

final draft

Cristina Burca

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Investigation of cyclist and pedestrain collisions in Toronto over the years. Meaning to answer the question of if Toronto is a safe city for cyclists and pedestrians, and if the citizens themselves agree based on statistics. Results?

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1. Introduction

Toronto stands among the many cities that has been advocating for more eco-friendly commuting practices among its citizens. A key aspect of this initiative involves the promotion of alternative modes of transportation, such as cycling, walking, and utilizing public transit options. The city has taken measures to implement and enforce these commuting alternatives, including the constant integration of bike lanes on city roads and the introduction of rentable city bikes, with hubs conveniently placed around the city for pickup and return of the bikes. Besides a means of commuting to work, the city also encourages citizens to explore these option under favorable weather conditions or when venturing out to local events or shops of shorter distance.

“There’s data to show that when we have bike lanes, car to car collisions go down along those streets, as do collisions and impacts on people walking,” said Jacquelyn Hayward, Toronto’s Director, Transportation Project Design & Management (Braun 2021). In 2016, Toronto launched a network plan named Vision Zero to install safety initiatives with the goal to decrease driving collisions and fatalities, with a specific focus on children, older citizens, pedestrians, and cyclists. 650 kilometers of trail, bike, and pedestrians lanes and paths have been funded by the government of Canada, and 15 kilometers of bike lanes have been established in city of Toronto in 2018 and 2019. But have these efforts by the city of Toronto led to an increase in cyclists and pedestrians?

Inherit issues such as heavy traffic, ongoing construction, unsafe road conditions, and the alarming number of vehicle and pedestrian accidents cause citizens to be apprehensive to walk or cycle down the streets of Toronto. “Toronto is the most perilous city in the world to be a cyclist,” states Henry Gold, “it’s more dangerous than anywhere else in the world,” (Murphy 2018). Council Mike Layton says that people should not be afraid to leave their homes and walk on the street because they are in fear of an accident. Clearly, there is uncertainty that this over \$87 million project Vision Zero has made an impact on the number of pedestrian and cyclists collisions and fatalities. For citizens to take advantage of initiatives the city of Toronto has implemented to make pedestrians safer, they must not question whether these measures are effective or not.

From here, I will analyze if there has been any overall change in pedestrian and cyclist collisions and fatalities in the city of Toronto, as well as the severity of injuries, to overview the trends of these variables over the years, as well as to infer on the city’s Vision Zero plan, and give insight on the safety conditions for pedestrians and cyclists.

2. Data

In this section, I will explain the contents of the data, the variables considered, and observations made from analyzing the data.

2.1 Introducing the data

The data used for this paper has been retrieved from the City of Toronto Open Data Portal (Gelfand 2022), titled “Motor Vehicle Collisions involving Killed or Seriously Injured Persons” (Data 2023). It includes driving collisions recorded from 2006 to 2022, listing 50 variables about the collisions such as location, people involved and age, weather conditions, driver actions, speed, and injuries. Data was cleaned and analyzed using R (R Core Team 2021), using functions from the following packages: knitr (Xie 2014), tidyverse (**rtidyverse?**), and lubricate (Grolemund and Wickham 2011).

2.2 Variables of interest

Since I am comparing pedestrian and cyclist collisions, I have filtered the data to show only pedestrian and cyclist collisions, and have selected the variables ‘Date’ and ‘Injury’ to study. ‘Date’ is formatted as YYYY-MM-DD and ‘Injury’ lists the severity of the injury of the cyclist or pedestrian from ‘None’, ‘Minimal’, ‘Minor’, ‘Major’ and ‘Fatal’. ‘DRIVACT’, ‘PEDACT’ and ‘CYCACT’ are variables that I have decided to include, which list the actions of the respective person, whether they were driving/ cycling/ walking properly, made an illegal action, etc. I then created two new columns titled ‘Year’ and ‘Month’, to separate the year and month information to allow for easier comparison of years and months.

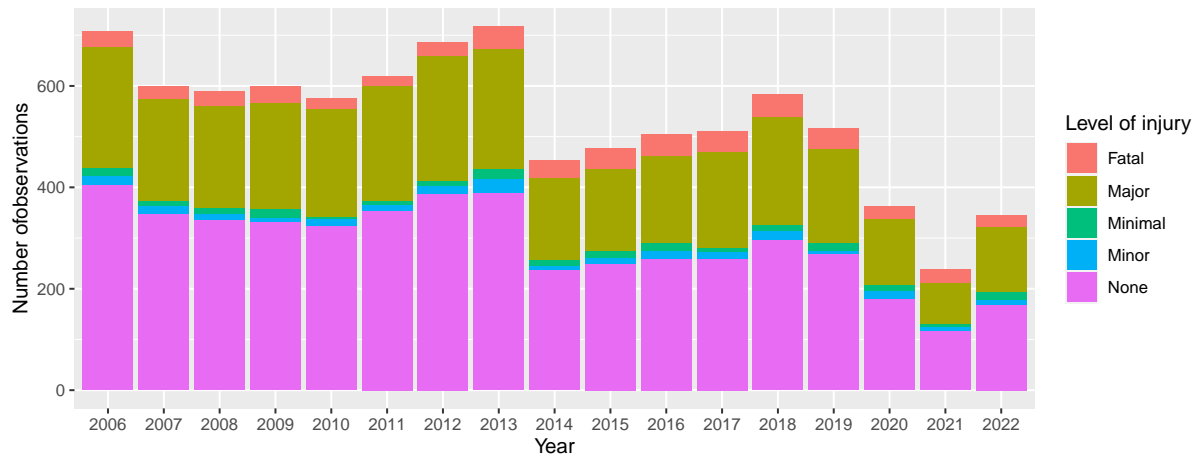
Year	Number of Injuries	Number of Fatalities
2006	676	33
2007	575	25
2008	560	29
2009	567	32
2010	554	22
2011	599	20
2012	659	27
2013	672	46
2014	419	35
2015	435	43
2016	461	45
2017	469	41
2018	538	45
2019	476	40
2020	337	25
2021	210	29
2022	321	25

Figure 1: Number of pedestrian and cyclist injuries and fatalities by year

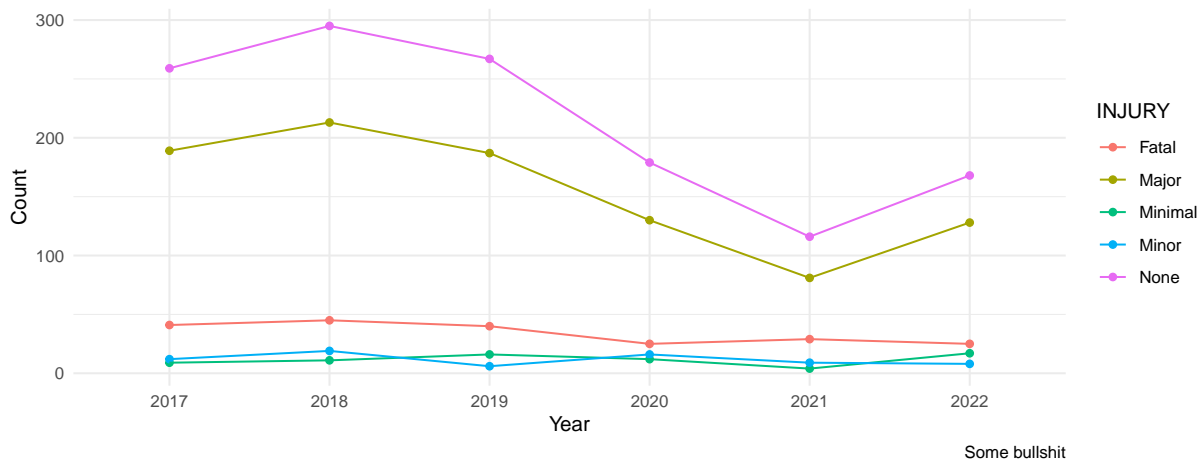
As a slight overview, I printed the number of injuries (not including fatalities) and fatalities in Figure 1 to get an idea of the trend. It is clear that the number of injuries is on an overall decline, as well as the number of fatalities, but with a spike in fatalities between 2013-2019. However, this is just some rough insight and I shall analyze the data more rigorously.

2.3 some observations

<https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/vision-zero-dashboard/> Vision Zero is an action plan implemented by the city of Toronto

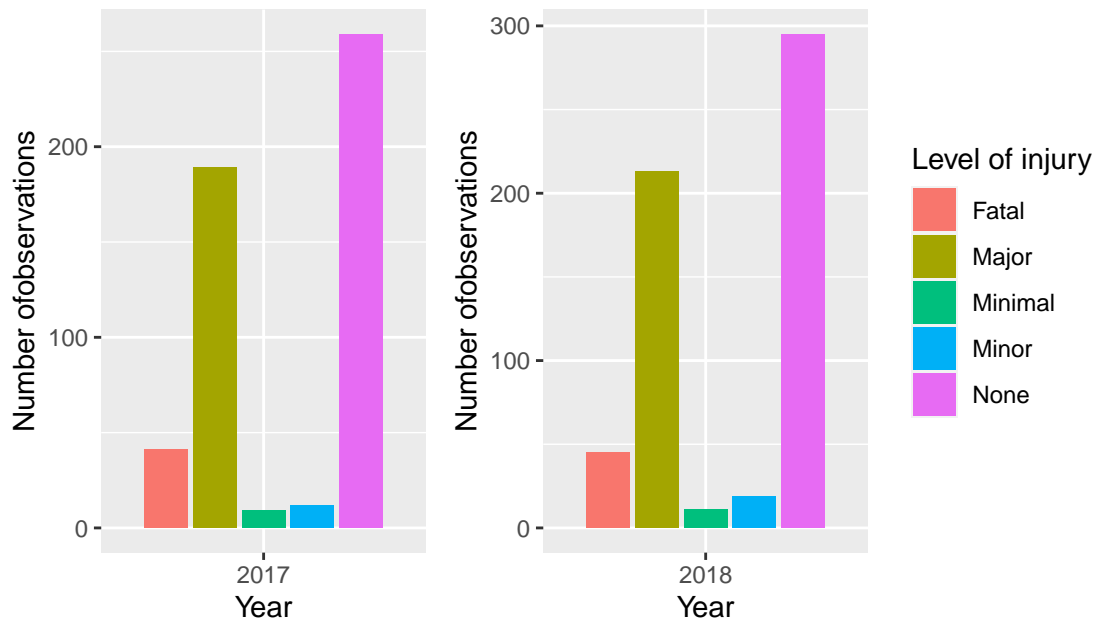


focused on reducing the amount of traffic and driving related fatalities. This plan was launched in 2016. Here we can observe the data of fatalities from 2016 until 2022.



- change graph to maybe line graphs? <https://www.cbc.ca/news/canada/toronto/pedestrian-deaths-prompt-concern-1.4560548>

There has been reported an increase in and pedestrian deaths from 2017 to 2018. Here we can compare the the two years, and notice a jump in injuries.



3. Results

4. References

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