

Analysis of traffic collision data involving pedestrians and cyclists around public schools in Kitchener, Ontario

Abstract

Should Kitchener-Waterloo implement speed cameras at all schools in the Region? I looked at traffic collision data from the City of Kitchener and found little evidence that speed cameras would provide any value. First, there are relatively few accidents near schools during school hours involving pedestrians or cyclists (an average of roughly 3.7 non-fatal accidents yearly). In Kitchener, the majority of recurring accidents have occurred at intersections near downtown schools or Williamsburg. I suggest that traditional traffic calming measures – speed bumps, crosswalks, and crossing attendants – provide citizens with better safety and value.

Introduction

Waterloo Regional Council has decided to invest in a series of speed cameras around schools in what they have called community safety zones (CSZ) (Fraser 2024). These cameras were supposed to be a good thing because they would reduce driver speeds and thus reduce any risk of accidents. The implicit assumption is that cameras are necessary to reduce the high rate of accidents involving local children. This raises the following questions:

- What is the average rate of traffic accidents involving pedestrians (and cyclists)?
- Is there justification for putting speed cameras around all schools to reduce pedestrian accidents?

Analysis

To answer the first question, I downloaded traffic accident data from Kitchener supplied by the Region of Waterloo's open data website (City of Kitchener 2024). The data lists 8928 records, covering 2015 to 2022 up to the second quarter. (The open-data website says the data should be up to 2024, but the downloads only include data up to 2022 Q2.) The majority of traffic accidents involve cars. There are 395 records involving pedestrians and 160 records of accidents involving cyclists.

However, this research focuses on whether there is a strong justification for speed cameras to monitor traffic around schools. So, I can't simply use all traffic data to evaluate the speed cameras. Instead, I need to focus on the accidents involving pedestrians and cyclists near schools. After all, purchases of speed cameras have been made for all schools in the Region. Our second question is about finding if there is a clear need for these expensive speed cameras.

We need to focus on all the traffic accidents involving pedestrians and cyclists near schools to find an answer. To do this, I focus on traffic data that is (a) within a 250-meter radius around a school and (b) occurs during a typical school day. For this, I look for pedestrian and cyclist

accidents that occurred between 6am and 6pm on a weekday. The goal of these restrictions is to capture accidents that took place close to schools that a traffic system with a speed camera would presumably make less likely.

To determine where schools are, I use the list of schools supplied by the Waterloo District School Board (Waterloo District School Board 2024). I focus only on Kitchener schools for this study because the traffic data is only for Kitchener. The latitude and longitude for each school are resolved based on the address using OpenStreetMap and Google Maps. The Kitchener Traffic data already contains the latitude and longitude of each accident. Using the Haversine distance algorithm, we can find the distance between each school, pedestrian, and cyclist accident point. (The Haversine algorithm is a way of measuring the distance between two points that are on a sphere.) Points within 250 meters of a school are kept, and those further away are ignored.

After accounting for proximity to a school, the time of day consistent with a school day, I was left with 28 unique records of pedestrian or cyclist accidents between 2015 and 2022, Q2 (see Table 1 for details). One accident in Table 1 is double-counted because it occurred near two schools, so the total in Table 1 is 29 and not 28, which I report here.

School	2015	2016	2017	2018	2019	2020	2021	2022	Total
Margaret Avenue Public School, 325, Louisa Street	1		1	1	2		1		6
Kitchener-Waterloo Collegiate and Vocational School, 787, King Street W.	2			1			1		4
Williamsburg Public School, 760, Commonwealth Crescent		1	1			1		1	4
King Edward Public School, 709, King Street West	1						1		2
11, Chopin Drive, Victoria Hills, Kitchener								1	1
1401, Doon Village Road, Doon, Kitchener				1					1
51, Natchez Road, Kitchener	1								1
55, Upper Canada Drive, Doon, Kitchener		1							1
Huron Heights Secondary School, 1825, Strasburg Road				1					1
Queensmount Public School, 21, Westmount Road West				1					1
Sandhills Public School, 1250, Victoria Street South, Kitchener				1					1
Sheppard Public School, 278, Weber Street East, Kitchener					1				1
Smithson Public School, 150, Belleview Avenue, Kitchener		1							1
Sunnyside Public School, 1042, Weber Street East, Kitchener				1					1
W.T. Townshend Public School, 245, Activa Avenue, Kitchener	1								1
Westmount Public School, 329, Glasgow Street, Westmount, Kitchener	1								1
Wilson Avenue Public School, 221, Wilson Avenue, Kitchener					1				1
Total									29

Table 1- Counts of pedestrian and cyclist accidents within 250m of schools, between 6am and 6pm on weekdays in Kitchener, Ontario, between 2015-2022 Q2.

Schools with Multiple Accidents

Table 1 shows that schools around Kitchener downtown and Williamsburg have experienced the most accidents. Margret Avenue Public School has had the most accidents, with six recorded between 2015 and the second quarter of 2022. Margret Avenue School is situated at the intersection of two busy roads: Margret Avenue and Wellington Street. Wellington Street has a highway exit at the northeast end that local commuters use to access the highway, and employees at companies like Google, located at the far end of Wellington, would use it to get to work.

A Google map of all the schools and nearby accidents is available (MacKay 2024). The map shows that most traffic accidents involving pedestrians are located at the intersection of Margret Ave and Wellington Street, with an existing traffic light and crosswalk. One additional accident happened further up Margret, and another occurred a block down Wellington adjacent to the school property.

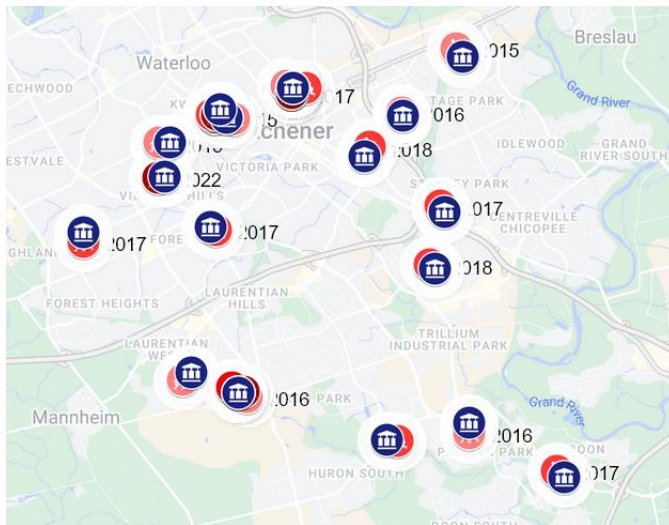


Figure 1- Map of traffic accidents involving pedestrians or cyclists near schools in Kitchener, Ontario. Dynamic Google map available at https://www.google.com/maps/d/viewer?mid=19qYtFXF_q_xqhNLUe56Asq1jqkOu5IY&hl=en&usp=sharing

Kitchener-Waterloo Collegiate Institute (KCI) High School has four recorded traffic accidents involving pedestrians. The high school is a few blocks from King Edward Public School, with two recorded accidents nearby. One of the accidents is double-counted as belonging to both KCI and King Edwards School, which is why the reported counts differ from those listed in Table 1. A close look at the Google Maps plot shows that two accidents happened near the corner of Park Street and Glasgow Street in 2015, where there is a crosswalk and traffic light. A more recent accident in 2021 happened closer to the back entrance of KCI at the corner of Glasgow Street and Gruhn Street. This latter accident happened close to a sharp corner with poor visibility on Glasgow Street. (Using our methodology, this 2021 accident is close enough to King Edwards to be counted towards that school.)

Further along, Glasgow is the site of a 2015 traffic accident. This is now the site of a crosswalk connecting the King Edwards School lot to its play area across the street. About 100 meters further up is a four-way stop on Glasgow Street, where there are regular crosswalk guards to help younger children cross during school hours.

Aside from the downtown area, there are four listed accidents involving pedestrians near Williamsburg Public School. Two accidents took place near Max Becker Drive and Isabella Street. Two more accidents are recorded at different sites along Commonwealth Street.

Patterns in Accidents

So far, the largest number of repeated accidents have occurred near downtown schools. Some have occurred at intersections with existing street lights and crosswalks. Other accidents indicate a potential pre-existing danger in the amount of traffic or the road configuration. The crosswalk on Glasgow near King Edwards school and the crosswalk attendants around busy intersections around the school are good examples of physical changes and policy responses made to keep young children safe downtown. (I live in the downtown so I am unaware of alterations to crossings made in the Williamsburg area in response to the accidents there.)

The results show that over the eight years from 2015 to the second quarter of 2022, there were 28 unique traffic accidents involving pedestrians and cyclists during the day and the school week. Of these accidents, none were fatal. Twenty-five resulted in non-fatal injuries. Three resulted in just property damage.

Overall Impressions

After examining the traffic accident data in Kitchener, it is clear that there are a few locations where accidents have repeatedly happened. These are cases where the schools are located near busy roads or roads with poor visibility, and there has been a pattern of repeated traffic accidents during the day involving pedestrians. Over the past eight years, 14 accidents have occurred in areas near downtown schools or Williamsburg. Some of these accidents occurred at intersections near traffic lights with existing walkways. Others appear to have been irregular crossings. In some cases, like near King Edwards Public School, the City acted to install a new crosswalk to more safely connect the school with a nearby greenspace.

In total, 17 schools, out of 52 in Kitchener, have had accidents near them during school hours. Given the low rate of accidents and their sporadic appearance at most locations, the need for speed cameras at all schools seems questionable. Many accidents where there have been repeated incidents near schools happened at intersections with existing lights and crosswalks. Speed cameras would not affect incidents where someone is crossing against the light or a driver improperly turns into a lane with a crossing pedestrian. All of the accidents at Margret Avenue Public School (6) were at an intersection. Of the four near Williamsburg Public School,

one was at a private drive, one was intersection related and two were not intersection. 75% of incidents near KCI were at an intersection (3/4). The non-intersection accident closest to King Edwards resulted in an additional crosswalk being installed leading from the school to the park with speed bumps to signal to drivers to be cautious.

Implementing physical solutions to traffic problems is important because it acts as a signal to pedestrians of where they can walk and to drivers about where they should be cautious. Speed cameras – if they are effective at all – take effect only after a driver receives a ticket in the mail.

In summary, in my opinion the evidence does not support a widespread need to purchase cameras to suppress traffic around all schools for public safety. Instead, it seems evident that a more cost-effective way would be to implement traditional traffic calming (such as speed bumps) and pedestrian aids like crosswalks and crossing guards. Physical items provide visual cues to both drivers and pedestrians.

The Problem with Speed Cameras

My primary concern is that speed cameras have been presented to the public as necessary for public safety. This data analysis, using open data from the City of Kitchener, has shown that there is no widespread problem these cameras are solving. As a citizen, I am very concerned when an expensive solution is presented for public safety that does not stand up to even basic scrutiny using past data available from the City. Although, on a positive note, I am grateful that the City of Kitchener releases its traffic collision data so I could write this report.

Speed cameras are expensive and require maintenance, and an ongoing bureaucracy to manage the fines. Other techniques, such as crossings, speed bumps, and crosswalk attendants, have shown their value over time and have comparatively low costs to implement.

Works Cited

City of Kitchener. 2024. "Traffic Collisions." 2024.

<https://data.waterloo.ca/datasets/KitchenerGIS::traffic-collisions/>.

Fraser, Justine. 2024. "Region Looks to Expand Speed Camera Program with Council Motion." *CityNews Kitchener* (blog). August 9, 2024.

<https://kitchener.citynews.ca/2024/08/09/region-looks-to-expand-speed-camera-program-with-council-motion/>.

MacKay, Jon. 2024. "Kitchener Pedestrian and Cyclist Collisions Near Schools." Google My Maps. 2024.

https://www.google.com/maps/d/viewer?mid=19gYtFXF_g_xqhNLUe56Asq1jgkOu5IY&hl=en.

Waterloo District School Board. 2024. "School List." Waterloo Region District School Board. 2024. <https://www.wrdsb.ca/our-schools/schools/>.