



STAFF REPORT ACTION REQUIRED

Pedestrian and Cyclist Safety in Toronto

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| Date: | June 15, 2015 |
| To: | Board of Health |
| From: | Medical Officer of Health |
| Wards: | All |
| Reference Number: | |

SUMMARY

Walking and cycling are important forms of active transportation that have significant health benefits including lower all-cause mortality and reductions in many chronic illnesses such as diabetes, cardiovascular disease, and some cancers. Walking and cycling also indirectly improve the health of the population by reducing motor vehicle trips. This lowers air pollution, greenhouse gases, noise, and traffic congestion.

Despite the many health benefits, people who walk and cycle are at increased risk of injury or death as a result of collisions with motor vehicles when compared to people travelling in cars or using public transit. Concerns about safety can result in people being less likely to travel using these modes of active transportation.

This report describes the health impacts of collisions involving pedestrians and cyclists in Toronto. It provides clear evidence that both behavioural and built environment characteristics contribute to the likelihood of a collision occurring and the severity of injury that may result. Young adults and youth are especially vulnerable to collisions, but older adults (65 years and older) are at greatest risk of severe injuries. Collisions that result in pedestrian and cyclist injury or death most commonly occur on roads with higher posted speeds like major and minor arterial roads.

Numerous road safety initiatives have been implemented throughout the City, however there are additional important opportunities for Toronto to improve pedestrian and cyclist safety. Implementing measures to slow driver speeds is an essential way to improve safety. Reducing posted speed limits as well as changes to the built environment such as designing streets that include narrower and fewer travel lanes, medians, and other traffic calming measures are effective ways to reduce speeds and therefore prevent injuries and deaths. Increased education for pedestrians, cyclists, and motor vehicle drivers will also improve safety by improving knowledge and skills.

This report recommends strategies to reduce the risk of vehicle collisions. Reducing speed limits along with measures to increase compliance, enhanced education, and improved road design collectively will improve safety for pedestrians and cyclists in Toronto.

RECOMMENDATIONS

The Medical Officer of Health recommends that:

1. The Medical Officer of Health work with Transportation Services and its Road Safety Advisory Group to identify effective ways to reduce speeds and improve safety on arterial and local roads by:
 - a. reducing posted speed limits;
 - b. exploring strategies to increase speed limit compliance;
 - c. enhancing public education about road safety, with a focus on motor vehicle drivers and vulnerable groups including youth and seniors;
 - d. improving road design to better protect pedestrians and cyclists and;
 - e. identifying opportunities to raise awareness of pedestrian safety in private driveways and parking lots;
2. The Board of Health express its support to the Ontario Minister of Transportation for amendments to the Highway Traffic Act to permit municipalities to adopt lower default speed limits according to their local context;
3. The Board of Health forward this report to the Toronto Transit Commission for their consideration in road safety education for public transit operators;
4. The Board of Health forward this report to the Public Works and Infrastructure Committee and the Etobicoke York, North York, Scarborough, and Toronto and East York Community Councils for their information;
5. The Board of Health forward this report to 8-80 Cities, Canadian Association of Retired Persons (CARP), Canadian Automobile Association, Canadian Institute of Planners, Canadian Public Health Association, Canadian Urban Institute, Canadian Urban Transit Association, Chief Coroner of Ontario, City of Toronto Road Safety Advisory Group, Civic Action, Clean Air Partnership, Cycle Toronto, Heart and Stroke Foundation, MADD, Metrolinx, the Minister of Health and Long-Term Care, Ontario Medical Association, Ontario Public Health Association, Ontario Professional Planners Institute, Ontario Safety League, Parachute, Public Health Ontario, Share the Road Cycling Coalition, Toronto Centre for Active Transportation, Toronto Cycling Think and Do Tank, Toronto District School Board, Toronto Catholic District School Board, Toronto Police Services, Transportation Association of Canada, Urban Public Health Network.

Financial Impact

There are no financial impacts arising from the adoption of this report beyond what has already been approved in the current year's budget.

DECISION HISTORY

In April 2012, the Board of Health adopted the *Road to Health: Improving Walking and Cycling in Toronto* (<http://www.toronto.ca/health/hphe/pdf/roadtohealth.pdf>), a report in the "Healthy Toronto by Design" series. One of the Board of Health's decisions in response to the *Road to Health* report was to request the Medical Officer of Health and the General Manager of Transportation Services to jointly examine specific approaches to enhance pedestrian and cycling safety and to report back to the Board of Health on the possibility of a pilot program.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2012.HL13.1>

In June 2013, the Medical Officer of Health in consultation with the Transportation Services division, reported on the development of Active Transportation Demonstration Projects. Speeding, particularly in residential areas, was a common concern reported by the communities in the demonstration projects. Speed contributed to the real and perceived lack of safety for non-motorized road users, especially young children.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.HL23.6>

In April 2015, City Council directed the General Manager, Transportation Services, in consultation with other City divisions to report to the Public Works and Infrastructure Committee in the fourth quarter of 2015 with a comprehensive plan to improve road safety, including the creation of a Road Safety Advisory Group. Toronto Public Health has been identified as a key internal partner on this group.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.PW2.11>

ISSUE BACKGROUND

Regular physical activity through walking and cycling has many important health benefits, including reducing the risk of obesity, type 2 diabetes, cardiovascular disease, and some types of cancer. Increases in walking and cycling also have positive effects on mental health such as lower depression and anxiety. The overall risk of all-cause mortality is also reduced when people increase the amount of physical activity in their daily routine.

Replacing car trips with active modes like walking and cycling improves air quality and eases congestion on roads in Toronto. This indirectly improves population-level health by reducing the health impacts that are associated with traffic-related pollution like cardiovascular disease, lung cancer, and several respiratory conditions. In the City of Toronto, traffic-related pollution contributes to about 280 premature deaths and 1090 hospitalizations each year.

However, while walking and cycling are associated with many health benefits, people that walk and cycle do face a higher risk of injury or death as a result of collisions with

motor vehicles. Compared with people using cars or public transit, pedestrians and cyclists are more likely to be injured or killed per trip or per distance travelled.

Concerns about safety can influence people's decision to be physically active through walking and cycling, despite the fact that research evidence indicates the overall health benefits outweigh the risks. Increasing the number of walking and cycling trips can actually lower collision and injury rates. This is often known as the "safety in numbers" effect that is attributed to an increased awareness of pedestrians and cyclists on the part of motor vehicle drivers when there are more people walking and cycling.

Motor vehicle collisions with pedestrians and cyclists and the resulting severity of injury are influenced by a number of factors at both the environmental and individual-level. Ensuring a safe walking and cycling environment in the City requires an understanding of these risk factors, as well as how they may differ across age groups. This is essential in order to develop effective program and policy interventions that can reduce these risks.

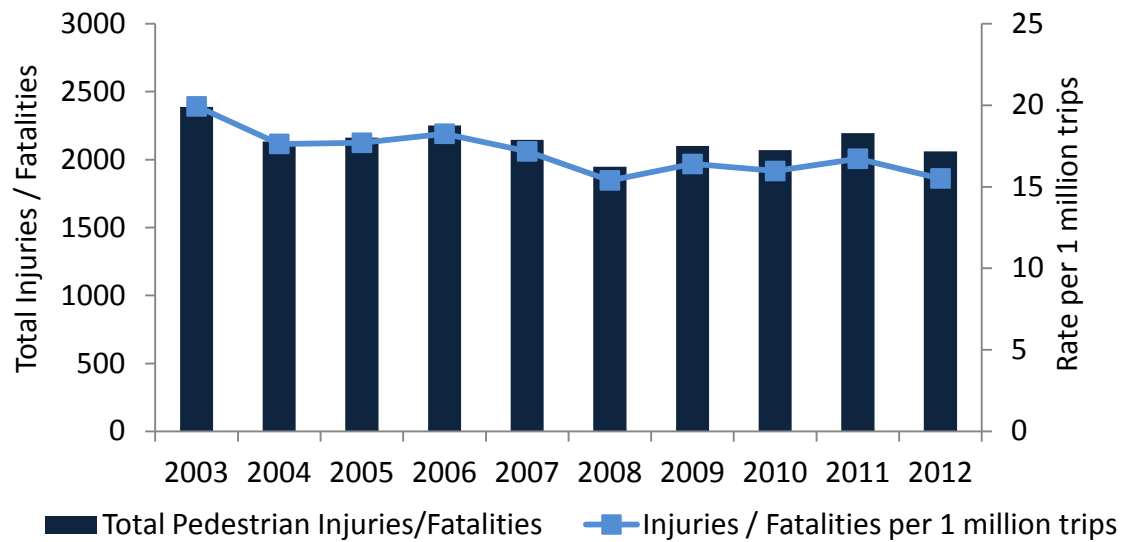
Toronto Public Health (TPH) conducted an analysis to identify the factors that increase risk for pedestrian and cyclist collisions with motor vehicles. This Board of Health report provides the key summary findings of this work. The details of the analysis and findings are available in a technical report called *Pedestrian and Cyclist Safety in Toronto* (Attachment 1). These reports were prepared in collaboration with Transportation Services staff who facilitated access to the collision data.

COMMENTS

Health Impacts of Vehicle Collisions on Pedestrians and Cyclists

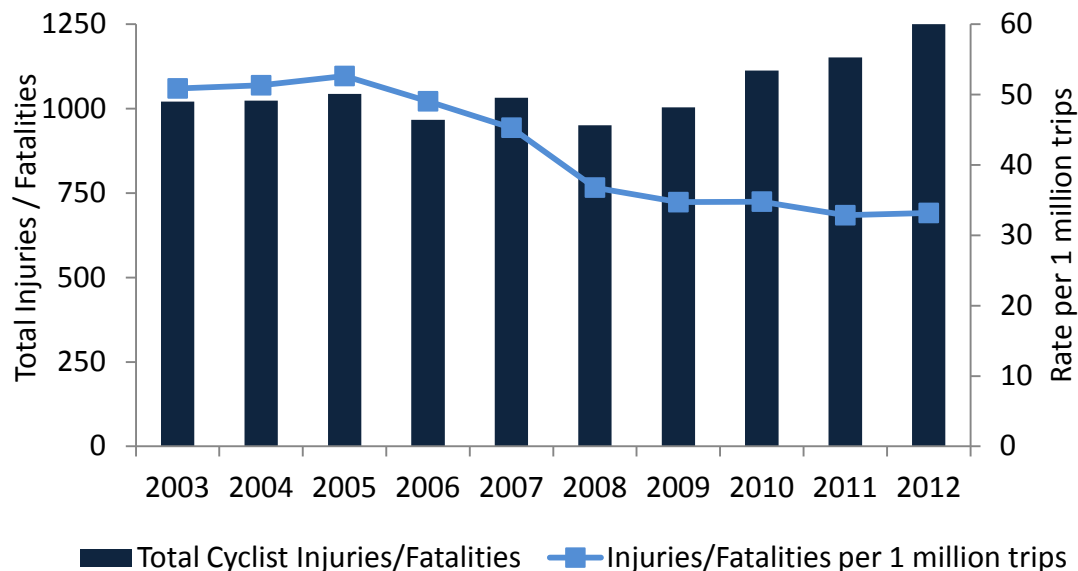
Between 2003 and 2012, rates of collisions that have resulted in pedestrian or cyclist injury have declined in Toronto (Figures 1 and 2). For pedestrians the annual number of injuries and fatalities due to collisions with motor vehicles decreased from about 20 to 16 per 1 million walking trips. For cyclists the decline happened at an even sharper rate over the same time period. In 2003 there were 51 cyclist collisions per 1 million trips, as compared to 33 per 1 million trips in 2012. However, the total number of cyclist injuries is increasing considerably due to increased numbers of cyclists each year. In addition, there has been an increase in the number of pedestrian fatalities in the last two years with 40 pedestrian fatalities in 2013 and 31 in 2014.

Figure 1: Pedestrian Collision Injuries and Fatalities, 2003-2012



Data Source: City of Toronto Police Motor Vehicle Collision Reports 2003-2012, Transportation Tomorrow Survey (2001, 2006 and 2011).

Figure 2: Cyclist Collision Injuries and Fatalities, 2003-2012



Data Source: City of Toronto Police Motor Vehicle Collision Reports 2003-2012, Transportation Tomorrow Survey (2001, 2006 and 2011).

Toronto Public Health conducted an analysis of pedestrian and cyclist collisions using information from the Toronto Police Services' collisions reports for the time period 2008-2012 to understand behavioural and environmental risk factors. Behavioural factors

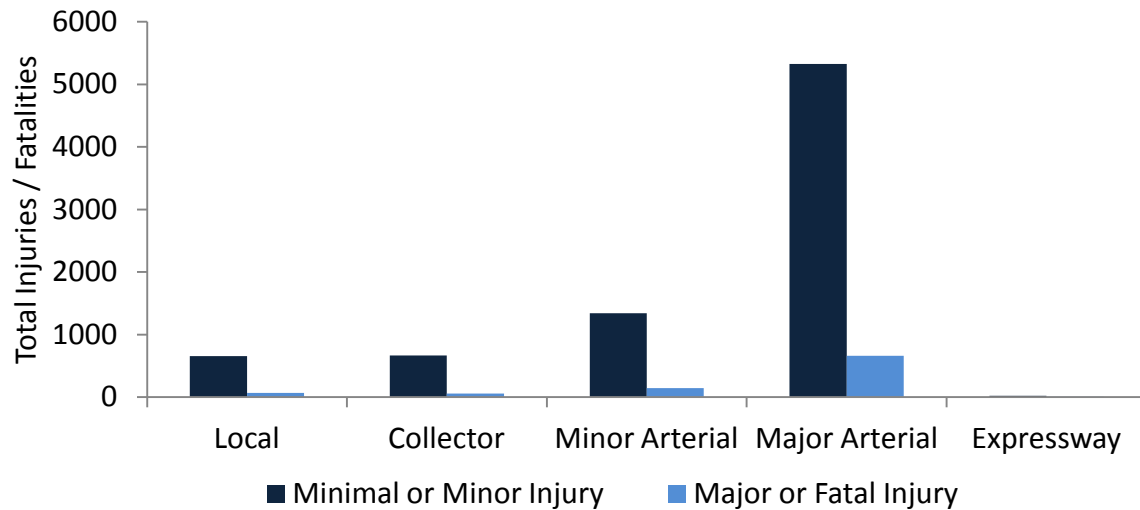
included driver/pedestrian/cyclist error such as advancing without the right of way, alcohol and drug use, and inattentiveness. Characteristics of the built environment were also considered including road type and speed, and type of bikeways. This research found that:

- On average, there were 2050 pedestrians and 1095 cyclists who were injured as a result of a collision with a motor vehicle per year in Toronto between 2008 and 2012.
- On average, there were 24 pedestrian and 2 cyclist fatalities per year between 2008 and 2012.
- The highest rate of pedestrian injuries was among young adults age 20-24 years and youth age 15-19 years. However, people aged 75 years and older, followed by older adults ages 65-74 years had the highest rate of major injuries and fatalities.
- The highest rate of cyclist injuries was among young adults between the ages of 20 and 24. Youth under 19 years of age also carried a large proportion of the burden of cyclist injury as compared to other age groups.
- About 67% of pedestrian injuries or fatalities were due to driver error as the pedestrian had the right of way.
- About 22% of pedestrian injuries in adults age 65 years and over occurred in parking lots or private driveways.

The analysis also considered features of the built environment and their association with different collision types. One of the characteristics was road type, using the road classification system for the City of Toronto. The road classification system assigns roads to a group according to the type of service the road is designed to provide. For example, local roads typically have lower traffic volume and speed as compared with arterial roads where traffic movement is a primary function and therefore they have a higher volume and speed of vehicles. The key findings of this analysis are:

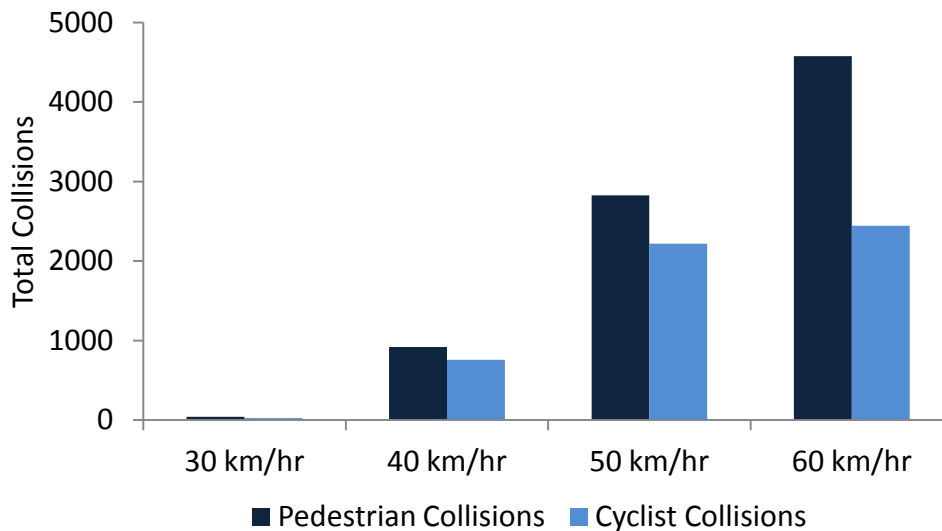
- In Toronto, about 80% of collisions with motor vehicles that result in a pedestrian injury or death occur on arterial roads (shown in Figure 3). This is also where the most severe injuries occur. The same pattern is seen when examining cyclist injuries and deaths.
- The majority of collisions resulting in pedestrian or cyclist injury or death occur on roads with higher posted speeds (50 and 60 km/hr), which also reflects road type as most of these are major and minor arterial roads (shown in Figure 4).
- Of the total pedestrian and cyclist fatalities, about 90% occurred on roads with posted speed limits of 50 km/hr or 60 km/hr. There were no fatalities that occurred on roads with a posted speed limit of 30 km/hr.

Figure 3: Pedestrian Collisions by Road Classification and Injury Severity, 2008-2012



Data Source: City of Toronto Police Motor Vehicle Collisions Reports, 2003-2012

Figure 4: Pedestrian and Cyclist Collisions Resulting in Injury or Death by Posted Speed Limit, 2009-2013



Note: Data & analysis provided by Transportation Services, *Supplemental Report to Proposed 30 km/h Speed Limit Policy*, PW3.3

Of the cyclist collisions that occurred in Toronto between 2008 and 2012, approximately two thirds happened on roads without dedicated cycling infrastructure such as bicycle lanes, multi-use pathways, and shared roadway routes.

About one third of cyclist collisions happened on a road with a bikeway that was either shared with vehicles (a sharrow) or with designated bike lanes that were not physically separated from traffic, or on off road pathways. Of these, the highest number of collisions

as a proportion of the total kilometre of bikeway type in the network occurred on roads with sharrows.

The analysis also considered each of Toronto's four Community Council areas separately. While pedestrian and cyclist collisions happen throughout the City, the Toronto and East York area has a higher number of collisions that result in pedestrian injury compared with the other three Community Council areas. This is also where there is likely to be higher cyclist and pedestrian volume and activity.

One of the challenges in analyzing risk factors for collisions is identifying the number of people who are actually at risk of being in a collision. This means identifying how many people are walking or cycling on a given day. Improvements to existing Toronto data sources of pedestrian and cyclist volume and travel patterns can enhance future analysis of collisions. Underlying traffic volume impacts the likelihood of a collision. For example, greater volumes of traffic along arterial roads as compared to local and collector roads suggest that the potential for a collision is greater.

Opportunities to Enhance Safety

Approaches to Reduce Speed

The Highway Traffic Act (HTA) sets the statutory default speed limit within a local municipality at 50 km/hr without the need to post signage. The Ontario Ministry of Transportation is currently consulting on the reduction of default speed limits on municipal roads from 50 to 40 km/hr. According to the HTA, a municipality can pass by-laws to set a different rate of speed on a segment of road within its jurisdiction provided it is accompanied by speed limit signage. An amendment to the default speed limit in the HTA would be required if the City wishes to implement lower default speed limits across the municipality without the applicable speed limit signage. This would enable City Council in future to make the decision to reduce the default speed limit to 40 km/hr in the City of Toronto.

The speed of a vehicle has an impact on both the likelihood of a collision and the severity of injuries for those involved.¹ Driving at lower speeds decreases the stopping distance between a car and a pedestrian or cyclist, allowing for more time to avoid a potential collision. A number of studies have developed pedestrian fatality risk curves as a function of impact speed and show an increased risk of pedestrian injury or death as speed increases, particularly at speeds of 50 km/hr and above.¹⁻³ For example, the Rosen and Sander study estimated the risk of a pedestrian fatality at 50 km/hr being twice as high as the risk at 40 km/hr and more than five times higher than the risk at 30 km/hr.³

A recent review of the evidence of the health impact of reduced speeds (zones and limits) found a reduction in traffic collisions, injuries, traffic speed and volume, as well as improved perceptions of safety.⁴ Several cities have implemented measures to reduce urban speed limits. For example, "Vision Zero" was introduced in New York City in 2014. One of the key components of this initiative is a reduction in default city-wide speed limits from 50 km/hr to 40 km/hr. There are also case studies of speed reduction

initiatives that have reduced collision and injury rates.^{1,5,6} For example, the town of Baden, Austria lowered speeds to 30 km/hr in about 75% of its road network. Since this was implemented, along with other measures, there has been a 60% reduction in road fatalities.⁶ The Toronto-specific data in the attached technical report, *Pedestrian and Cyclist Safety in Toronto*, support the existing findings from the literature and together, are compelling evidence for Toronto to implement a similar approach and reduce posted speed limits.

Many activities that support safer walking and cycling have been successfully initiated in Toronto. Important actions have recently been taken to limit speed in the City. In May 2015, City Council adopted a 30 km/hr speed limit warrant criteria for local and collector roads. At its meeting on June 22, 2015, the Toronto and East York Community Council (TEYCC) will consider reducing the speed limit on all local roads from 40 to 30 km/hr in the Toronto and East York Community Council area. The TEYCC has delegated authority from City Council to set speed limits on local roads within its boundaries. The Transportation Services report "30 km/h Speed Limit on Local Roads in the TEYCC Area" (<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.TE8.1>) highlights the associated costs to implement speed limit reduction including signage and resources required.

There is also evidence to suggest that lowering posted speed limits in urban environments has a minimal impact of drivers' travel time.⁷ Several factors influence travel time in urban areas including road conditions, traffic signal timings, and the number and type of intersections. Lower speed limits can result in smoother flow of traffic which can result in a reduction in congestion and delays.⁷

Enforcement campaigns to improve speed limit compliance are also an important way to reduce collisions. In May 2015, City Council adopted a request to the Toronto Police Services Board to create a strategy to increase police presence and improve enforcement of speed limits in local streets. A request to the Province of Ontario to enact a regulation that will allow for a doubling of speeding fines in 30 km/hr zones in the City of Toronto was also approved.

Lowering speed limits is an important way to improve safety; however, they are only part of the solution. Street design that includes narrower and fewer travel lanes, medians, and other traffic calming measures are also effective ways to reduce speeds and therefore lower collision rates. In January 2015, the Board of Health adopted the three *Healthy Streets* reports (*Design Features and Benefits*, *Evidence Review*, *Jurisdictional Review*) that will inform the development of the City's Complete Streets Guidelines and promote healthier street design in Toronto.

The Toronto Bike Plan, (<http://www.toronto.ca/cycling/bikeplan>) was adopted by City Council in 2001. It establishes a vision for safe cycling in Toronto that includes recommendations for cycling-related infrastructure. Transportation Services is currently developing an updated Cycling Network Plan for consideration by City Council. This plan will recommend 5- and 10-year implementation plans for the expansion of the cycling network in Toronto.

The Toronto Walking Strategy was adopted by City Council in 2009 (<http://www1.toronto.ca/City%20Of%20Toronto/Transportation%20Services/Walking/Files/pdf/walking-strategy-highres.pdf>). The Strategy is an interdivisional action plan that includes infrastructure, partnerships, and policy projects over a 10-year time period to implement a more walkable City.

Improving Safety Through Public Education and Community Partnerships

In addition to a continued investment in pedestrian and cycling infrastructure initiatives, there are many existing public awareness and educational initiatives that support safe walking and cycling in Toronto that should be built upon and enhanced. For example, the Stay Alert – Stay Safe campaign by Transportation Services encourages pedestrians, drivers and cyclists to be more aware of others as they travel on Toronto streets.

Toronto Public Health (TPH) provides a number of public education programs related to road safety. TPH supports safe active transportation in schools. Activities within this initiative incorporate education and skill-building related to traffic safety skills, and makes linkages to the curriculum, the environment and road congestion. School communities are engaged in a variety of activities that encourage and promote active modes of transportation. Activities are customized to meet the needs and interest level of each individual school.

Pedestrian and wheel safety classroom activities are also supported in schools involved in school travel planning or participating in strategies to support active transportation. Strategies include awareness raising, knowledge and skill building activities to recognize and assess situations to reduce injuries to pedestrians and users of non-motorized wheeled travel or sports. These classroom activities are developed for students in grades three to six and are linked to the Ontario Curriculum. TPH staff promote peer leadership programs in schools where students are encouraged to actively contribute to identifying issues, planning solutions and implementing interventions within their school or community. Students may choose active transportation as an area of focus which has been a growing area of interest to schools.

Finally, iNavigait is an education program of Sunnybrook Health Sciences Centre developed in partnership with the Toronto Area Safety Coalition (TASC), a collaboration of businesses, public sector agencies and volunteer organizations in the Greater Toronto Area. TPH staff delivers the iNavigait program which provides information about topics such as road and walking safety, traffic rules, dangerous spots (where and when injuries occur) and contributing factors to accidents. To date this education is mainly targeted to seniors groups. The City of Toronto's Seniors Strategy, "Towards an Age-Friendly City" also highlights the importance of improved road safety for seniors, and recommends the City take steps to reduce the number of pedestrian and vehicle collisions in this population.

As well as information aimed at the general public, there are also initiatives that target specific groups of drivers such as public transit vehicle operators. The Toronto Transit Commission introduced the 12 point Safe Service Action Plan in January 2015. This

initiative highlights several road safety measures including a communication campaign aimed at both pedestrians and operators, investigating new technologies such as dashboard cameras, and GPS and radar to track and enforce speed limits.

Toronto Public Health will continue to promote public awareness and educational campaigns to improve pedestrian and cyclist safety. It is recommended that TPH work with the Road Safety Advisory Group to enhance public education about road safety, with a particular focus on motor vehicle drivers, and vulnerable groups such as youth and older adults.

Toronto Public Health is a member of various community partnerships including the Safe School Zones committee which arose from a directive from City Council for Transportation Services to strike an interdepartmental committee. The committee looks at strategies for increasing active transportation and safety in school zones and is led by Toronto Transportation Services.

Another partnership is the Greater Toronto Hamilton Area (GTHA) Active and Sustainable School Transportation (ASST) Hub coordinated by Metrolinx, with membership from Toronto Catholic District School Board (TCDSB), Toronto District School Board (TDSB), GTHA local public health agencies, Transportation Services, Planning, University of Toronto and non-governmental organizations with an active transportation focus. The group's goal is to get more children to walk, bike or roll to school and to do so in a safe manner.

Toronto Public Health is also a member of the Toronto School Travel Planning Committee with Green Communities Canada, TDSB, TCDSB, Transportation and Planning and school travel planning facilitators, oversee and supports school travel planning as requested.

The findings from the analysis presented in this report support specific strategies and opportunities to increase the safety for pedestrians and cyclists in Toronto. Through a combination of lowering speed limits, increased investments in safe infrastructure, and enhanced educational campaigns targeted to drivers and vulnerable road users, improvements in cycling and walking safety can be achieved.

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SIGNATURE

Dr. David McKeown
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ATTACHMENTS

Attachment 1: Pedestrian and Cyclist Safety in Toronto

REFERENCES

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