environment of the UTSG campus has not witnessed an increase in hazard, some data even demonstrates that it is transforming into a comparatively safer state.

4 Discussion

There are many reasons for such belief to start spreading around the community. Undoubtedly, one of the main rationales is the media. In the modern world, technologies are improving at a faster and faster pace, and more information has become easier to access in everyday life. Before wards, news is only accessible through newspapers or TV. Nowadays, we can read any news just with a simple click on the phone. For that reason, more information about violence and crimes starts to interfere with our lives and affect what we actually believe. Unfortunately, some media is dedicated to exaggerating their reports, even publishing unreal news, just to gain more views and attention. As a result, "media often elicit affective responses in the recipients" (Kühne 2012). These information have the power to change one's mindset, and spread anxiety in various communities.

Living in the contemporary information-driven world, it is essential to have the ability to distinguish between real and counterfeit, using scientific ways to prove what is real and and what warrants our belief.

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