April 2008

Toronto Pedestrian Committee

Response to the City of Toronto Pedestrian Collision Study (January 2007)

Summary

The Toronto Pedestrian Committee thanks City of Toronto staff for preparing the Pedestrian Collision Study. The collection and initial analysis of statistics about collisions between vehicles and pedestrians is valuable, and the creation of a new typology of these collisions has already proven to be very useful.

However, the Toronto Pedestrian Committee is disappointed that the study does not point to specific programs that could be designed to target specific problems brought to light by the analysis. As well, the Committee believes that the analysis of the statistics needs to be deepened to discover important additional information.

The Toronto Pedestrian Committee therefore recommends:

> **That the city investigate the potential for programs that may address specific findings in the study, as proposed in the report below.**
>
> **In particular, that the city once again fund targeted pedestrian safety publicity campaigns, which will focus on problems identified in the Pedestrian Collisions Study itself and by deeper analysis of the statistics in the study.**
>
> **That the city find ways to pursue further analysis of certain aspects of the statistics that may point to important insights into pedestrian collisions, as detailed in the report below.**

We also request that the following response be considered an attachment to the Pedestrian Collisions Study.

Detailed Response

The danger of being hit by a vehicle is one of the primary concerns expressed by Toronto pedestrians. It is the cause of death for dozens of Toronto's citizens each year, and of serious injury to hundreds more.

The collection of statistics regarding pedestrian collisions over an extended period of time therefore has considerable potential to identify patterns of behaviour by drivers and pedestrians that result in collisions. Once these patterns have been identified, it may be possible to develop specific programs that target these patterns and therefore reduce the number of overall collisions.

The pedestrian collision typology developed in the study provides a much clearer picture of the kinds of dangers faced by pedestrians in Toronto, and their relative frequency.

As well, the provision of statistics regarding overall vehicle-pedestrian collisions and the individual types is a useful resource. The initial level of analysis of these statistics points to some patterns that may be useful in designing pedestrian safety programs.

The Toronto Pedestrian Committee thanks staff for the work put into compiling this valuable resource.

However, the Committee is disappointed with the study on two counts where the study could have gone further, to make more valuable use of the material collected.

a) the study does not propose specific programs that are targeted at addressing issues and dangers revealed by the analysis of the statistics.

The study identifies some patterns in the statistics. It also provides a general list of existing pedestrian safety programs. However, it does not relate programs to specific findings in the study, nor does it propose refinements or additions to the City's pedestrian safety programs to target factors identified in the study.

b) the study only provides a limited analysis of the statistics. There are several potential trends and patterns suggested by the study's findings which are not pursued in further depth, although further investigation could reveal useful findings.

The Pedestrian Committee therefore recommends that additional programs be considered to address specific issues that can be identified in the study. These issues and proposed programs are itemized below.

In particular, the Committee recommends that the city once again fund independent, targeted pedestrian safety publicity campaigns, as it did until a few years ago (for example, the "We're all pedestrians" campaign in 2005). These new programs could be targeted at specific issues and dangers identified in the Pedestrian Collisions Study. It would be regrettable to go through the exercise of performing a study that identifies areas where the public need to be made aware of specific safety issues, only to no longer have a program to take advantage of this new information.

The Pedestrian Committee also recommends that the Pedestrian Collision Study be supplemented by further analysis of certain issues and patterns that emerge from the statistics. These issues are also itemized below.

Potential programs to address issues identified in the Pedestrian Collision Study

Disproportionate injuries to seniors

The Pedestrian Collision Study finds that, although the proportion of seniors hit by vehicles is similar to other groups, they tend to suffer more serious injuries and are more likely to be killed when they are hit.

This finding suggests both educational and infrastructure programs could have significant beneficial effects.

- Pedestrian safety education campaigns could have a greater harm-reduction effect if targeted towards seniors.
- Programs to change infrastructure to make it easier and safer for seniors to cross roads could have significant benefits:
    - Since seniors tend to move more slowly, allowing greater crossing times for pedestrians at signalized intersections could reduce the risk of injury
    - Providing bulb-outs at intersections would help reduce crossing times and exposure to danger.
    - Providing greater frequency of signalized pedestrian crossings could help reduce the dangers to seniors. Seniors with mobility difficulties may be reluctant to take wide detours in order to cross at signalized intersections.

Parking lot safety

The one specific program recommendation in the study is for improvements to parking lots to make them safer for pedestrians (p. 33).

- This is a good reason to promote the new “Design Guidelines for Greening Surface Parking Lots”

Pedestrians hit at driveways

The study identifies the possibility that collisions resulting from cars exiting driveways are the result of cars not stopping at the sidewalk, as they are required to by law.

- Reminding drivers of this law would be a good candidate for an education and publicity program
- Design guidelines for driveways could incorporate ways of conveying the pedestrian right-of-way at the sidewalk

Youth in head-on collisions

The study misses a potential pattern in its analysis of overall patterns in pedestrian age.

In the analysis of Table 14, "Over-Represented Characteristics by collision types" (p. 44-45), the study states there is no significant pattern identifiable regarding pedestrian ages.

In fact, there is a possible pattern. In head-on collisions (where a car is driving straight and hits a crossing pedestrian), youth are over-represented consistently.

- This pattern suggests the need for further education for children in safe street crossing.

Lack of understanding of PXOs

The study notes that accidents at Pedestrian Crossovers (PXOs) may be in part the result of a lack of understanding by drivers and by young pedestrians in particular of the regulations surrounding PXOs.

- This suggests the need for further targeted education campaigns for both drivers and pedestrians about PXOs.
    - In particular, children aged 5-14 clearly need targeted education in how to use PXOs safely.
- It may also suggest the need for greater instruction regarding PXOs in driver training programs

We also object to the use of the phrase "false sense of security" regarding pedestrian use of PXOs. If designed effectively and used correctly, PXOs should provide pedestrians with genuine security.

Weather conditions on left turns

The analysis of Table 14, "Over-Represented Characteristics by collision types" (p. 44-45), likewise misses a pattern in weather conditions.

Accidents involving left-turning vehicles are over-represented on rainy days with wet road conditions.

- This pattern suggests that a publicity campaign addressing this specific situation might help reduce accidents.
- There may also be infrastructure solutions that would make left turns safer for pedestrians and vehicles, such as:
    - more visible crosswalks
    - pedestrian advance signals
    - more dedicated left turn signals for vehicles

Preponderance of male drivers

The Pedestrian Collision Study notes that 72% of drivers involved in collisions with pedestrians are male (almost three times as many as female drivers), with a preponderance in the 25-54 age bracket.

- Given this finding, it could be worth considering targeting publicity programs that encourage driver awareness of pedestrians towards this demographic.

Areas for further investigation

The Pedestrian Collision Study only pursues a limited level of analysis of the statistics. Cross-correlation of some of the statistics could provide valuable additional insights. As well, correlation of the collision data with other data available to the city could yield additional valuable information.

The further levels of analysis could be pursued by city staff, or the data could be released so that other researchers, such as graduate students, could pursue further analysis. This data could provide a valuable basis for a pedestrian research agenda for Toronto

The following are some of the areas that could benefit from further analysis.

Peak in collisions after school

The statistics compiled by the Pedestrian Collision study show that the peak hour for collisions is 3-4 in the afternoon on weekdays.

This is the hour in which children get out of school, suggesting that children leaving school are at particular risk of collisions. However, the study does not pursue further analysis to confirm this possible pattern.

Confirmation that this peak in collisions is related to children leaving school could be developed by correlating the time of collision with the age of those being hit. We

recommend that the statistics be further investigated to see if this hypothesis is confirmed.

If this pattern is found, it suggests many possibilities for enhancing or refining programs that would improve the safety of children leaving school:

- targeted educational programs in walking safety for all school children
- "slow" zones for vehicles around schools
- Additional funds to expand crossing guides programs and "walking school buses"

Peak in collisions during darkest months

The statistics compiled by the Pedestrian Collision study show that the peak months for collisions are the darkest months of the year – October to January. In particular, the months from October to December are the one period where there are a disproportionate number of collisions with pedestrians compared to those with other vehicles.

The study notes these months as the peak months, and also that they are also the months with the longest hours of darkness, and suggests a possible correlation between collision and extended hours of darkness.

This hypothesis could be confirmed by correlating the date of collisions with the statistics for the time of day of collisions, and with the times of dawn and dusk.

It is also worth noting that the most distinctive peak occurs when hours of darkness are *increasing* (October to December). That suggests that drivers and pedestrians are not adjusting their behaviour sufficiently to compensate.

If the link is confirmed, this information could then suggest possibilities for targeted programs to address this problem, e.g.:

- Driver and pedestrian education campaigns targeted towards adjusting to changes in daylight.
- Campaigns to get drivers to turn their headlights on earlier in the evening, and off later in the morning
- Earlier turning on and later turning off of streetlights

Relation of location to severity of injury

Maps of pedestrian fatalities over the years have suggested that a disproportionate number of fatalities occur in suburban areas of the city (the majority of fatalities occur in the suburbs, although the majority of collisions occur downtown). See, for example, the "Pedestrian Collisions Summary" for 2006, available on the City of Toronto website.

However, this study no longer provides information linking deaths to location, despite it having been done in past years. This is a noticeable gap.

The geographic pattern of greater danger of severe injury or death in the suburbs could be confirmed if the geographic locations were correlated with death, and also with severity of injury.

It also appears, from past collision summaries, that death is more likely on arterial roads (especially in the suburbs).

We recommend further analysis by correlating the severity of injury to the location of collisions.

If this pattern were confirmed, it would indicate that suburban arterial roads pose a particular danger to pedestrians.

An important reason could be the speed at which cars are travelling. Studies have shown that the danger of serious injury or death for a pedestrian hit by a car increases exponentially with higher speeds.

That means that even if a car is travelling within the speed limit, the speed at which cars travel on arterial roads is such that the car is more likely to cause serious injury or death. At the same time, the design of arterial roads could make it more likely that cars will drive over the speed limit, becoming even greater dangers to pedestrians.

Another cause may be the extreme width of some suburban arterial roads, which exposes pedestrians to danger for a longer length of time. As, well, excessive distance between signalized crossing points could lead to pedestrians attempting dangerous mid-block crossings on these roads.

If this correlation between the severity of injury and suburban arterial roads were confirmed by further analysis, it would suggest several potential programs to reduce this danger:

- narrowing lanes to both discourage speeding and make roads quicker to cross.
- Finding opportunities to reduce speed limits, where this has the potential to be effective
- More pedestrian-oriented design for intersections and crossing points.
- “Psychological” speed management through urban design, such as installing trees and posts along the edge of the roadway, or allowing on-street parking.
- Establishing maximum allowable intervals between signalized pedestrian crossings along wide and fast arterials so that pedestrians can reach a safe crossing easily and are not tempted to cross mid-block to reach their destination.
- Further installation of red-light cameras so that drivers do not speed through intersections when pedestrians start their crossing.

These programs could have a real impact in reducing deaths and serious injuries to Toronto’s citizens.

Problem intersections

In the past, the annual "Pedestrian Collisions Summaries" have identified the intersections with the highest frequency of collisions. Unfortunately, this identification has not been done in the study.

It would be valuable to investigate those dangerous intersections using this new set of data and the new typology created in the study.

For example, the most dangerous intersections could be identified, and then correlated with the typology to see if there is a specific recurring type of collision over the years. This would then provide insight into ways in which the intersection could be redesigned to become safer. This exercise could also result in broader insights that can be applied to many intersections.

Going forward, any time an intersection is up for redesign, it should be investigated for frequency and type of collisions to see if there are specific issues that need to be addressed.

Comparison with geographic information

The data set created by the study is very valuable, and could lead to a great deal of further research. In particular, if it were inserted into a Geographic Information System (GIS) database, it could be correlated to a wide variety of other information already available to the city and to external researchers.

Doing so would open this study up to many opportunities for further research, making it an important first step in a pedestrian research agenda for Toronto.

As well, the data collected for this study could be correlated with the additional data that will be collected as part of Toronto's Walking Strategy, now under development (for example, pedestrian volumes).

There are many comparisons with specific uses that could lead to insights into pedestrian-vehicle interaction:

- Comparison with road characteristics, such as:
    - speed limits, and also recorded actual speeds
    - number and width of lanes
    - traffic volume
    - road classification (as was done in the bicycle collision study)
    - presence of turning lanes/channels, turn signals
- Comparison to land use characteristics, such as
    - proximity to schools
    - block length

- TTC major transfer points (e.g. people crossing from one stop to another)
- presence of billboards and signage

Having performed the data collection involved in the Pedestrian Collision Study, it is crucial to provide opportunities to build on it.