ROAD TRAFFIC INJURY DURING THE COVID-19 PANDEMIC: CURED OR A CONTINUED THREAT?

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Abstract

Road traffic injury, one of the leading causes of preventable morbidity and mortality in Canada, declined substantially as an indirect outcome of the first wave of the COVID-19 pandemic. Public health policies encouraging people to ‘stay at home’ and ‘practice physical distancing’ precipitated shifts in vehicle volumes and speed, transportation mode, and collision rates. Toronto data from January to June 2020 showed a decrease in road transportation, and a simultaneous decrease in road traffic collisions. However, reduced traffic volumes also led to increased vehicle speeds which can result in an increase in injury severity involving pedestrians and cyclists. As the pandemic progresses, an emphasis on safe, active transportation and equitable distribution of street infrastructure throughout the city is essential. A public health approach to road safety includes implementation of evidence-based road safety infrastructure enabled by access to timely transportation data to evaluate changes made.

Keywords: COVID-19; Public Policy; Accidents, Traffic; Pedestrians; Bicycling; Transportation

Introduction

During the first wave of the COVID-19 pandemic, public health policies were implemented in Canada to control the spread of the disease. These policies encouraged people to ‘stay at home’ and to ‘practice physical distancing’ which precipitated shifts in vehicle volumes and speed, transportation mode, and collision rates. As jurisdictions began to re-open, fewer people stayed at home, though physical distancing policies have continued in most public spaces. Fear of crowded public transit may continue to influence people to choose either active transportation (i.e., walking/cycling) or private vehicle travel.

Road traffic injuries are the second single leading cause of death among Canadian adults under 50 years of age, accounting for 9% of all fatalities, and are the leading cause of death among Canadian children and youth (ages 5-14), comprising 16% of all fatalities. In 2017, the City of Toronto implemented the Vision Zero Road Safety Strategy to achieve the goal of zero serious injuries and...
fatalities on Toronto roads. To understand the impacts of ‘stay at home’ and ‘physical distancing’ policies in the City of Toronto during its first wave, we examined the rates of road traffic deaths and serious injuries across transportation modes and age groups following policy implementation and subsequent relaxation from January to June 2020.

**Policies enacted during the COVID-19 pandemic that influenced transportation**

We conducted a scan of policies enacted at the municipal, provincial, and federal levels from January 1, 2020 to June 30, 2020 that affected the City of Toronto. The official online news portals for the Governments of Canada, Ontario and City of Toronto were scanned for relevant articles. The timeline in Figure 1a shows increasingly stringent guidelines implemented during the first wave, with the declaration of a state of emergency by the Ontario government on March 17, 2020. A decrease in new cases and a concern for the economic impact of COVID-19 led to the relaxation of ‘stay at home’ policies beginning on May 4, 2020 (Figure 1b). Stages of re-opening began in Ontario on May 19, 2020. While the most notable policies were province-wide, local responses had a large impact on access to active modes of transportation.

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**Figures 1a and 1b:** A timeline of the policies enacted during the COVID-19 pandemic in the City of Toronto at the municipal (M), provincial (P), and federal (F) levels.
Changes in transportation modes and speeds
COVID-19 policies had dramatic implications for transportation. Following the initiation of the state of emergency, traffic volumes in Toronto plummeted to a congestion index of 17%, compared with 72% one year earlier. In these analyses, we looked at three study time periods: i) “before” the state of emergency (January 14-March 16, 2020); ii) “during” the ‘stay at home’ and ‘physical distancing’ (March 17-May 18, 2020); and iii) “re-opening” (May 19-June 29, 2020). Based on Apple Maps routing requests, Figure 2 indicates the decreases in walking (-48%), driving (-41%) and transit (-63%) on March 17, 2020 compared to the baseline of January 13, 2020. Concurrently, bike shop sales and servicing increased and Bike Share Toronto ridership continued to hit new records.

Reduced traffic volumes led to increased vehicle speeds. Toronto Police Services reported a 35% increase in speeding tickets, and an almost 200% increase in stunt driving in mid-March compared with a year prior, though this may have been impacted by an increased deployment of officers. Increased vehicle speeds may lead to more collisions with more severe injuries. Vehicle speed is the most important factor in the risk of crash and severity of injury: every 1% increase in speed results in a 3% increase in the risk of a serious crash and a 4% increase in the risk of a fatal crash. Our investigation into vehicle speeds on the frontage of 11 schools on 50 km/hr roads with Watch Your Speed Boards, found a 31% greater odds of speeding during school activity times (8 am – 4 pm) after schools were closed on March 14, 2020 and before the start of the academic year (2020-21).

Figure 2: Percent change in routing requests by transportation mode made to Apple Maps in the period “before” the state of emergency, “during” stay at home and physical distancing and the “re-opening” period.
Impacts on the safety of road users

We analyzed collision rates during the 3 study time periods compared to the same periods in 2019 (Figures 3–4). Data on all collisions resulting in a severe injury or fatality were obtained from the online Vision Zero dashboard from the City of Toronto at the time of analysis (mid-July). The dashboard pulls data from the Toronto Police Service’s internal database. Collision rates were calculated in 14-day time periods deemed the most appropriate time frame to capture a sufficient number of collisions for comparative purposes. Total and age-group population counts were obtained from the 2016 Census to calculate population-based collision rates. We used population denominators because mode-specific denominators (e.g., km travelled by mode) were not readily available.

Compared to 2019, there was a marked decrease in collision rates beginning in March which continued to diverge thereafter (Figure 3). Rates increased in April, potentially due to some businesses re-opening and/or warmer temperatures with people starting to leave their homes. These changes were concurrent with those seen in the decreases in mobility as indicated in Figure 2.

There was no significant difference in collision rates in the “before” period between 2019 and 2020. In the “during” period, there was a 65% reduction in collision rates (Incidence Rate Ratio, IRR 0.35; 95% Confidence Intervals, CI 0.21, 0.59; p-value<0.0001). In the “re-opening” period, there was still a significant reduction in collision rates of 59% (IRR=0.41, 95% CI 0.24, 0.70; p-value<0.0001). In total, there were 34 fewer fatal and serious injury collisions in the 9-week “during” period following the state of emergency, and 27 fewer in the 6-week “re-opening” period. Although 2020 collision rates were lower as compared to 2019, trends in the “re-opening period” from May 19-June 29, 2020 suggested an uptick in collision rates that, at the time of this analysis, suggested a return, or an increase, to prior levels (Figure 3).

Absolute numbers became smaller when we looked at mode-specific collision rates. Nevertheless, the data suggest that pedestrian and motorist collision rates showed similar downward trends from March 3, 2020 onwards (Figure 4). Cyclist and motorcycle collision rates did not decline over time; however, rates were lower in 2020 than 2019. There was a notable decrease in collision rates.
rates in all ages with the largest decrease observed in young adults, showing a 3.7-fold decrease collision rates resulting in a severe injury or fatality after the state of emergency and before re-opening (figure not shown).

Maintaining safer roads as physical distancing policies relax

The reduction in collisions was likely due to lower vehicular and pedestrian volumes and public transit ridership. While the early period of “re-opening” had not yet reached 2019 collision injury/fatality rates at the time of these analyses, it is expected that without directed interventions, collision incidence and severity would increase, especially following reports of increased speeding.10 On-going physical distancing policies and concerns with crowding have led to lower public transit ridership. Should this lead to more people opting for private vehicle use, it may well lead to undesirable outcomes such as increased traffic congestion, pollution, and heightened risk to vulnerable road users.

In response, the City of Toronto began to implement important changes for safe active transportation over the spring and summer 2020. Forty kilometres of separated on-road cycling routes are being installed for commuting cyclists.13 Curb lanes have been allocated to pedestrians where pedestrian crowding occurs. Neighbourhood “quiet streets” have been installed to physically discourage motorized traffic. Finally, some road segments are now temporarily closed to motorized vehicles on weekends in order to expand the recreational cycling and pedestrian network.14

There is, however, substantial room for continued road infrastructure improvement, including making temporary changes permanent should they be shown to be effective. Vehicle speed can be addressed by decreasing posted speed limits, using Watch Your Speed Boards and automated speed enforcement, and introducing more traffic calming infrastructure. A decrease in vehicle speed will ultimately lead to a decrease in collision severity, should they occur.12 Equity issues must also be addressed. The majority of road infrastructure
changes have occurred in the downtown core and in higher income areas of the city and need to be extended to the inner suburbs and to areas of social disadvantage. \(^\text{15}\) Collision rates are higher in areas of social disadvantage and residents in these areas are more likely to be essential workers who need to travel to work. \(^\text{16,17}\)

There is evidence available to support the effectiveness of many road safety infrastructure improvements. However, we currently lack the capacity to affect and monitor drastic changes in travel mode distribution. There is a need for comprehensive and timely data regarding traffic, pedestrian and cyclist volumes, collisions and subsequent injury. This data is essential for the monitoring and evaluation of new infrastructure interventions to assess their impact in encouraging active transportation and reducing road traffic injury and fatalities.

**Conclusion**

Road traffic injury, a leading cause of preventable morbidity and mortality, was drastically reduced as an indirect outcome of public health measures during the first wave of the COVID-19 pandemic. This review provides an analysis of collision rates during the height of ‘stay at home’ measures in Toronto, Canada. This provides novel evidence as a basis for future research efforts that seek to evaluate road traffic safety conditions during the pandemic. An emphasis on implementing evidence-based, equitable and safe active transportation infrastructure with careful monitoring and evaluation and timely access to a comprehensive dataset is essential. Reducing vehicle speeds is paramount. If municipalities hope to sustain decreases in collision rates, efforts must be accelerated to reach the Vision Zero Road Safety Strategy’s public health goal of zero severe and fatal collisions, during and after the pandemic. \(^\text{2}\)

**Competing interests**

The authors declare no competing interests.

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