

Motor Vehicle Collisions Decreased in Toronto During and After the Beginning of the COVID-19 Pandemic*

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26 January 2024

As one of the fastest-growing and densest Canadian cities, road and pedestrian safety are growing concerns in Toronto, especially after the COVID-19 pandemic. This paper looks at trends of motor vehicle collisions from 2017 to 2023 in Toronto neighbourhoods and wards, types of collisions, and the number of pedestrians involved. The results show that motor vehicle collisions and pedestrian involvement in them have decreased during and after the pandemic but are prevalent in the same areas from 2017 to 2023. Further investigation is needed on the demographics of Toronto areas with a high number of motor vehicle collisions.

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*Data and code are available at: <https://github.com/moonsdust/toronto-collisions>

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1 Introduction

As of 2024, Toronto was reported to have one of the worst traffic congestion in North America (Callan January 11 2024). As Toronto's population increases over the years, congestion on the road has increased and road and pedestrian safety is a growing concern for many. Some also believe that roads have gotten unsafer in the years after the pandemic. In a 2023 study done by Ipsos surveying Canadians on road safety, they mentioned that concerns about road safety have increased to 65% in 2023 from 59% in 2021 (Cordeiro and Sethi 2023). To reduce traffic collision injuries and fatalities, the city of Toronto created the Vision Zero Safety Plan in 2016, which contains over 50 safety measures with the ultimate goal of eliminating all fatalities on roads (C. of Toronto 2024). It's an ambitious goal yet it raises the question of how effective this plan across Toronto over the years. We investigated this question and the following: how do motor vehicle collisions compare from the early years of the plan to the present following the outbreak of the COVID-19 pandemic in 2020?

In this paper, collision trends were analyzed from 2017 to 2023, specifically into motor vehicle collisions in Toronto neighbourhoods and wards, the types of motor vehicle collisions that had occurred, and the number of pedestrians involved in them. In our findings, there was a decline in motor vehicle collisions overall from 2020 onwards. However, we saw that the locations where motor vehicle collisions had occurred stayed consistent over the years. We also found that the majority of wards that make up a larger proportion of motor vehicle collisions had average household incomes that are below Toronto's overall average household income. Understanding collision trends over the years in Toronto can aid with identifying areas of improvement of current safety plans like Vision Zero and overall help others feel safer in the city.

In the rest of this paper, the data section will cover the datasets used, define variables used by our tables and graphs, and briefly explain the data-cleaning process. In the results section, we will reveal tables and graphs made on our datasets and explain what they show. In the discussion section, we will connect back to the real world and explain what the results could mean, the implications of our results, potential areas of improvement for the paper, and suggestions for future works. Finally, the appendix section will include the entire table of some of our results and other information.

2 Data

The data used by the paper are “City Wards” (“City Wards” 2024), “Ward Profiles (25-Ward Model)” (“Ward Profiles (25-Ward Model)” 2024), and “Police Annual Statistical Report - Traffic Collisions” (“Police Annual Statistical Report - Traffic Collisions” 2023) datasets, which were sourced from the City of Toronto’s Open Data Portal. These datasets were accessed using the `opendatatoronto` library (Gelfand 2022). Another dataset that could have been used was the “About Motor Vehicle Collisions involving Killed or Seriously Injured Persons” dataset from the City of Toronto’s Open Data Portal. However, this dataset’s most current record was in 2022 and is outdated for our purposes.

The datasets were simulated, cleaned, analyzed, and tested using the R programming language (R Core Team 2023), `tidyverse` (Wickham et al. 2019), `knitr` (Xie 2014), `janitor`(Firke 2023), `dplyr` (Wickham et al. 2023), `ggplot2` (Wickham 2016), and `sf` (Pebesma and Bivand 2023). The variables created for the datasets were formed by grouping rows by existing columns and counting the number of rows with certain column variables. However, not all variables from our datasets were used or are visible on the graph. The original datasets were filtered for the years 2017 to 2023 and rows with missing information were omitted. These are the name of the following datasets with variables used for our analysis: “cleaned_city_wards_data” (`area_short_code`, `geometry`); “cleaned_map_data” (`year`, `collision_type`, `long`, `lat`, `neighbourhood`, `pedestrian_involved`, `num_of_collisions`, `yearly_collision_num`, `total_collisions_2017_2023`); “cleaned_collisions_data” (`year`, `collision_type`, `num_of_collisions`, `num_of_pedestrians`); “cleaned_ward_data” (`ward_num`, `ward_name`, `pop_num`, `avg_income`). In our dataset, `year` represents a year from 2017 to 2023, inclusive. To view the cleaned datasets created, see Section .2 under the Appendix section for more information.

2.1 Police Annual Statistical Report - Traffic Collisions

The datasets, “cleaned_collisions_data” and “cleaned_map_data” are clean versions of the Police Annual Statistical Report - Traffic Collisions dataset and contain around 56 observations and 113,129 observations, respectively. The “cleaned_collisions_data” dataset contains a summary of the number of collisions and pedestrians involved for each collision type for each year. On the other hand, “cleaned_map_data” contains more information regarding the neighbourhoods where each collision occurs. The Toronto Police Services has defined motor vehicle collisions under four categories: Fatal, Personal Injury, Fail to Remain, and Property Damage (“Police Annual Statistical Report - Traffic Collisions” 2023). Fatal means that a person was killed during the vehicle collision, Personal Injury indicates a person was injured during the collision, Fail to Remain means that the person left the scene before information was provided, and Property Damage indicates that property has been damaged during the collision. With this, they are the four possible values under the variable `collision_type`, which is also named “Type of Collision”. Due to the various ways motor vehicle collisions can

be categorized and their complexity, our analysis looked at motor vehicle collisions that were defined in only one of the four categories.

`num_of_collisions` denotes the number of collisions that occurred in either a neighbourhood in a specific year (also called “Number of Motor Vehicle Collisions”) or the number of collisions of a certain type of a certain year (named “Number of Collisions”). `num_of_pedestrians` represents the number of pedestrians that were hit in a vehicle collision in each collision type per year. `pedestrian_involved` signifies if a pedestrian was hit a collision with a “Yes” or “No”. `yearly_collision_num` and `total_collisions_2017_2023` are the count of collisions in a specific year and the total number of collisions from 2017 to 2023 for each Toronto neighbourhood, respectively. Three variables are found in the `cleaned_map_data` `long`, `lat`, and `neighbourhood`, which represent the longitude of the collision site, the latitude of the collision site, and the neighbourhood name and number where the collision site occurred, respectively.

2.2 City Wards

The City Wards dataset, also known as “`cleaned_citywards_data`”, contains information used to recreate a map of Toronto with its ward divisions. This dataset contains around 25 observations. The following variables were used in our analysis: `geometry` represents the coordinates of the ward divisions and `area_short_code` represents the ward number.

2.3 Ward Profiles (25-Ward Model)

The Ward Profiles dataset, also known as “`cleaned_ward_data`”, has 25 observations and contains census data of Toronto’s population such as income, population size, etc. For the variables in the dataset, `ward_name` signifies the ward number, `ward_name` indicates the name of the Toronto ward, `pop_num` represents the population size of Toronto wards as of 2020, and `avg_income` denotes the average household income of each ward as of 2020. The cleaned dataset selected columns from the original dataset by selecting the rows “Average total income of households in 2020 (\$)” and “Total - Age”, where “Total - Age” contains the population size of each ward.

3 Results

3.1 Motor vehicle collisions across Toronto neighbourhoods and wards (2017-2023)

As of 2024, there are 25 wards and 158 neighbourhoods in Toronto. The distribution of motor vehicle collisions across different neighbourhoods and wards was investigated and the following

was obtained:

Table 1: Toronto neighbourhoods with the most number of motor vehicle collisions from 2017 to 2023

Neighbourhood Name and Number	Number of Motor Vehicle Collisions (2017 to 2023)	Proportion of Motor Vehicle Collisions (2017 to 2023)
West	2812	0.02
Humber-Clairville		
(1)		
Wexford/Maryvale	2075	0.02
(119)		
South Riverdale	1866	0.02
(70)		
York University Heights (27)	1781	0.02
Clairlea-Birchmount (120)	1567	0.01
Etobicoke City Centre (159)	1519	0.01

Table 2: Minimum, quartiles, median, and maximum of population size and average household income across Toronto wards in 2020

Population Number	Average Household Income (CAD)
Min. : 94025	Min. : 85700
1st Qu.:103690	1st Qu.: 95200
Median :110095	Median :107300
Mean :110452	Mean :120096
3rd Qu.:115120	3rd Qu.:130600
Max. :139920	Max. :224800

Table 1 reveals the neighbourhood with the highest number of motor vehicle collisions and approximately how many motor vehicle collisions from 2017 to 2023 occurred in each neighbourhood. The neighbourhoods with a high number of collisions are the following: West Humber-Clairville (approximately 2%), Wexford/Maryvale (approximately 2%), South Riverdale (approximately 2%), York University Heights (approximately 2%), Clairlea-Birchmount (approximately 2%), Birchmount (approximately 1%), and Etobicoke City Centre (approximately 1%). The full table of Table 1 can be found here Table 7 in the Appendix section with the rest of the neighbourhoods making up roughly 1% of collisions or less.

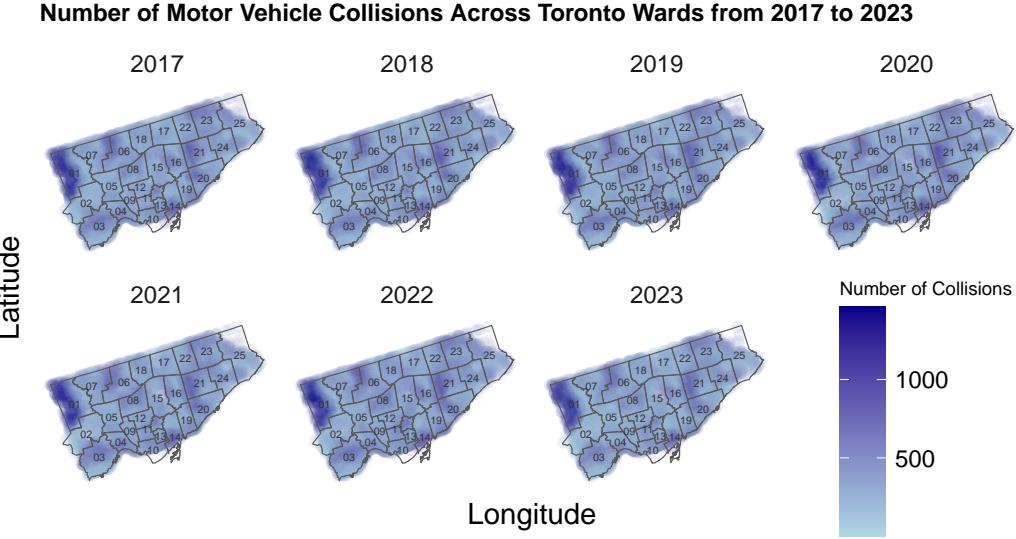


Figure 1: Number of motor vehicle collisions from 2017 to 2023 across different Toronto wards.

In Table 1, West Humber-Clairville has the largest amount of collisions with 2812 motor vehicle collisions from 2017 to 2023. West Humber-Clairville is located in ward 1, which from Figure 1 is the region with the darkest shade of blue and has the highest density of points (Toronto 2024). Following this is Wexford/Maryvale, which is located in ward 21 with 2075 collisions (Toronto 2024). The rest of the neighbourhood is in the following wards based on Toronto (2024): South Riverdale is in Ward 14, York University Heights is in Ward 7, Clairlea-Birchmount is in Ward 20, and Etobicoke City Centre is in Ward 2.

We will first define the following: mean means the average value amongst the dataset, median means the data point found in the middle of a dataset, and the standard deviation is how far are values from the mean of a dataset. Table 2 reveals that the mean (also known as the average) population size per ward in Toronto is 110452 people with a standard deviation of 10594 people and the mean for the average household income per ward is \$120,096 with a standard deviation of \$33,980.64. It also indicates that the median population size per ward is 110095 people and the median average household income per ward is \$107,300. From Table 6, Ward 1's average household income is \$95,200 with a population of 115120 people and Ward 21's average household income is \$91,500 with a population of 115120 people. For wards 14, 7, 20, and 2, the average households incomes are \$130,800, \$85,700, \$102,200, and \$146,600, respectively and the population sizes are 104555, 111200, 110095, and 117200 people, respectively.

When comparing the density of collisions in Toronto for each year with Figure 1, the density

stays the same from 2017 to 2023 with ward 1 having the largest amount of collisions. According to Table 1, Table 2, Figure 1, and Toronto (2024), the average household incomes for three out of four of the wards of each neighbourhood that make up 2% of motor vehicle collisions are below the mean and median average income per ward with their population size being higher than the mean population size per ward. One ward in the 2% has an average household income above the mean and median for average income per ward and its population size is below the mean and median population size per ward. With the wards of the other two neighbourhoods from Table 1, Clairlea-Birchmount's average household income is below the mean and median with its population size being above or equal to the mean and median. On the other hand, Etobicoke City Centre's average household income is above the mean and median and the population size is above the mean and median.

3.2 Types of motor vehicle collisions in Toronto (2017 - 2023)

Table 3: Motor vehicle collisions of different types in Toronto from 2017 to 2023

Year	Motor Vehicle Collision Type	Number of Collisions	Proportion of Motor Vehicle Collisions (Per Year)
2017	Fail to Remain	11411	0.16
2017	Property Damage	50157	0.69
2017	Personal Injury	10868	0.15
2017	Fatal	60	0.00
2018	Personal Injury	9832	0.13
2018	Property Damage	55762	0.72
2018	Fail to Remain	11851	0.15
2018	Fatal	66	0.00
2019	Personal Injury	8774	0.11
2019	Property Damage	60865	0.77
2019	Fail to Remain	9504	0.12
2019	Fatal	62	0.00
2020	Property Damage	34056	0.79
2020	Fail to Remain	4251	0.10
2020	Personal Injury	4950	0.11
2020	Fatal	40	0.00
2021	Personal Injury	5211	0.12
2021	Fail to Remain	4430	0.11
2021	Property Damage	32053	0.77
2021	Fatal	55	0.00
2022	Personal Injury	5930	0.10
2022	Property Damage	47917	0.83
2022	Fail to Remain	3600	0.06

Table 3: Motor vehicle collisions of different types in Toronto from 2017 to 2023

Year	Motor Vehicle Collision Type	Number of Collisions	Proportion of Motor Vehicle Collisions (Per Year)
2022	Fatal	45	0.00
2023	Property Damage	34262	0.71
2023	Personal Injury	5831	0.12
2023	Fail to Remain	8408	0.17
2023	Fatal	28	0.00

Table 4: Minimum, quartiles, median, and maximum of motor vehicle collisions of different types in Toronto from 2017 to 2023

Number of Collisions
Min. : 28
1st Qu.: 2716
Median : 7169
Mean : 15010
3rd Qu.: 16902
Max. : 60865

From Figure 2 and Table 3, when comparing the overall number of motor vehicle collisions before 2020 and 2020 onwards, there is an overall annual decrease in the number of collisions. The result also reveals that the number of motor vehicle collisions increased from 2017 to 2019 before decreasing in 2020. Collisions involving property damage remain the majority of collision cases over the years. We can see this decrease from 2019 and 2020 from about 79205 collisions to 43297 collisions. According to Table 4 and Table 3, the highest number of property damage collisions from 2017 to 2023 was at 60865 in 2019, which made up around 77% of the collisions in that year. However, property damage collisions in 2020 were up to 79% of collisions in 2020. We can also see that the lowest number of collisions occurred in 2021 and has stayed below 60865 since 2020. Figure 2 and Table 3 also reveal that from 2020 to 2022, the second most common collision type was Personal injury (making up 10% to 12% of collisions in their respective years). In other years, the second most common motor vehicle collisions are Fail to Remain collisions.

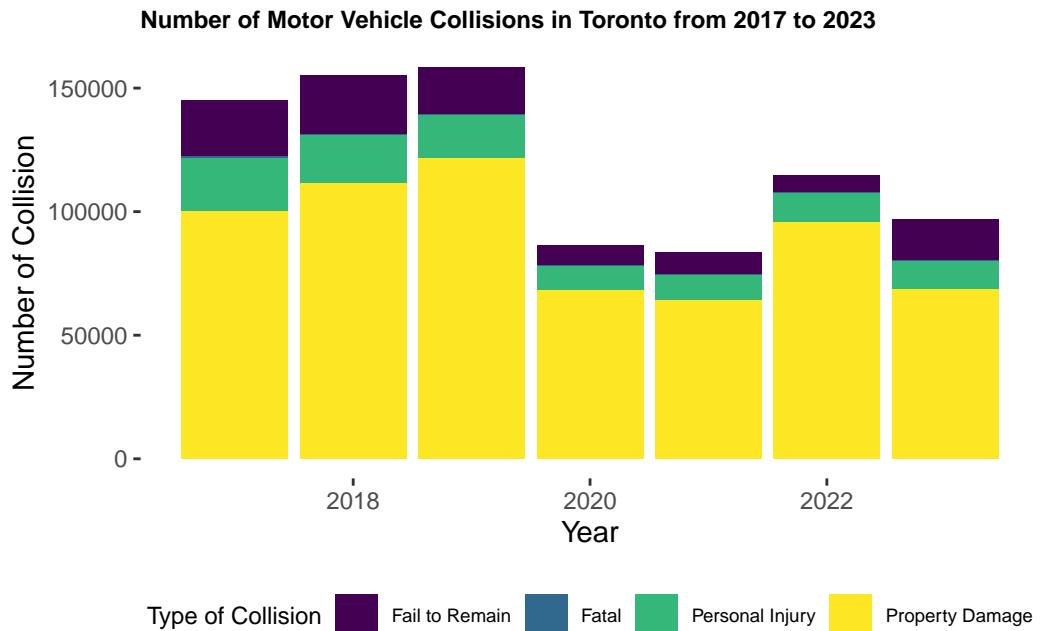


Figure 2: Number of motor vehicle collisions in Toronto grouped by types from 2017 to 2023

3.3 Pedestrians involved in a motor vehicle collision (2017-2023)

Table 5: Number of pedestrians involved in motor vehicle collisions in Toronto from 2017 to 2023

Year	Number of pedestrians involved (Per Year)	Proportion of pedestrians involved (Per Year)
2017	1748	0.024
2018	1601	0.021
2019	1545	0.020
2020	1055	0.024
2021	990	0.024
2022	1241	0.022
2023	968	0.020

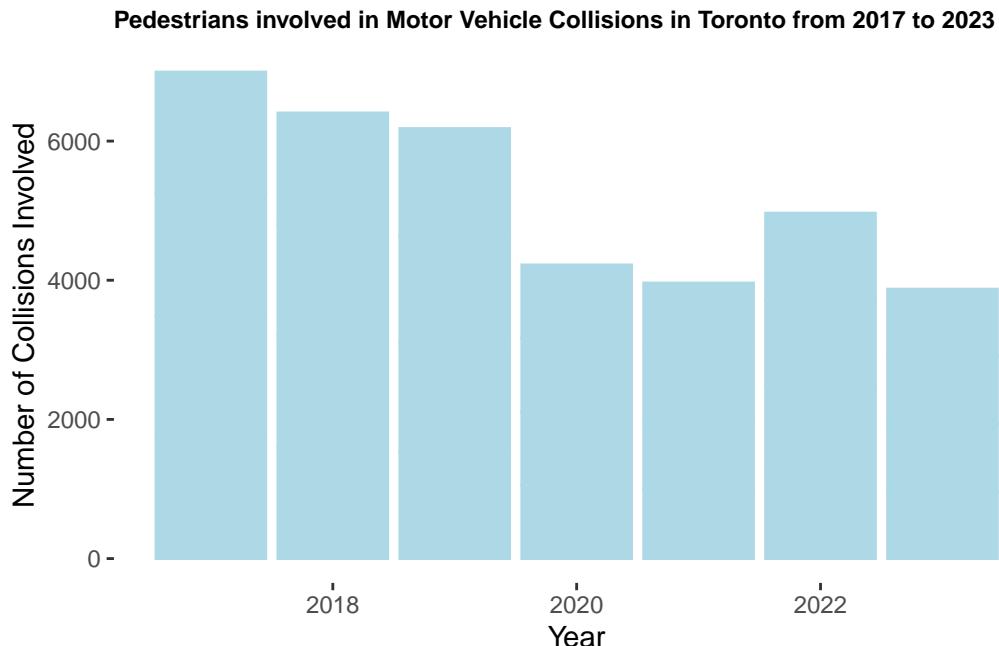


Figure 3: Number of pedestrians involved in motor vehicle collisions from 2017 to 2023 in Toronto.

From Figure 3, we can see that there has been a decline in pedestrian involvement in motor vehicle collisions from 2017 to 2023. Pedestrian involvement was at its highest point in 2017 with 1748 pedestrians, where approximately 24% of the total number of collisions in 2017 involved pedestrians. In 2018, 1601 pedestrians were involved in motor vehicle collisions (approximately 21%). In 2019, 2020, and 2021, it was 1545 (approximately 20%), 1055 (approximately 24%), and 990 (approximately 24%), respectively. In 2022, the number of pedestrians increased to 1241 (approximately 22%) but fell to its lowest number of pedestrians in collisions in a year with 968 people in 2023 (approximately 20%).

4 Discussion

From Section 3, we found that from 2017 to 2023, the number of motor vehicle collisions decreased during 2020 and onwards, the number of pedestrians involved in these collisions decreased, and hotspots for motor vehicle collisions stayed consistent. We also found that the most common type of collision was Property Damage and the second most common collision type in 2020 to 2022 was Personal Injury and for other years it was Fail to Remain. We also observed that there was a decrease in numbers from 2019 to 2020 where the number of pedestrians involved in collisions in Toronto decreased by approximately 38% and the number of collisions in Toronto decreased by 59%. Our observations also revealed that the number of pedestrians and the number of collisions were below the numbers reached in the years prior to 2020, which was when the COVID-19 pandemic started.

Throughout 2020 to 2021, the Ontario Government imposed Stay-at-Home orders and required Canadians to stay at home unless they are travelling for essential purposes such as grocery shopping (Office of the Premier 2021). This could have been one of the reasons why there was a decrease in motor vehicle collisions by 59% and 2020 and 2021 had fewer accidents. In 2022, the Ontario Government began plans to reopen Ontario at the beginning of the year, which led to more people on the road and being outside and therefore could have resulted in the number of collisions in 2022 being higher than in 2020 and 2021 in Figure 2.

Vision Zero Safety Plan is a plan created by the City of Toronto in 2016 to reduce traffic collision injuries and fatalities (C. of Toronto 2024). Based on the decreasing number of pedestrians being involved in collisions over the years, it suggests Vision Zero could have influenced this trend. However, the number of motor vehicle collisions increased from 2017 to 2019, which means other factors are in play that could be further investigated by future works. Vision Zero has also faced criticism due to its lack of focus on addressing road and pedestrian safety in low-income areas (Roy 2022). While we did not directly look at the relationship between ward income and the number of collisions, which could be investigated in future works, we found that the number of crashes across Toronto stayed consistent from 2017 to 2023 based on Figure 1. The neighbourhoods we found impacted with high amounts of vehicle collisions (composing about 2% of total collisions) in Table 1 were mostly in wards that are below the mean average household income based on data from 2020.

Despite using datasets with over 100,000 observations, the datasets are not completely accurate. With the data entry for one of datasets, human error has occurred. This is seen with the original dataset containing rows that are partially completed with N/A as some of their entries. As mentioned by “Police Annual Statistical Report - Traffic Collisions” (2023), in order to ensure privacy, coordinates to the collision sites were offset to the closest road intersection. This means that the neighbourhoods where collisions were recorded at might not be completely accurate. Other errors that may have occurred include motor vehicle collisions being purposely misrepresented when entered or inaccurate information being entered by mistake.

The analysis was faced with several limitations as well. The data on Toronto Wards' average incomes and population size was done in 2020, which may not reflect trends of other years. Due to the complexity of motor vehicle collisions and the different ways they can be categorized, our analysis looked at collisions that were defined in only one of the four categories (Fatal, Fail to Remain, Property Damage, and Personal Injury). This means that the number of motor vehicle collisions and the number of pedestrians involved with them are lower than they would be. Currently, no dataset exists that corresponds neighbourhoods with their respective wards and so searches for each neighbourhood and their ward were done manually using Toronto's Find Your Neighbourhood page (Toronto 2024).

Future investigations could be conducted on the demographics of Toronto locations with a high number of motor vehicle collisions. Other investigations that could be made include ones regarding the increase in motor vehicle collisions from 2017 to 2019 and the relationship between ward income and the number of collisions. Datasets could also be created that map Toronto neighbourhoods to their respective wards to allow for more in-depth and accurate analysis of motor vehicle collisions in different neighbourhoods and wards.

Appendix

.1 Acknowledgments

We would like to acknowledge Alexander (2023) for some of the R code used in this paper to produce the tables and graphs.

.2 Datasets Used

Due to the length of the datasets horizontally, presenting glimpses of the datasets was not possible in the paper. However, the cleaned datasets that were used can be found here: <https://github.com/moonsdust/toronto-collisions/tree/main/outputs/data>.

.3 Tables from Results

Table 6: Population size and average household income across Toronto wards in 2020

Ward Number	Ward Name	Population Number	Average Household Income (CAD)
1	Etobicoke North	115120	95200
2	Etobicoke Centre	117200	146600
3	Etobicoke-Lakeshore	139920	127200
4	Parkdale-High Park	104715	127200
5	York South-Weston	115675	88700
6	York Centre	107355	107500
7	Humber River-Black Creek	111200	85700
8	Eglinton-Lawrence	114820	176400
9	Davenport	104730	107300
10	Spadina-Fort York	135400	118200
11	University-Rosedale	102385	174800
12	Toronto-St. Paul's	114095	160400
13	Toronto Centre	116930	89400
14	Toronto-Danforth	104555	130800
15	Don Valley West	101025	224800
16	Don Valley East	94335	100300
17	Don Valley North	112590	103800
18	Willowdale	117130	106300
19	Beaches-East York	108500	130600
20	Scarborough Southwest	110095	102200

Table 6: Population size and average household income across Toronto wards in 2020

Ward Number	Ward Name	Population Number	Average Household Income (CAD)
21	Scarborough Centre	111560	91500
22	Scarborough-Agincourt	103690	93000
23	Scarborough North	94025	100000
24	Scarborough-Guildwood	102755	92700
25	Scarborough-Rouge Park	101485	121800

Table 7: Toronto Neighbourhoods with the most number of motor vehicle collisions from 2017 to 2023

Neighbourhood Name and Number	Number of Motor Vehicle Collisions (2017 to 2023)	Proportion of Motor Vehicle Collisions (2017 to 2023)
West Humber-Clairville (1)	2812	0.02
Wexford/Maryvale (119)	2075	0.02
South Riverdale (70)	1866	0.02
York University Heights (27)	1781	0.02
Clairlea-Birchmount (120)	1567	0.01
Etobicoke City Centre (159)	1519	0.01
Milliken (130)	1491	0.01
Annex (95)	1327	0.01
St Lawrence-East	1324	0.01
Bayfront-The Islands (166)		
High Park-Swansea (87)	1294	0.01
Dorset Park (126)	1272	0.01
Moss Park (73)	1259	0.01
Yorkdale-Glen Park (31)	1255	0.01
Banbury-Don Mills (42)	1252	0.01
Morningside Heights (144)	1251	0.01
Wellington Place (164)	1224	0.01
Stonegate-Queensway (16)	1223	0.01
Rosedale-Moore Park (98)	1212	0.01

Table 7: Toronto Neighbourhoods with the most number of motor vehicle collisions from 2017 to 2023

Neighbourhood Name and Number	Number of Motor Vehicle Collisions (2017 to 2023)	Proportion of Motor Vehicle Collisions (2017 to 2023)
The Beaches (63)	1181	0.01
Yonge-Bay Corridor (170)	1160	0.01
Agincourt South-Malvern West (128)	1159	0.01
Kensington-Chinatown (78)	1140	0.01
Bedford Park-Nortown (39)	1132	0.01
South Parkdale (85)	1110	0.01
Golfdale-Cedarbrae-Woburn (141)	1058	0.01
West Hill (136)	1054	0.01
Downtown Yonge East (168)	1046	0.01
Woburn North (142)	1023	0.01
Glenfield-Jane Heights (25)	1004	0.01
Humber Summit (21)	971	0.01
Birchcliffe-Cliffside (122)	961	0.01
East End-Danforth (62)	926	0.01
Trinity-Bellwoods (81)	896	0.01
Junction Area (90)	895	0.01
Tam O'Shanter-Sullivan (118)	887	0.01
Harbourfront-CityPlace (165)	885	0.01
Malvern East (146)	883	0.01
Oakdale-Beverley Heights (154)	882	0.01
Bendale-Glen Andrew (156)	868	0.01
Newtonbrook West (36)	858	0.01
Rockcliffe-Smythe (111)	853	0.01
Downsview (155)	849	0.01
Leaside-Bennington (56)	849	0.01
Agincourt North (129)	838	0.01
Islington (158)	810	0.01

Table 7: Toronto Neighbourhoods with the most number of motor vehicle collisions from 2017 to 2023

Neighbourhood Name and Number	Number of Motor Vehicle Collisions (2017 to 2023)	Proportion of Motor Vehicle Collisions (2017 to 2023)
Junction-Wallace	807	0.01
Emerson (171)		
Mount Pleasant East (99)	803	0.01
Oakwood Village (107)	790	0.01
Mount Olive-Silverstone-Jamestown (2)	778	0.01
Mimico-Queensway (160)	774	0.01
Bayview Village (52)	772	0.01
Clanton Park (33)	766	0.01
Newtonbrook East (50)	747	0.01
West Rouge (143)	746	0.01
Brookhaven-Amesbury (30)	745	0.01
Forest Hill South (101)	742	0.01
Cliffcrest (123)	732	0.01
Kennedy Park (124)	706	0.01
Lawrence Park South (103)	703	0.01
Don Valley Village (47)	695	0.01
Hillcrest Village (48)	691	0.01
Old East York (58)	687	0.01
St. Andrew-Windfields (40)	680	0.01
Steeles (116)	672	0.01
Malvern West (145)	667	0.01
Eglinton East (138)	665	0.01
East Willowdale (152)	662	0.01
Danforth East York (59)	655	0.01
Bridle Path-Sunnybrook-York Mills (41)	648	0.01
Little Portugal (84)	647	0.01
Keelesdale-Eglinton West (110)	643	0.01
Wychwood (94)	642	0.01
Bathurst Manor (34)	640	0.01

Table 7: Toronto Neighbourhoods with the most number of motor vehicle collisions from 2017 to 2023

Neighbourhood Name and Number	Number of Motor Vehicle Collisions (2017 to 2023)	Proportion of Motor Vehicle Collisions (2017 to 2023)
Corso Italia-Davenport (92)	635	0.01
Lansing-Westgate (38)	627	0.01
Fort York-Liberty Village (163)	626	0.01
Roncesvalles (86)	625	0.01
Weston (113)	624	0.01
University (79)	620	0.01
Englemount-Lawrence (32)	619	0.01
Yonge-Eglinton (100)	619	0.01
Greenwood-Coxwell (65)	616	0.01
Humbermede (22)	607	0.01
Henry Farm (53)	605	0.01
Casa Loma (96)	601	0.01
West Queen West (162)	601	0.01
Willowridge-Martingrove-Richview (7)	597	0.01
Cabbagetown-South	589	0.01
St.James Town (71)		
Palmerston-Little Italy (80)	587	0.01
Dufferin Grove (83)	585	0.01
Alderwood (20)	584	0.01
O'Connor-Parkview (54)	583	0.01
Victoria Village (43)	574	0.01
North Riverdale (68)	569	0.01
Pelmo Park-Humberlea (23)	568	0.01
Willowdale West (37)	562	0.00
High Park North (88)	558	0.00
Thorncliffe Park (55)	556	0.00
Dovercourt Village (172)	552	0.00
Lawrence Park North (105)	552	0.00
L'Amoreaux West (147)	548	0.00

Table 7: Toronto Neighbourhoods with the most number of motor vehicle collisions from 2017 to 2023

Neighbourhood Name and Number	Number of Motor Vehicle Collisions (2017 to 2023)	Proportion of Motor Vehicle Collisions (2017 to 2023)
Edenbridge-Humber Valley (9)	534	0.00
Black Creek (24)	517	0.00
Bay-Cloverhill (169)	517	0.00
East L'Amoreaux (148)	517	0.00
Church-Wellesley (167)	516	0.00
Bendale South (157)	509	0.00
Fenside-Parkwoods (150)	497	0.00
Oakridge (121)	493	0.00
Morningside (135)	490	0.00
Kingsview Village-The Westway (6)	489	0.00
Flemington Park (44)	487	0.00
Eringate-Centennial-West Deane (11)	486	0.00
Woodbine Corridor (64)	484	0.00
Westminster-Branson (35)	467	0.00
Weston-Pelham Park (91)	465	0.00
Scarborough Village (139)	464	0.00
Mount Dennis (115)	461	0.00
New Toronto (18)	460	0.00
Highland Creek (134)	460	0.00
Parkwoods-O'Connor Hills (149)	459	0.00
Thistletown-Beaumont Heights (3)	456	0.00
Runnymede-Bloor West Village (89)	454	0.00
Briar Hill-Belgravia (108)	453	0.00
South Eglinton-Davisville (174)	432	0.00
Regent Park (72)	431	0.00
Yonge-Doris (151)	429	0.00
Yonge-St.Clair (97)	428	0.00
Humber Heights-Westmount (8)	423	0.00

Table 7: Toronto Neighbourhoods with the most number of motor vehicle collisions from 2017 to 2023

Neighbourhood Name and Number	Number of Motor Vehicle Collisions (2017 to 2023)	Proportion of Motor Vehicle Collisions (2017 to 2023)
Beechborough-Greenbrook (112)	422	0.00
Forest Hill North (102)	420	0.00
Caledonia-Fairbank (109)	416	0.00
Long Branch (19)	413	0.00
Humewood-Cedarvale (106)	412	0.00
Humber Bay Shores (161)	400	0.00
Pleasant View (46)	399	0.00
Broadview North (57)	399	0.00
Kingsway South (15)	397	0.00
Avondale (153)	396	0.00
Elms-Old Rexdale (5)	392	0.00
Bayview Woods-Steeles (49)	388	0.00
Danforth (66)	384	0.00
Centennial Scarborough (133)	383	0.00
Rexdale-Kipling (4)	382	0.00
Princess-Rosethorn (10)	368	0.00
Blake-Jones (69)	357	0.00
Maple Leaf (29)	340	0.00
Ionview (125)	324	0.00
North St.James Town (74)	320	0.00
Woodbine-Lumsden (60)	313	0.00
Taylor-Massey (61)	298	0.00
Etobicoke West Mall (13)	295	0.00
Markland Wood (12)	289	0.00
Rustic (28)	287	0.00
Guildwood (140)	281	0.00
Playter Estates-Danforth (67)	276	0.00
North Toronto (173)	246	0.00
Lambton Baby Point (114)	130	0.00
NSA	48	0.00

References

- Alexander, Rohan. 2023. “Telling Stories with Data.” Chapman; Hall/CRC. <https://tellingsstorieswithdata.com/>.
- Callan, Isaac. January 11 2024. “Toronto Among World’s Worst Cities for Congestion, According to a New Report,” January 11 2024. <https://globalnews.ca/news/10220758/toronto-traffic-world-worst-3rd/>.
- “City Wards.” 2024. Open Data Toronto; City Clerk’s Office. <https://open.toronto.ca/dataset/city-wards/>.
- Cordeiro, Adriana, and Sanyam Sethi. 2023. “Perceptions about the Safety of Canada’s Roads Have Deteriorated Within the Last Two Years.” <https://thelocal.to/vision-zero-inequality-toronto/>.
- Firke, Sam. 2023. *Janitor: Simple Tools for Examining and Cleaning Dirty Data*. <https://github.com/sfirke/janitor>.
- Gelfand, Sharla. 2022. *Opendatatoronto: Access the City of Toronto Open Data Portal*. <https://CRAN.R-project.org/package=opendatatoronto>.
- Office of the Premier. 2021. “Ontario Strengthens Enforcement of Stay-at-Home Order.” <https://news.ontario.ca/en/release/61192/ontario-strengthens-enforcement-of-stay-at-home-order>.
- Pebesma, E, and R Bivand. 2023. *Spatial Data Science: With Applications in r*. Chapman; Hall/CRC. <https://doi.org/10.1201/9780429459016>.
- “Police Annual Statistical Report - Traffic Collisions.” 2023. Open Data Toronto; Toronto Police Services. <https://open.toronto.ca/dataset/police-annual-statistical-report-traffic-collisions/>.
- R Core Team. 2023. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. <https://www.R-project.org/>.
- Roy, Inori. 2022. “The Deadly Inequality of Toronto’s Vision Zero Rollout.” <https://thelocal.to/vision-zero-inequality-toronto/>.
- Toronto. 2024. “Find Your Neighbourhood.” Toronto. <https://www.toronto.ca/city-government/data-research-maps/neighbourhoods-communities/neighbourhood-profiles/find-your-neighbourhood>.
- Toronto, City of. 2024. “Vision Zero Plan Overview.” <https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/vision-zero-plan-overview/>.
- “Ward Profiles (25-Ward Model).” 2024. Open Data Toronto; City Planning. <https://open.toronto.ca/dataset/ward-profiles-25-ward-model/>.
- Wickham, Hadley. 2016. *Ggplot2: Elegant Graphics for Data Analysis*. Springer-Verlag New York. <https://ggplot2.tidyverse.org>.
- Wickham, Hadley, Mara Averick, Jennifer Bryan, Winston Chang, Lucy D’Agostino McGowan, Romain François, Garrett Grolemund, et al. 2019. “Welcome to the tidyverse.” *Journal of Open Source Software* 4 (43): 1686. <https://doi.org/10.21105/joss.01686>.
- Wickham, Hadley, Romain François, Lionel Henry, Kirill Müller, and Davis Vaughan. 2023. *Dplyr: A Grammar of Data Manipulation*. <https://CRAN.R-project.org/package=dplyr>.

Xie, Yihui. 2014. “Knitr: A Comprehensive Tool for Reproducible Research in R.” In *Implementing Reproducible Computational Research*, edited by Victoria Stodden, Friedrich Leisch, and Roger D. Peng. Chapman; Hall/CRC. <http://www.crcpress.com/product/isbn/9781466561595>.