

Health Evidence to Support Development of Complete Streets Guidelines

Date:	December 19, 2014
To:	Board of Health
From:	Medical Officer of Health
Wards:	All
Reference Number:	

SUMMARY

Toronto Public Health, in consultation with Transportation Services and City Planning, commissioned three reports about how the design of Complete Streets is associated with better health. These reports highlight the health evidence and experiences of other cities as they shifted their focus from moving cars to moving people. Recognition that road ways are a finite urban resource has led to more egalitarian design decisions regarding the needs of pedestrians, cyclists, transit users and motorists.

Complete Streets is a concept that guides road design for all ages, abilities and modes of travel. Expanded active transportation options enable residents to build physical activity into their lives every day, thereby reducing the risk of serious chronic diseases such as diabetes, stroke and heart attacks. Implementation of Complete Streets guidelines facilitates physical activity, supports positive mental health, reduces the frequency and severity of collisions, and decreases exposures to harmful pollutants from vehicles.

The *Healthy Streets: Evidence Review* report (see Attachment 1) provides the results of an extensive review of scientific evidence on the health impact of providing more support for active modes of transit and encouraging safe automobile use at appropriate speeds.

The *Healthy Streets: Jurisdictional Review* report (see Attachment 2) contains key informant interviews of how other jurisdictions have made complete streets policy choices and their consideration of health evidence.

The *Healthy Streets: Design Features and Benefits* report (see Attachment 3) depicts the evidence for how specific street design choices can positively influence health outcomes.

The report provides a visual representation of the project's conclusions about how the information can be used to promote healthier street design in Toronto.

Taken together, these three reports provide health evidence to be considered by Transportation Services and City Planning in the development of the City's Complete Streets Guidelines.

RECOMMENDATIONS

The Medical Officer of Health recommends that:

1. The Medical Officer of Health continue to collaborate with the General Manager, Transportation Services and the Chief Planner and Executive Director, City Planning to:
 - a) Incorporate the findings of the Healthy Streets Evidence Review, Jurisdictional Review, and Design Features and Benefits reports in the creation of the new Complete Streets Guidelines; and
 - b) Promote health equity by prioritizing Complete Street projects in high need neighbourhoods including those identified in the Toronto Strong Neighbourhood Strategy as well as those with higher rates of diabetes, low walkability, and limited cycling infrastructure.
2. This report be forwarded to the Public Works and Infrastructure Committee for information; and
3. This report be forwarded to the:
 - a) Ontario Ministers of Health and Long-Term Care and Transportation
 - b) Public Health Ontario
 - c) Canadian Diabetes Association, Canadian Public Health Association, Ontario Public Health Association, Heart and Stroke Foundation, Ontario Medical Association, Ontario Public Health Association, Toronto Cancer Prevention Coalition - Occupational and Environmental Health Working Group, and Urban Public Health Network;
 - d) Canadian Institute of Planners, Canadian Urban Institute, Ontario Professional Planners Institute; Ontario Association of Landscape Architects; Canadian Society of Landscape Architects; and
 - e) 8-80 Cities, Civic Action, Clean Air Partnership, Cycle Toronto, Toronto Cycling Think and Do Tank, and Toronto Centre for Active Transportation.

Financial Impact

There are no financial impacts arising from this report.

DECISION HISTORY

On May 13, 2014 the Board of Health adopted the *Advancing Active Transportation in Toronto: Findings from Four Demonstration Projects* report. This report outlines the findings from the demonstration projects and highlights opportunities to further support active transportation in Toronto.

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>). This report reviews the health evidence related to active transportation and health and sets out recommended actions to support increased and safer walking and cycling in the city.

ISSUE BACKGROUND

The benefits of increased physical activity through walking and cycling are numerous and diverse, including significantly reducing the risk of all-cause mortality, cardiovascular disease, obesity, type II diabetes, and breast and colon cancer. Increases in cycling and walking also generate significant social, environmental, economic and transportation system benefits. Better design for active modes, such as walking and cycling, can greatly increase safety for all modes. Increasing the number of trips made by walking and cycling can lower collision and injury rates. Regular physical activity has many mental health benefits such as lower stress, depression and anxiety levels.

People's decision to be physically active through walking, cycling and use of transit can be influenced by the availability of streets and other facilities which allow for convenient routes to destinations in safe and enjoyable ways. The complexity of creating health supporting street infrastructure requires that all stakeholders contribute to creating an integrated policy that supports healthy or complete streets.

A Complete Street is one that is designed for all ages, abilities, and modes of travel where street design is modified to better accommodate pedestrians, cyclists, transit users, and other vulnerable users, rather than providing for the needs of the automobile to the detriment of other groups. Complete Streets guidelines are an important tool when new roads are built or existing ones redesigned. Guidelines can bring greater clarity to decision-making processes such that social, economic and environmental priorities are considered and balanced in the design and construction of the entire right-of-way.

Transportation Services and City Planning co-lead the development of Toronto's Complete Streets Guidelines. The Guidelines will be a handbook for street planning, design and management for the City of Toronto. An integrated approach through collaboration with relevant city divisions, including Toronto Public Health, is intended to provide street design guidance in a cohesive manner.

Toronto Public Health commissioned a review of the available health evidence associated with design elements of Complete Streets. Three new reports were created to help inform the development of the Complete Streets Guidelines. These reports are:

- a. The *Healthy Streets: Evidence Review* report (see Attachment 1) which provides the results of an extensive review of research investigating the health impact of

- providing more support for active modes of transit and encouraging safe automobile use at appropriate speeds.
- b. The *Healthy Streets: Jurisdictional Review* report (see Attachment 2) which contains key informant interviews of how other jurisdictions have made complete streets policy choices and their consideration of health evidence.
 - c. The *Healthy Streets: Design Features and Benefits* report (see Attachment 3) which depicts the evidence for how specific street design choices can positively influence health outcomes. The report provides a visual representation of the project's conclusions about how the information can be used to promote healthier street design in Toronto.

The *Healthy Streets* project advisory group members included staff from Transportation Services and City Planning.

COMMENTS

Public Support for Complete Streets

There is considerable public support for improvements to street infrastructure consistent with many aspects of Complete Streets approaches. This is apparent in the findings from the Four Active Transportation Projects conducted by TPH in 2013-2014, during which four communities (Black Creek, North York, Cliffside, Annex) were engaged to identify their needs and preferences for multi-modal transportation infrastructure changes. As noted in the *Advancing Active Transportation in Toronto: Findings from Four Demonstration Projects* report, the community identified a range of needs for pedestrian and cycling infrastructure changes.

Community concerns included:

- Vehicle speeds and traffic
- Lack of bicycle lanes or connected network
- Local streets without sidewalks
- Long distances between crosswalks/intersections

Interventions preferred by community included:

- Lower speed limits
- Traffic calming
- More bicycle lanes
- More pedestrian crossings that are safe and strategically placed

Similar public feedback was obtained during the creation of TPH's *ActiveTO.ca* campaign. As shown in the video *Your ideas for an Active TO*, random members of the public expressed their views on what could be done to improve two different streets displayed on a poster board. Bike lanes, wider sidewalks and pedestrian crossings were commonly cited suggestions for improving the streetscape.

Health Evidence for Complete Street Design Elements

Overall, the health evidence review found that Complete Streets are beneficial to health due to increased physical activity, increased traffic safety, better air quality, lowered body weight and improved physical, mental and social health.

The Healthy Streets evidence review considered how Complete Streets can be achieved as part of the normal revitalization process for infrastructure. To help inform decisions made during road maintenance, reconstruction and upgrades, the review summarized healthier street design choices in three categories – improvements to accessibility; ensuring safety and security; and enhancing the experience of the street.

Convenient access to destinations, such as residences, jobs, retail destinations, transit facilities, recreational amenities, and public services, is very important when making the choice to walk or cycle. Continuity of transportation, pedestrian and cycling facilities throughout the network is critical. Filling gaps where facilities are missing or inadequate is a key priority to improving accessibility. Providing street connectivity via short blocks and 4 way intersections or connections through existing long blocks also increases accessibility and encourages physical activity.

Having routes to destinations which are safe from motor vehicle collisions and crime is an important factor when deciding to walk, cycle or use transit. At a minimum, users need to have a continuous network of sidewalks and cycle facilities to be safe, and to have adequate lighting and safe intersection crossings. Depending on traffic and other locally specific conditions, other features should be considered to improve pedestrian/cyclist safety such as providing medians with pedestrian refuge, enhanced crosswalk and signalization treatment, and curb extensions. Integration of road design options should be considered to lower speeds as this increases the survivability of pedestrians and cyclists involved in collisions.

Attractive street design and amenities encourage walking, cycling and transit use. Areas with good accessibility and safety can be further enhanced through the provision of wide sidewalks, commercial or public seating, trees, landscaping, human scaled buildings and attractive, transparent façade design.

The health evidence review also provides insights into specific Complete Streets design elements and how they influence safety, physical and social activity. Conclusions shown in Table 1 were drawn from a review of published studies. It should be noted that the results do not take into account findings of less documented initiatives such as pilot-projects, which are generally not widely published. Table 1 is adapted from Healthy Streets: Evidence Review and it summarizes the evidence for each selected design element. Associations with positive health impacts are represented with a “+” and negative impacts with a “-”. Overall, the vast majority of design elements are associated with improved safety and enhanced physical activity. The evidence on social benefits is positive where studies have been done, but this is an area of limited research to date. Social benefits include noise reduction, development of social networks, improvements in mental health and reduced criminal activity.

Table 1. Complete Street Health-related Element Associations with Safety, Physical and Social Activity

Category	Design element	Safety	Physical activity	Social Activity
Street & network	Street connectivity	+	+	P
Pedestrian category	Sidewalk presence & width	+	+	+
	Buffer zone	+	+	P
	Lighting	+	+	P
	Furnishings	P	+	+
	Trees & vegetation	+	+	P
	Public transit facilities	P	+	P
	On-street parking	+/- ¹	+	P
Cycling category	Bike lanes	+	+	P
	Cycle tracks	+	+	P
	Off-street bike paths/trails	+/-	+	P
	Bike boulevards	P	+	P
	Bicycle parking	P	+	P
	On-street parking	-	-	P
Roadway	Minimize street width / # lanes	+	+	+
	Narrow lane width	+	+	P
	Median inclusion	+	+	P
	Traffic calming features	+	+	P
Intersections & crossings	Intersection control	+	+	P
	Midblock control	+/- ²	+	P
	Small corner radius & other curb treatments	+	+	P
Adjacent buildings and land uses	Retail uses	+	+	+
	Open space uses	P	+	P
	Building enclosure & façade	+	+	P
	Café/vending space	+	+	+

* P = promising but limited published evidence

¹ +/-: On-street parking seems to provide safety benefits for adult pedestrians, but can have negative impact on children, bicyclists, and motor vehicles.

²+/-: Impacts for pedestrians tend to be positive for low volume streets with few lanes and negative for higher volume, multi-lane streets. However, with proper signalization and stop control impacts can be positive on higher volume streets. The selection of the right treatment is an engineering design issue that is very context-sensitive.

* +/- = both positive and negative impacts were found, conflicting evidence

Enhancing Safety

Motor vehicle collisions with pedestrians and cyclists continue to be an area of significant health concern in major urban centres throughout North America. Data obtained from the City of Toronto Traffic Safety Unit (2008-2012), and correspondence with management at Transportation Services (2013), shows that in Toronto during 2008 to 2013 (the latest years for which data is available), there were an average of 2,146 collisions involving pedestrians each year. Of these, 27 (on average) were fatal and 2,032 (on average) resulted in injuries. During this same time period, there were 1,287 (on average) collisions with cyclists each year, of which 2 (on average) were fatal and 1,117 (on average) resulted in injuries.

Street design can help minimize potential conflicts between automobiles and vulnerable users like pedestrians and cyclists. Street design can reduce motor vehicle travel speeds, which help to decrease the likelihood of collisions. Also, slower motor vehicle travel speeds result in less severe injuries and decrease the likelihood of death. Figure 1 shows that a pedestrian has a 90 percent chance of surviving a crash that happens at 30 km/hour or below. If the crash happens at double the speed (60 km/hour), the pedestrian is unlikely to survive. The elderly are particularly vulnerable.

Figure 1. Speed and Probability of Fatality

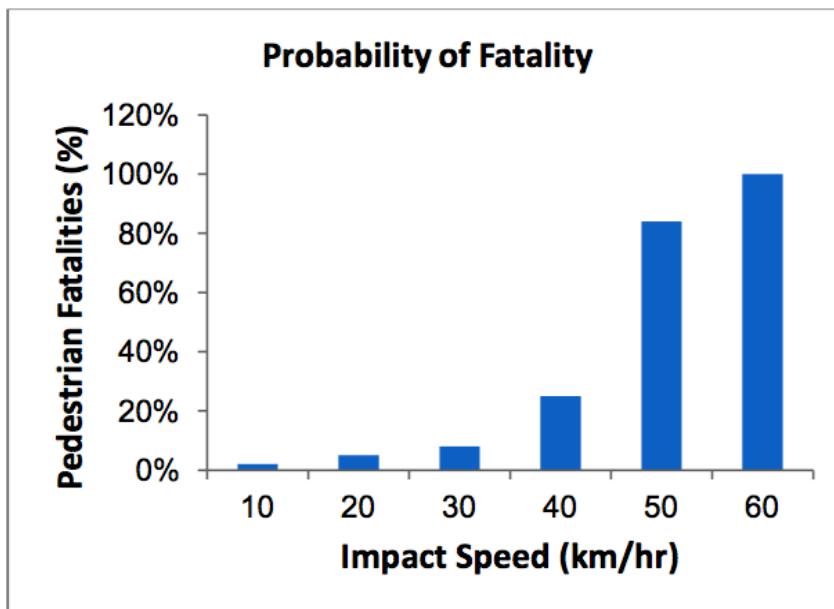


Figure 1: Speed and Probability of Fatality.

Although reductions in speed limits and enforcement campaigns can help reduce vehicle speeds, their impact will remain limited unless they are supported by changes to reduce the “design speed” of the street. Many Complete Street elements can help reduce a street’s design speed, such as trees, sidewalks, cycle lanes, narrower and fewer travel

lanes, medians, traffic calming (e.g. curb extensions at intersections, chicanes, traffic circles, speed tables/humps) and tighter turning radii. In what is called the “Safety in Numbers” phenomenon, streets with many cyclists and pedestrians may also cause drivers to move more slowly and cautiously. This can cause a positive feedback loop, where the slower traffic speeds encourage yet more walking and cycling.

Collision rates tend to be higher for wider roads, even after adjusting for traffic volume, particularly when comparing two or three-lane sections to four-lane and wider sections. A “road diet” is a technique whereby the number of travel lanes and/or effective width of a road is reduced to achieve system-wide improvements including better traffic flow and reduced congestion. Road diets provide especially strong evidence of the association between road width and collision rates. A typical road diet consists of removing one lane in each direction of a four-lane street section, adding a centre turn lane and/or landscaped median, and repurposing the additional road space for things such as bike lanes or wider sidewalks. Another configuration is to maintain two travel lanes in a given direction, but narrow the through traffic lane and create more space for cyclists in the right lane. Evidence suggests that narrower lanes reduce vehicular travel speed as the constraints of the lane force drivers to operate more cautiously. Narrower lane widths also provide the benefit of reducing crossing distance for pedestrians.

The benefits of road diets to cyclist, pedestrians and motorists can include reduced vehicle speeds, improved mobility and access, reduced collisions and injuries, and improved livability and quality of life. Before/after studies of road diets, have consistently indicated that collisions are reduced after reducing the number of travel lanes. An added centre turn lane helps to maintain smoother traffic flow than before the road diet.

Increasing Health Equity

The Complete Streets Guidelines are intended to coordinate decision making on all street design and construction projects that are already identified in the five year capital plan. To better promote health equity, priority consideration should be given to improving transportation infrastructure in low income and high need communities. The Toronto Strong Neighbourhoods Strategy 2020 (TSNS2020) has identified 31 neighbourhoods that are below the Neighbourhood Equity Benchmark and as such their residents face significant inequities in economic opportunities, social development, participation in decision making, healthy lives and physical surroundings – specifically the built environment and active transportation. In order to improve active transportation for these residents, priority should be given to those complete streets projects identified in current capital projects in these neighbourhoods.

Future work should focus on continued collaboration with city partners to develop the Complete Streets Guidelines and to include consideration of community input and equity aspects that supports neighbourhood access to healthy street design and infrastructure.

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SIGNATURE

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ATTACHMENTS

Attachment 1: Healthy Streets: Evidence Review
Attachment 2: Healthy Streets: Jurisdictional Review
Attachment 3: Healthy Streets: Design Features and Benefits