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Prescribing Active Travel for Healthy People and a Healthy Planet:

A Toolkit for Health Professionals

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Ontario

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Letter from the Executive Director

As an organization run by physicians who are concerned about human health and the environment, we are aware of two urgent debates in Canadian society that can both be partially addressed by promoting communities that support public transit and active modes of transportation.

As health professionals, we know that the rate of chronic diseases such as heart disease and diabetes are rising across Canada at alarming rates. Aside from the human pain and suffering associated with these diseases, we have grave concerns about the impact that they are having on health care and provincial budgets across the country.

As health professionals who follow environmental health issues, we are also deeply concerned about climate change, the significant impacts that it is already having on human health, and the catastrophic impacts that it could have on people around the world if dramatic action is not taken soon to significantly reduce our reliance on fossil fuels.

The promotion of transit and active modes of transportation, such as walking and cycling, have been identified by the medical journal, *The Lancet,* and the World Health Organization as one of a few policy initiatives that hold the promise of significantly reducing chronic diseases while simultaneously reducing greenhouse gases.

Transit and active modes of transportation are a quadruple win for public health. By designing or re-designing our communities so they support transit and safe and active modes of transportation, we can reduce rates of chronic disease, improve air quality, slow climate change, and increase health equity by making jobs, services, and recreation more accessible. Each of these outcomes can produce significant health benefits at home and abroad.

Kim Perrotta, MHSc
CAPE Executive Director

Introduction

Across the country, provinces are developing policies and plans to manage growth in larger urban centres. In 2006, the Province of Ontario released the **Growth Plan for the Greater Golden Horseshoe**. This landmark plan began to fundamentally change the way that our communities are planned and designed in Ontario. The Growth Plan emphasizes compact, vibrant, and complete communities that support a greater range of transportation options including public transit and active transportation. In 2015 the Growth Plan underwent a review and the updated version is expected in early 2017.

The Growth Plan is an important document because well-designed communities can support and foster active living, improve air quality, reduce greenhouse gases that contribute to climate change, and reduce social inequities. Unfortunately, many of the changes required to create healthier communities lack political and public support. This is where physicians and other health professionals can play an important role. Health professionals are in an excellent position to influence the public and decision-makers in public policy discussions that have an impact on human health. They are also well situated to encourage behavioral changes among their patients.

This toolkit has been developed to increase knowledge, understanding, and capacity among doctors, and other health professionals, so they can become effective advocates for healthy communities that support and foster public transit and active modes of transportation. It has also been developed to encourage health professionals to promote transit use and active modes of transportation to patients who need to be more physically active for their own health and well-being.

This toolkit does not need to be read from start to finish. Instead, it should be considered a resource with modules that can be read on their own. These modules have been prepared to arm health professionals with evidence that can be used to motivate patients and to influence public policy discussions. The goal is to create or re-create communities so they support and foster transit and active modes of transportation that are good for public health and for the planet.

Toolkit Contents

Module 1: Active Travel, Public Health and the Environment
This module describes the health, environmental and social benefits associated with transit and active modes of transportation.

Module 2: Promoting Active Travel to Improve Patient Health
This module discusses how health professionals can encourage patients to use transit and active modes of transportation to get the physical activity they need to stay healthy and fit. It identifies resources and groups that patients can be referred to. It is supported by two pamphlets that can be given to patients.

Module 3: Community Design That Supports Active Travel
This module explains how community design affects transit and active modes of transportation. It will help health professionals to understand what urban and transportation planning elements are needed to create communities that support walking, cycling and public transit. It is supported by a backgrounder on the links between community design and active transportation that can be used in advocacy efforts.

Module 4: Places to Grow – Managing Growth in Ontario's Greater Golden Horseshoe to Support Active Travel
This module describes Ontario's Growth Plan and how it requires the community design elements that are needed to encourage transit and active transportation.

Module 5: Promoting Policies That Support Active Travel
This module describes how health professionals can become advocates for the public policies needed to create communities that help patients to live healthier lives. It identifies ways to engage in policy discussions and provides some "tips" about how to be most effective. It is supported by two backgrounders that be used when participating in community events, presenting at a town meeting, or meeting with elected officials.

Appendices
- Backgrounder: Transit, Active Transportation, and Public Health
- Backgrounder: Transit and Active Transportation Require Supportive Community Design
- Patient Factsheet: Get Healthy & Fit with Active Transportation
- Patient Factsheet: Get Healthy & Fit: Use Public Transit
- Patient Brochure: Get Healthy & Fit with Active Transportation
- Patient Brochure: Get Healthy & Fit: Use Public Transit

Module 1: Active Travel, Public Health and the Environment

There are many public health benefits to be achieved by encouraging walking, cycling, and public transit use. Walking, cycling, and transit use as modes of transportation help reduce the risk of chronic disease, motor vehicle injuries and deaths, and can improve mental health. In addition, walking, cycling, and transit use can reduce air pollution and emissions of greenhouse gases that contribute to climate change. Finally, walking, cycling, and transit use can help reduce poverty and social inequalities.

What do we mean by Active Transportation & Active Travel?
The term "active transportation" is being used in this toolkit to refer to walking and cycling when used for the purposes of transporting a person from an origin (such as home) to a destination (such as work, school, or the store). When we use "active travel", we are referring to transit and active transportation.

Active Travel Increases Physical Activity

Chronic Diseases Are Costly to Society

As health professionals, we see the results of the increasing chronic disease epidemic in Canada every day. The cost of cardiovascular disease alone was $12.1 billion in 2008 (PHAC, 2014). One of the leading causes of chronic diseases is obesity, which is on the rise in Canada. According to the Public Health Agency of Canada (PHAC, 2011), over 25 per cent of Canadian adults are obese and 8.6 per cent of children and youth aged 6 to 17 are obese. The factors—or determinants—that are linked to obesity include physical activity, diet, socioeconomic status, ethnicity, immigration status, and environmental factors. The estimated cost of 18 chronic diseases associated with obesity is $7.1 billion per year in Canada (PHAC, 2011).

Most Canadians Are Physically Inactive

Physical inactivity and obesity cost the Greater Toronto and Hamilton Area (GTHA) $4 billion each year. This includes $1.4 billion of direct medical costs. (Mowat et al., 2014).

The benefits of physical activity are clear and well known. Each hour of moderate or vigorous activity per week is associated with a 4 to 9 per cent reduction in the risk of premature death from all causes (Samitz et al., 2011). In addition, physical activity has been found to provide health benefits that are as large as those provided by drugs in preventing death in the treatment of coronary heart disease, stroke, heart failure and the prevention of diabetes (Naci and Ioannidis, 2013). Unfortunately, most Canadians are not physically active enough to achieve health benefits. A Canadian study found that only 17 per cent of men and 14 per cent of women are achieving the 150 minutes of moderate to vigorous physical activity that are needed each week to achieve health benefits (Colley, et al., 2011).

Time Is a Major Barrier

Increasing physical activity will be a major benefit to your patients. Typically, people are encouraged to be active during their leisure time, such as going to the gym or playing sports. These activities are beneficial for those who are highly motivated or have the time. However, on a population-wide basis, leisure time activity accounts for only about 10 per cent of people's total energy expenditure (Csizmadi, 2011). People may wish to be active but many ultimately fail to find the time to add physical activity into their busy days. People often cite "time" as the major barrier to being active. (CFLRI, 1996)

Active Transportation Increases Physical Activity

Walking and cycling for transportation, on the other hand, has proven to be an effective strategy for encouraging adults to be regularly active and reduce their risk of chronic diseases. This is because active transportation incorporates activity into the day-to-day lives of people by replacing automobile trips with walking or cycling (De Hartog et al., 2010). This was demonstrated with a meta review which found that walking or cycling to work was associated with an overall 11 per cent reduction in cardiovascular risk (Hamer & Chida, 2008). A U.S. study that found that every additional kilometre walked per day is associated with a 4.8 per cent reduction in obesity, whereas each hour spent in a car is associated with a 6 per cent increase in the likelihood of obesity (Frank et al, 2004).

Case Study: Active Transportation's Impact on Physical Activity, Air Quality, Greenhouse Gases and Safety

A study directed at San Francisco, California, estimates that if the region could increase walking and cycling for shorter trips from the median of 4.5 minutes per day to 22 minutes, it would:

- ***Reduce Vehicle Miles Travelled in the region by 15 per cent;***
- ***Reduce greenhouse gas emissions by 14.5 per cent;***
- ***Reduce the number of premature deaths and disability-adjusted life years (DALYs) from chronic diseases such as cardiovascular disease by 13 per cent or more by increasing levels of physical activity;***
- ***Reduce air levels of PM2.5; and***
- ***Increase traffic-related injuries by 39 per cent.***

The premature deaths avoided per year because of increases in physical activity (about 2,400) far outweighed the increases in premature deaths that could occur each year from an increase in vehicle-related collisions (about 113). (Maizlish et al, 2013).

Transit Use Increases Physical Activity

Often public transit projects are introduced as a way of reducing congestion. However, there are many health benefits to be achieved by introducing a quality public transport system to a community. There are two mains ways transit is connected to reductions in chronic diseases. First, transit allows people to visit areas outside of their community that may be beyond walking or cycling distance. This is important because it allows people to live without an automobile (Litman, 2010) which then leads to them to use active transportation for most of their travel.

Second, most transit trips begin and/or end with walking. A Montreal study found that a public transit round trip averaged 2,500 steps, which accounts for 25 per cent of the recommended amount of physical activity required each day (Morency et al., 2011). A US study found that adults who use public transit walk on average 19 minutes a day in the process of taking public transit, with 29 per cent of them achieving the 30 minutes of daily physical activity recommended just by their public transit use

(Besser et al., 2005). Public transit commuters average 5 to 10 more minutes of moderate-intensity physical activity per day, and walk more to services and destinations near home and near the workplace than those who drive, regardless of how easy it is to walk in their neighborhoods (Lachapelle, et al. 2011).

Active Travel Improves Mental Health

Poor Mental Health Is Costly for Canadians

Approximately 20 per cent of Canadians will personally experience a mental illness in their lifetime and it is a leading cause of disability in Canada. The economic cost of mental illness is estimated to be $51 billion per year in Canada, which includes health care costs, lost productivity, and a reduction in health-related quality of life (CAMH, 2016).

Active Transportation Improves Mental Health

When people walk or cycle for transportation, it increases their levels of physical activity, which has a positive effect on mental health. Mental health issues positively impacted by physical activity include emotion and mood, self-esteem, sleep, cognitive functioning in older adults, dementia, depression, anxiety, stress, schizophrenia, and drug and alcohol rehabilitation (Bingham, 2009).

In addition, communities that are designed to support walking and cycling for transport also build social cohesion or a sense of community, which also produces mental health benefits. Social cohesion is fostered by creating opportunities that bring people together and give them opportunities to interact (Giles-Corti et al., 2010).

Transit Use Can Improve Mental Health

Transit can support good mental health in several ways. First, as mentioned above, transit can help people increase their levels of physical activity, which can improve their mental health. Secondly, transit-supportive communities, like walkable communities, improve social cohesion by giving people an opportunity to positively interact and engage with other people.

Transit can also reduce the emotional stress associated with commuting. Long-distance commuting by car has negative impacts on people's mental health.

Toronto streetcar riders having a pleasant conversation.
(Gaye Jackson)

Common stressors for car users include traffic congestion and the driving behaviour of other road users (Lyons and Chatterjee, 2008). However, the impacts of commuting by driving versus transit are complex. In order for transit use to offer stress relief to commuters, it must be high quality and reliable (Litman, 2010). A quality transit system can also reduce stress for those who do not own or drive cars by giving them greater access to jobs, services, and recreational opportunities.

Active Travel Reduces Vehicle-Related Injuries and Deaths

Motor Vehicle Collisions Are Costly

Motor vehicle collisions are responsible for a significant burden in our society in terms of lives lost, pain and suffering, and the impact on the healthcare system. In 2014, 1,834 people were killed in motor vehicle collisions and 149,900 people were injured in Canada. Of those killed, 15.7 per cent were pedestrians and 1.9 per cent were cyclists (Transport Canada, 2016).

Active Transportation Reduces Vehicle-Related Injuries and Deaths

Walking and cycling can reduce the number of motor vehicle injuries and deaths in two ways. First, by shifting people from cars to walking or cycling, we can reduce the number of vehicles on the road. This reduces the potential for collisions in part because active travel poses minimal risks to other road users (Litman, 2010).

Second, studies suggest that when more people walk and cycle as a mode of transportation, the roads become safer for pedestrians and cyclists because drivers are expecting them and become more cautious (Litman, 2010). Studies from Copenhagen, London, and New York have found that substantial increases in the distances cycled are associated with a decrease in the numbers of cyclists killed or seriously injured (Woodcock et al., 2009).

Cyclists in a separated bike lane. *(Kim Perrotta)*

People often say one of the main reasons they avoid cycling is because it is unsafe. However, in reality, the health benefits associated with cycling are much greater than the risks posed by cycling. In addition, when the risks to all other road users is considered, the risk of fatal traffic accidents is virtually the same for cyclists and drivers (De Hartog et al., 2010). Proper infrastructure can make it safer and increase the perception of safety among reluctant cyclists.

Transit Reduces Vehicle-Related Injuries and Deaths

When we shift drivers to public transit, we also reduce the number of vehicles on the road and thereby reduce the potential for vehicle collisions. In addition, people who live or work in communities that are designed to support and encourage transit tend to drive fewer kilometres, drive at lower speeds, and have travel options that allow them to avoid high-risk driving, such as driving after drinking alcohol (Litman 2010). Public transit is a safe mode of travel; the fatality rate for transit passengers is about one-twentieth of the fatality rate for those who travel in cars (Beck et al., 2007). Even considering risks to other road users, transit travel tends to have a lower fatality rate per passenger-mile than car travel under the same conditions. Total per capita traffic fatalities (including transit and automobile occupants, and pedestrians) decline significantly as transit ridership increases in a community (Litman, 2010).

Active Travel Reduces Air Pollution

Air Pollution Is Costly to Health

Air pollution is a significant health concern in several areas across Canada. With thousands of studies, air pollution has been associated with a wide assortment of acute and chronic adverse health impacts including aggravation of asthma, impairment of lung function, development of cardiovascular diseases including lung cancer, and premature deaths from all causes and cardiovascular diseases (Health Effects Institute, 2010).

Transportation Is a Significant Source of Air Pollution

The transportation sector is a significant source of air pollution in Canada (ECCC, 2016). Toronto Public Health has estimated that traffic-related air pollution produces approximately 440 deaths, 1,700 hospital admissions and 200,000 restricted activity days per year in the City of Toronto alone (Toronto Public Health, 2007). In 2014, the Medical Officers of Health across the Greater Toronto and Hamilton Area (GTHA) extrapolated these results to estimate that traffic-related air pollution is responsible for approximately 700 premature deaths in the GTHA each year with an economic impact of over $4.6 billion per year (Mowat et al., 2014).

Air pollution is typically concentrated near major transportation arteries, which receive a lot of traffic and are often congested. Studies emphasize that those living on or near busy traffic roads (within 300 metres) are exposed to significantly higher levels of air pollution than those who live elsewhere (Giles-Corti et al, 2010). Research suggests that traffic-related air pollution may also be associated with an increased incidence of post-menopausal breast cancer (Crouse et al., 2010), an increase in the risk of cervical and brain cancers (Raaschou-Nielsen et al. 2011), and an increase the risks of developing dementia (Chen et al., 2017).

…traffic-related air pollution is responsible for approximately 700 premature deaths in the GTHA each year with an economic impact of over $4.6 billion per year (Mowat et al., 2014).

Traffic-Related Air Pollution Increasing in Large Urban Areas

Unfortunately, this problem is expected to increase in many communities in Canada. While emissions from individual cars and trucks are dropping in response to vehicle emission regulations and improved technologies, the volume of air pollutants emitted continues to increase because of increasing volumes of traffic and traffic congestion. For example, between 1986 and 2006, the kilometres of road in the GTHA increased by 5 per cent and the distance people travelled in personal vehicles increased by 106 per cent. At the same time, average peak period traffic speed was reduced by 25 per cent and average time spent commuting increased 52 per cent due to traffic congestion.

In fact, the direct annual costs of congestion (i.e. lost time to drivers) grew to more than $3 billion per year during this period, while the drag on the economy grew to more than $2 billion per year (Toronto City Summit Alliance, 2010). Metrolinx estimates that by 2031, emissions of fine particulate matter (PM2.5)—the air pollutant most clearly and consistently linked to acute and chronic health impacts—will increase by 27 per cent across the GTHA because of the increasing volume of traffic (Mowat et al., 2014).

Case Study: Active Transportation's Impact on Physical Activity, Air Quality, and Greenhouse Gases

Across a region in the Midwestern United States that includes 31.3 million people, a study found that the elimination of all short automobile trips (anything less than or equal to 8 kilometres), with 50 per cent of those trips replaced by cycling, would produce $3.6 billion in air quality health benefits each year and $3.75 billion in physical activity-related health benefits each year.

This is equivalent to about 2.5 per cent of the 2004 health care costs for five of the Midwestern states included in the study. The 20 per cent reduction in vehicle miles travelled would also reduce greenhouse gas emissions by 3.9 billion pounds or 1.8 million tonnes (Grabow et al., 2011).

Active Transportation Improves Air Quality

Active transportation can improve air quality in several ways. Short vehicle trips that can easily be replaced with walking and cycling could significantly reduce air pollution because, in a typical 11-kilometre trip, 90 per cent of emissions are generated in the first 1.6 kilometres before the vehicle warms up (Transport Canada, 2011).

While people can be exposed to greater levels of air pollution when cycling than when driving in a car, researchers have estimated that the physical activity health benefits gained by cycling far outweigh the health risks posed by their increased exposure to air pollutants. They estimate that people who shift from car to bicycle gain 9 times more in life-years from the physical activity than they lose from increased exposure to air pollutants (De Hartog, 2010).

Transit Reduces Emissions of Air Pollutants

Encouraging public transit use is one of the most important measures a community can take to improve air quality. Longer vehicle trips, which are too long to be managed through active transportation strategies, can be replaced by public transit. Public transit is a less polluting form of transportation because it handles a greater number of passengers.

Public transit tends to produce less air pollution per passenger-kilometre than single-person vehicles. This is particularly true for electric-powered vehicles which release no air pollutants along traffic corridors, and for newer diesel-fueled vehicles that produce far fewer emissions than older technologies (Litman, 2010).

GO Bus in a dedicated bus lane. *(Kim Perrotta)*

In addition, public transit makes owning an automobile less of a necessity by allowing people to visit areas of their community that might be too far to travel by walking or cycling. Residents of communities with high-quality, well-integrated public transit own half as many vehicles, drive half as many annual miles, walk and cycle four times more, and use public transit ten times more than residents of more automobile-dependent communities (Litman, 2010). Even residents who commute by automobile tend to reduce their annual vehicle mileage by shifting mode and reducing the distances of other trips due to more accessible land use (Litman, 2010).

Active Travel Reduces Greenhouse Gases

Climate Change Is a Huge Threat to Public Health

The World Health Organization has declared climate change to be the greatest public health threat of the 21st Century (WHO 2016). It estimates that, by the year 2030, an additional 250,000 people will die each year from heat stress, diarrhea, malaria, and malnutrition because of climate change (WHO, 2014).

Transportation Is a Significant Source of Greenhouse Gases

For Canada to meet the commitments made under the Paris Agreement on Climate Change, we must reduce greenhouse gas (GHG) emissions by 30 per cent from 2005 levels by 2030 and by 80 per cent by 2050 (Canada, 2016). In Canada, the transportation sector was the second largest source of GHG emissions in 2004 accounting for 26 per cent of total national emissions (Canada, 2016). In Ontario, the transportation sector is the largest contributor of GHGs, responsible for 35 per cent of Ontario's emissions (Canada, 2016).

Active Travel Reduces Greenhouse Gases

To meet our climate obligations, Canada must shift travel to transit and active modes of transportation and shift most vehicles from fossil fuels to electric power (Canada, 2016). Walking and cycling produce no GHG emissions, making active transport highly desirable from a climate perspective.

Public transit has the potential to greatly reduce GHGs. Even conventionally powered buses and trains emit far fewer GHGs per passenger-kilometre travelled than conventionally powered cars. When transit vehicles are electrified, the emission reductions will be even greater (WHO, 2011).

In Ontario, for example, Metrolinx has projected that the regional transportation plan, if implemented as developed, could reduce GHG emissions from passenger transportation by 30 per cent, from 2.4 tonnes per person per year in 2016 to 1.7 tonnes per person per year in 2030.

Cyclist in a separated bike lane. *(Gaye Jackson)*

Active Travel Alleviates Poverty

Poverty Has a Huge Impact on Health

The World Health Organization considers poverty to be the single largest determinant of health, which can lead to illness due to poor nutrition, inadequate shelter, greater environmental risk, and less access to medicine (WHO 2008). Research has found that people who receive social assistance are five times more likely than higher-income earners to report their health as poor or fair and have higher rates of diabetes, heart disease, mood and anxiety disorders, and other chronic conditions than higher-income earners (Wellesley Institute, 2013). According to the Ontario Association of Food Banks (2008), the social costs of poverty in Ontario are estimated to be $10.3 to $13.1 billion, and include extra costs for health care and social assistance, the loss of tax revenue, and the costs of crime.

Low Income Populations Less Likely to Own Cars

People living on low incomes often do not own a car. In a typical community, 20-40 per cent of residents cannot drive due to income, age, or ability (Litman, 2017). This means that many groups of people rely on transit and active transportation more than others in the general population and are much more dependent on local services (Frank et al, 2003). Unfortunately, people living on low incomes are most often located in peripheral locations at the edges of cities that have inadequate access to amenities—such as schools, facilities, and retail stores—and where there are few employment possibilities (Lucas et al., 2016). For example, a study conducted in Toronto found that poverty is concentrated in the suburban northwest and northeast of the city, which has poorer access to amenities, poorer walkability, and less reliable transit service than the downtown core (Toronto Public Health, 2012).

The average annual cost to own and operate a vehicle in Canada is $10,456 a year. This figure is based on running a 2013 Toyota Camry 18,000 km a year, with the cost of gas set at $1.23/litre and regular maintenance and repair. (Travel Smart, 2016)

Transit and Active Transportation Can Alleviate Poverty

By designing communities so that employment, amenities, schools, and retail are accessible by walking, cycling, and efficient transit service, we can reduce the need for residents to own cars. This allows people who are living on low incomes to spend more money on other necessities such as food and rent. For example, in the U.S., families in car-dependent suburbs spend 25 per cent of their monthly income on transportation, whereas those families living in walkable, transit-efficient neighbourhoods spend only 9 per cent (Center for Transit-Oriented Development, 2007).

Active Travel Alleviates Social and Health Inequalities

Travel Needs Can Exacerbate Social Inequalities

Social inequality refers to the ways in which certain populations, such as women, children, the elderly, and new immigrants, are given different access to a variety of social goods, such as employment, education, and healthcare (Walker, 2007). Women's access to transportation is an example of a social inequality. Women's travel is often more complex than men's travel due to the many roles they play within the family. Women are often the primary caregivers in the family, and therefore have to travel to schools, medical appointments, and retail outlets more frequently than men.

Toronto streetcar riders. *(Gaye Jackson)*

This means that women have more complicated trip patterns than men. A woman might make several quick stops to do a grocery run, pick up a package, get the kids from childcare, and head home. This is called "trip-chaining" and it can be expensive for women reliant on the use of transit in places where a trip is considered to be a simple journey from an origin to one destination. This is often the case when transit is designed to support men's travel patterns where the focus is on peak travel times and a single journey. This can create an inequality in access to transportation for women. The City of Vancouver has helped alleviate this inequity by implementing time-based transfers that allow passengers to travel for 1.5 hours on a single ticket (Drimonis, 2016).

Women's Perception of Safety and Cycling Behaviour

In addition, women's transportation options are much more constrained when our communities do not support and encourage active transportation. Currently, less than 30 per cent of cyclists in the Greater Toronto and Hamilton Area are female (Mitra et al., 2016). Perceived traffic danger to cyclists is an important deterrent for women (Pucher et al., 2008). In countries with a low modal share of cycling, where cycling can be perceived as unsafe, men are consistently more likely to cycle than women for transport and recreation (WHO, 2011).

However, in cities with higher modal shares of cycling, there is almost no difference in the number of female and male cyclists (WHO, 2011). For example, women take 45 per cent of all bike trips in Denmark and 55 per cent in the Netherlands. In the Toronto neighbourhoods with the highest cycling mode share, almost half of the trips are by women (Mitra et al., 2016).

Female cyclist in Toronto. *(Gaye Jackson)*

Health Inequalities Are Expensive for Society

Health inequalities, or the differences in health status between these different population groups, often result from social inequalities. Health inequalities have a substantial impact on society. For example, the Canadian Institute for Health Information found that by reducing income-related health inequalities, we could save considerable money for the health care system. For example, there could be a 45 per cent overall reduction in the rate of chronic obstructive pulmonary disease (COPD) hospitalizations for those younger than 75 if Canadians of all income levels experienced the same rate as those in the highest income level. This potential rate reduction represents 18,700 fewer hospitalizations in Canada per year and approximately $149 million in health system savings (CIHI, 2016).

Transit and Active Transportation Can Reduce Health Inequities

Neighbourhoods that support active transportation and transit use can reduce social and health inequities by providing transportation options to those who cannot drive. According to one survey, approximately 4 per cent of U.S. children (3.2 million) were unable to access necessary medical services at least once during 2004 because of inadequate transportation (Redlener, et al. 2006). A study conducted in Toronto and Edmonton found that low-income residents restricted their use of health-related services due to transportation concerns (CUTA, 2010). By planning neighbourhoods to support active transportation and transit use we can prevent the marginalisation of groups that have restricted mobility by providing access to employment, services, and retail.

Module 2: Promoting Active Travel to Improve Patient Health

Promoting Active Travel to Patients

As a health professional, you are in an excellent position to encourage greater levels of physical activity among your patients by promoting active modes of transportation and transit use. Your patients listen to you and trust your advice.

With so many health benefits linked to physical activity, it is important to encourage patients to be physically active. However, people are busy and may not understand how they can find time to be active, especially if they think that means they must to go to a gym. In fact, "lack of time" is considered the number one barrier to people being more active.

What do we mean by Active Transportation & Active Travel?
The term "active transportation" is being used in this toolkit to refer to walking and cycling when used for the purposes of transporting a person from an origin (such as home) to a destination (such as work, school, or the store). When we use "active travel", we are referring to transit and active transportation.

This is where active transportation comes in: patients can increase their levels of physical activity by replacing an automobile trip to the store, to work or to their child's school by walking or cycling. Physical activity then becomes part of people's day-to-day activity and not something special for which they need to find time.

Use Motivational Interviewing

Motivational interviewing is one method that many physicians have found successful to encourage healthy behaviours with their patients. This approach addresses and helps resolve the patient's ambivalence to change, as it is often ambivalence that stands in the way of action. Using such an approach, physicians can help address those factors that might be preventing someone from being active. Research has shown that for those practitioners who do provide initial counselling, follow-up advice, and reinforcement, many patients will change their understanding and ultimately their physical activity behaviour (Bauman et al., 2009).

Motivational interviewing is a client-centered approach whereby the healthcare provider focuses on the patient's interests, values, and concerns as a way of increasing motivation to change. For more information see the NCBI at https://www.ncbi.nlm.nih.gov/books/NBK64964/

Identify trusted resources

In addition to one-on-one counselling, physicians are also well positioned to refer their patients to trusted resources in the community that may be able to provide social support to those interested in using active transport. Social support is an important strategy to help encourage people to use active

transportation. Scheepers et al., (2012) found that workplace-based and school-based interventions have the potential to shift modes from automobiles to active transportation for commuting.

Ask patients if they are physically active

Use the time during consultations to discuss patients' physical activity levels and to discuss the benefits of physical activity.

Discuss ways to integrate more physical activity into day-to-day life

For patients that are currently inactive, investigate the reasons they may not be active. For many, the reasons may be related to time, money, or skills. Discuss strategies that will help your patients remove the barriers to active transport. Identify the ways in which active transportation may address these barriers, including:

- Walking is free.
- Leaving the car at home and walking to one's destination or to transit is an easy way to integrate activity into one's daily routine.
- Walking is easy and something most people can do every day.
- Cycling is an economical way to reach destinations further away. After the cost of the bicycle, it's free.

A recent Hamilton study found that patients were interested in learning about active transportation from their physician and that this type of discussion would be an effective way to encourage them to engage in active commuting. Interestingly, patients indicated that they would be interested in hearing about "non-health" benefits from their physician including cost savings information. (Wallace et al., (2016)

For those who are physically active recreationally…

Some patients are already active by going to the gym or participating in a sports program. These patients, in particular, may be motivated to integrate active transportation strategies into their day-to-day lives. Share the benefits and discuss the ways in which they might replace a car trip with a walking or cycling trip.

For those for whom walking and cycling is not practical…

For those patients where it is not practical to visit many destinations through walking or cycling, encourage them to use transit instead. This will help achieve many environmental benefits and research shows that transit users can often achieve their needed physical activity by walking to and from transit.

Offer Practical Tips

Consider providing some practical tips based on your own experience. Provide information about where patients can buy cycling equipment, where they can buy transit vouchers, and discuss the destinations they can reach by walking or cycling. Consider finding a local transportation app that could help your patients identify the best transit or cycling routes. "Citymapper" is an example of a free

transportation app that is available for Vancouver, Toronto, and Montreal. It provides information about the best routes for both transit and cycling.

Connect patients to resources in the community

Physicians are also well positioned to refer their patients to trusted resources in the community that may be able to provide social support to those interested in using active transport and transit. Creating social support is an especially important strategy to help encourage people to cycle.

Walking and cycling groups are excellent sources of social support for people interested in using active transport. They often run programs that provide safe cycling training, peer support, and workplace and school programs. These are generally community-based programs.

Bicycles Parked on Spadina Avenue in Toronto *(Gaye Jackson)*

Here are some examples:

Smart Commute – www.smartcommute.ca

Smart Commute is a program of Metrolinx and the municipalities in the Greater Toronto and Hamilton Area. They help anyone who is going from A to B explore and try out smart travel options such as walking, cycling, and transit. They provide links to cycling resources and can help employers and employees start smart commute programs within their own workplaces.

Active & Safe Routes to School – www.saferoutestoschool.ca

Active & Safe Routes to School is a community-based initiative that promotes the use of active transportation for the daily trip to school. The website provides links to resources such as a school travel planning toolkit, videos, webinars and newsletters.

CAN-BIKE – www.canbikecanada.ca

Cycling Canada's CAN-BIKE program is a series of progression courses taught on all aspects of cycling, to ride safely, effectively, and enjoyably on the road. Course delivery and administration takes place through CAN-BIKE Delivery Agents, such as community associations, municipal departments, service groups and the efforts of independent instructors.

Bike Host – www.culturelink.ca/bike-host

The Bike Host Program matches up newcomers who are open to cycling with mentors who ride regularly. In large and small group activities, Bike Host participants practice their communication skills and learn about civic engagement, all while exploring Toronto by bike. It is an opportunity for the newcomers to gain some Canadian experience while enjoying fun and healthy outdoor activities. Results of evaluations of the program showed that participants increased their cycling by 200 per cent.

Resources for Health Professionals

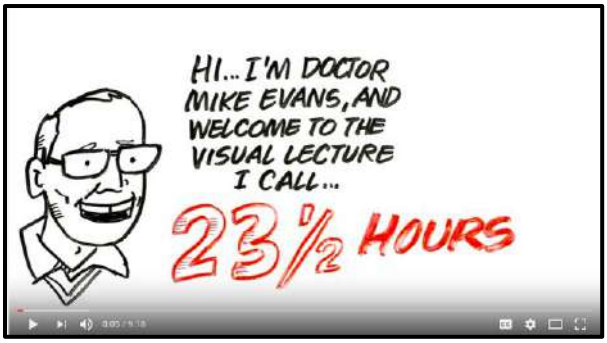
There are many resources available to physicians to help promote active transportation. Physicians can contact their local health department or health authority to learn about social marketing campaigns that are currently underway and the materials that are available to distribute to patients.

Toronto Centre for Active Transportation (TCAT)

TCAT has produced a series of short videos by active transportation champions under the brand, *It's Your Move (*http://itsyourmove.tcat.ca/video/*)* These videos feature 12 different leaders including Dr. David Mowat, former Medical Officer of Health for Peel Region, who has been exceptionally outspoken about the many health benefits of communities that support active modes of transportation (http://itsyourmove.tcat.ca/video/davidmowatvideo/)

Dr. Mike Evans' Videos

Dr. Mike Evans has produced a series of educational videos on medical issues that are informative and engaging. He has produced one called "23 and 1/2 hours: What is the single best thing we can do for our health?" which presents the incredible value of 30 minutes of physical activity per day (https://www.youtube.com/watch?v=aUaInS6HIGo).



iCANwalk – www.icanwalk.ca

iCANwalk promotes walking and walk-friendly communities across Ontario. The aim is to encourage active transportation—walking, biking, in-line skating, skateboarding—instead of travel by car for short trips. The iCANwalk website includes resources that can be downloaded including posters, articles, postcards, and an online pledge patients could take. In addition, the website includes a walkability checklist that patients can use to do a walking audit of their neighbourhoods.

PACE Canada – www.pace-canada.org

PACE Canada is a comprehensive guide to counselling for healthy active living designed to assist health care providers in effectively increasing their patients' physical activity levels and improving their eating habits. The website provides research, information kits, and a step-by-step guide to assist healthcare professionals in their work with patients.

The website provides the "Go for Green" prescription. The health professional issues their patient with the Green Prescription to encourage greater levels of physical activity, including using active transport. If the patient wants ongoing support the script is forwarded to a patient support person.

CAPE Resources

Module 1 in this Toolkit provides a solid summary of the health, environmental, and social benefits associated with communities designed around transit and active transportation. CAPE has also produced a backgrounder that provides an overview of the health, environmental and social benefits of transit use and active transportation. In addition, we have produced two handouts that you can provide to your patients. They are included in the Appendix of the Toolkit and can be printed as folded brochures or as factsheets.

Module 3: Community Design That Supports Active Travel

Creating Communities That Foster Active Travel

Given the many health, environmental, and social benefits associated with active transportation and transit use, it is important to encourage people to walk, cycle, and take transit as often as they are able. However, it is unrealistic to think that an increased number of people will use active transportation and transit if their surrounding community does not support that choice. This module will outline the ways neighbourhoods need to be designed to support greater levels of walking, cycling, and transit use.

What do we mean by Active Transportation and Active Travel?
The term "active transportation" is being used in this toolkit to refer to walking and cycling when used for the purposes of transporting a person from an origin (such as home) to a destination (such as work, school, or the store). When we use "active travel", we are referring to transit and active transportation.

As a health professional, you don't need to understand land use and transportation planning processes to be a good advocate on this issue. Your expertise is health and that is the value that you bring to discussions. However, there are lots of studies that have looked at how different elements of community design affect levels of physical activity, modes of transportation, and human health. Knowledge about these studies and concepts can build your confidence and help you to be a more effective advocate within your community.

Built Environment

Changing the way people travel in cities, from driving to using active transportation and transit, is the most heavily researched subject in urban planning (Ewing and Cervero, 2010). At least 38 studies using nine different research approaches have found resounding evidence of statistically significant associations between the built environment and travel behavior and these results are independent of self-selection influences. The built environment accounts for between 48 per cent and 90 per cent of the differences in walking levels (Ewing and Cervero, 2010).

The built environment refers to the man-made surroundings that provide the setting for human activity, and can include buildings, parks and green spaces, roads, and infrastructure such as bike lanes and sidewalks.

One study conducted in the Toronto area found a significant relationship between the built environment and travel choice. The more walkable their neighbourhoods are, the more often people walk and use public transit. The study found that residents from the most walkable neighbourhoods in Toronto walk for transportation reasons (rather than for pleasure) 2.7 times as often and use transit

2.5 times as often as residents in the least walkable neighbourhoods. Importantly for health, the study found that residents surveyed from the most walkable neighbourhoods in Toronto have, on average, a Body Mass Index (BMI) that is one point less than that of residents from the least walkable neighbourhoods (TPH, 2012).

The Five Ds

The evidence clearly suggests that interventions that encourage active transportation promote the shift from using cars towards walking, cycling, and public transit (Rutter et al, 2013). Researchers have investigated the community design elements that influence the way people travel and have identified the "5 Ds". These 5 Ds include density, land use diversity, design, destination accessibility, and distance to transit. They are the community elements that have been found to have the greatest impact on walking, cycling, and transit use by residents.

Density

Density refers to how many residents and/or employees are located within an area such as a hectare or square kilometre (McKibbon, 2011). Density is important for two reasons. First, by increasing the number of employees or residents in an area, we can increase the chances that transit will be viable; that there will be enough people using transit to make it affordable and convenient. Second, increasing the number of people who live and/or work in an area helps reach the critical mass needed to attract stores, restaurants, and other services into the area (Frank et al., 2006). The Ministry of Transportation in Ontario has suggested the minimum densities for areas within a 5-10 minute walk of transit that are capable of supporting different types and levels of transit service. These are provided in Table 1 below.

Density is about making sure there are enough people to support quality transit and a range of retail and services.

Table 1: Transit - Supportive Densities

Type of Transit Service	Minimum Density Suggested
Basic Transit Service (One bus every 20-30 minutes)	22 units per ha 50 residents & jobs combined
Frequent Transit Service (One Bus every 10-15 minutes)	37 units per ha 80 residents & jobs combined
Very Frequent Bus Service (One bus every 5 minutes with potential for LRT or BRT)	45 units per ha 100 residents & jobs combined
Dedicated Rapid Transit (LRT/BRT)	72 units per ha 160 residents & jobs combined
Subway Transit service type	90 units per ha 200 residents & jobs combined

Source: Ministry of Transportation, Transit Supportive Guidelines, Ontario Government, 2012

Higher densities have long been thought to reduce motor vehicle travel and increase walking, cycling, and transit use (TPH, 2014b). However, the relationship between density and active transport and transit use is more complex than initially thought. Although higher density is correlated with walking, cycling and transit use, overall there is a relatively weak relationship between higher density and travel choices. Instead density supports the other variables that are more strongly linked to travel choice such as land use diversity and destination accessibility (Ewing and Cervero, 2010; Zapata-Diomedi et al., 2016).

Complete communities meet people's needs for daily living throughout an entire lifetime by providing convenient access to an appropriate mix of jobs, local services, a full range of housing, and community infrastructure including affordable housing, schools, recreation, and open space for their residents. Convenient access to public transportation and options for safe, non-motorized travel are also provided (MAH, 2016).

This suggests that density on its own is unlikely to have a positive effect on active transportation if there are very few destinations within a reasonable distance. This is important because often new communities are built with sufficient density to support transit and active transportation, but do not include the retail, services, and transit that make active transportation a reliable choice. Communities need to be built as "complete communities" at the beginning to support active travel choices.

Low-density development
(Source: www.pedbikeimages.org / Dan Burden)

Higher-density development
(Source: www.pedbikeimages.org / Ryan Snyder)

Land Use Diversity

Land use diversity refers to the degree to which different land uses are located within close proximity to each other (McKibbon, 2011). Land uses can include residences, employment, retail, and institutions such as schools or hospitals. Land use diversity is important because, when different land uses are mixed together in one neighbourhood, it reduces the distance people need to travel. The closer different destinations are

Land use diversity is about making sure that where people live, work, play and go to school are located within the same area.

to one another, the more likely people will be able to meet their daily needs using active transportation and transit.

(Source: http://www.yomiuri.co.jp/adv/chuo/dy/research/20140508.html/ Ikuho Yamada)

There is strong evidence to demonstrate a positive relationship between land use diversity and walking and cycling for transport (Zapata-Diomedi et al., 2016; Dunn et al., 2009; Saelens et al., 2003). In addition, land use diversity makes it possible to efficiently link transit trips with errands on the way to and from transit stops (Ewing and Cervero, 2010). Results from a California study show that the number of businesses per acre is the single most robust indicator of whether people are likely to walk in their neighbourhoods. People living in neighbourhoods with more business establishments per acre conduct more of their travel within their neighbourhood and are more likely to travel by walking. This study suggests that neighbourhoods that support active transportation are places where there are a large number and variety of businesses in a relatively small area (Boarnet, 2010).

Design

Design refers to a range of measures that describe how easy it is to walk, cycle, and use transit (McKibbon, 2011). Design features include measures such as quality sidewalks and bicycle lanes, the connectivity of the road network, and the ease with which pedestrians and cyclists can cross the road. Importantly, design also includes elements such as street trees, street furniture, and building placements that differentiate active transportation supportive communities from auto-oriented communities. Design also includes measures that make it easier for people living with disabilities to use active transportation and transit including curb ramps, tactile walking surfaces, and pedestrian signals.

Design is about making sure that active transportation is a comfortable, safe, and attractive choice.

The presence and quality of the sidewalks and cycling lanes is an important design factor for active transportation (Dunn et al., 2009). Having separated spaces for pedestrians, cyclists, transit, and motor vehicles improves overall safety and contributes to a more comfortable environment for all users (Lee and Moudon 2006). Cycling lanes and facilities, such as advanced stop lines for cyclists at intersections, have been shown to increase cycling in countries such as Denmark, England, the Netherlands, and the United States (Goodman et al., 2014; Panter et al., 2016).

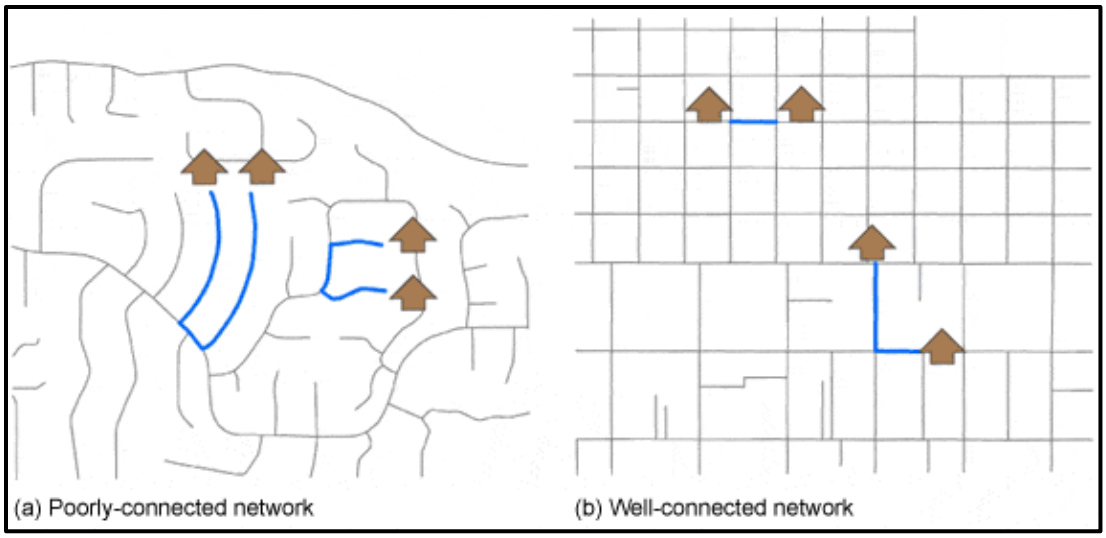
Developing and maintaining bicycle and pedestrian facilities is much more economical than building and maintaining infrastructure for automobiles. The cost of creating a bike lane is $20,000 if there is no road widening and $150,000 if the road does need to be widened. It costs approximately $1.3 million/km to widen a two-lane urban road to a four-lane urban road (Transport Canada, 2011).

The presence of traffic calming measures that slow traffic, such as narrow traffic lanes, lane restrictions, curb extensions, or speed bumps, encourages active transportation because they increase the perception of safety (NCCHPP, 2011).

There are strong associations between intersection density of the road network, street connectivity and active transportation (Ewing and Cervero, 2010; Owen 2010). Intersection density refers to the number of intersections in a given area. Street connectivity refers to how the roads are connected. Grid patterns of streets tend to provide more direct and shorter routes to destinations and dissipates car traffic, compared to cul-de-sac-type street layouts (Owen, 2010). Both high intersection density and greater street connectivity shorten distances and provide more route options for transit users and transit service providers (Ewing and Cervero, 2010).

Design also includes those built environment elements that make a community safe and physically and visually appealing. These elements are associated with increased active transportation (Dunn et al., 2009). Walking and cycling travel is much slower than automobile travel, which allows people to notice differences in landscape. Elements such as streetscapes, lighting, street furniture (like benches for sitting, umbrellas for shade), building façades, and building setbacks can help make people feel safe and interested while moving through public spaces in their neighbourhood (TPH 2014).

Traffic calming features
(Source: www.pedbikeimages.org/Dan Burden)



(Source: http://www.yomiuri.co.jp/adv/chuo/dy/research/20140508.html/ Ikuho Yamada)

Lastly, an important design feature is the parking requirements in communities. Many cities and towns outline in policy minimum parking requirements. This means that when building residences or businesses, developers must include a certain number of parking spaces. Parking has an impact on many other walkable community elements including density and land use diversity (Dunn et al., 2009). Large parking areas, like those attached to big box stores, encourage driving, and create an unappealing, uninviting, and unsafe environment for pedestrians. Although there is little research that examines the health outcomes directly related to parking, there is a strong link between parking and other built environment elements (Dunn et al., 2009).

London, UK has seen cycling increase 63 per cent into central London because of major cycling investments (Greater London Authority, 2016).

Destination Accessibility

Destination accessibility refers to how easy it is to reach destinations such as employment or retail, which can be measured by distance or time (McKibbon, 2011). Destination accessibility affects how long people need to travel. We are more likely to choose active transportation if our destinations are easily reached by walking or cycling. If destinations are too far apart, people are more likely to drive (TPH 2014).

Destination accessibility is about making sure that where people live is close to where they work, shop, go to school, and use services.

Walking distance for retail and services is typically considered 400 m (or a 5-minute walk). However, people may be willing to walk farther for higher order transit, schools, and employment (Dunn et al., 2009). Cycling distance is typically considered between 1 km and 5 km (Mitra et al., 2016). There is a strong relationship between the availability of destinations and active travel (Ewing and Cervero, 2010; Owen, 2010; Zapata-Diomedi et al., 2016). The destinations with the strongest links to active transport include retail, services, post offices, food outlets, transit stops, jobs, and open public spaces such as parks (Zapata-Diomedi et al., 2016).

Lots of stores and destinations
(Source: www.pedbikeimages.org/ Andy Hamilton)

Distance to Transit

Distance to transit is about ensuring that transit is within close proximity to where people live, work, play, and go to school.

Distance to transit refers to how far an area is from the nearest public transit stop or station (McKibbon, 2011). Having a transit stop nearby is important if transit is going to be a viable option. The likelihood that people will take transit is strongly associated with transit access. There are two types of transit in the Greater Golden Horseshoe: local transit, which provides services to a specific city or town, and regional transit (GO Train) that can move people around the region. The ideal distance for local transit from origin (such as a house or job) to the local transit stop appears to be 400 m (Ewing and Cervero, 2015). However, people may be willing to travel farther to access regional transit services (Dunn et al., 2009; El-Geneidy et al., 2013), which should connect with and be accessible by local transit.

Among the 35 per cent of Torontonians who commute to work by public transit, 93 per cent report that they walk to their transit stop. About seven out of ten of these transit walkers say it takes them 5 minutes or less to walk to their transit stop (Toronto Public Health, 2012).

Distance to a transit stop will also decide the mode used to travel to that station. There is strong evidence that shows the shorter distance to transit the more likely individuals will walk or cycle to transit (Zapata-Diomedi et al., 2016). However, the quality of public transit access relative to car access is important. Being located near a transit stop is less important than where the transit can take you (McKibbon, 2011). In addition, people will only choose transit if it is equal or better in terms of comfort and convenience if they have access to an automobile (McKibbon, 2011). A recent American study found that service frequency, travel time, and reliability of service were the three most important determinants for rider satisfaction (TransitCenter, 2016).

Module 4: Places to Grow – Managing Growth in Ontario's Greater Golden Horseshoe to Support Active Travel

Introduction

This module is intended for physicians and other health professionals living in the Greater Golden Horseshoe (**GGH**) of Ontario who are interested in helping to shape their communities to better support active transportation and transit. As trusted members of the community, health professionals can be influential advocates for land use and transportation planning decisions that support active modes of transportation and healthy living.

> ***What do we mean by Active Transportation and Active Travel?*** ***The term "active transportation" is being used in this toolkit to refer to walking and cycling when used for the purposes of transporting a person from an origin (such as home) to a destination (such as work, school, or the store). When we use "active travel", we are referring to transit and active transportation.***

This module provides basic information about land use and transportation planning processes in Ontario to help health professionals under the processes. It also provides an overview on the Growth Plan for the Greater Golden Horseshoe (**GGH**) and discusses ways in it can affect active transportation and public transit in the area. This module should be read along with **Module 3: Community Design That Supports Active Travel** to get a fuller picture about how land use planning can support or undermine active transportation.

Overview of Land Use and Transportation Planning in Ontario

The land use and transportation planning system is complex with many interconnected components and different levels of government. Land use and transportation planning in Canada generally follows a linear nested path where the policies of the upper level of government, such as the provincial and federal governments, must be adhered to by the lower levels of government, such as regional and local municipalities.

Federal Role

At this time, the federal government plays a minimal role in the land use and transportation planning of municipalities in Canada. There are federal policies that implicitly impact urban policy within Canadian municipalities. However, unlike many other countries, Canada has currently no national urban policy, no active transportation policy, and no transit policy (CUTA, 2010).

Ontario Government

The Province of Ontario has the authority to establish policies and plans that describe how municipalities can develop communities. These policies and plans provide guidance and direction to

municipalities about where and how land can be developed, where and how facilities are to be built, how transportation infrastructure is to be developed, and how land is to be managed. Although provincial policies and plan are generally applicable to the entire province, they can be established for specific areas, such as the Greater Toronto and Hamilton Area (**GTHA**), or for a specific topic, such as climate change. Municipalities are required to conform to provincial policy when developing their local plans so these policies are an important way for provinces to influence issues of provincial interest.

Ministry of Municipal Affairs

The Ontario Ministry of Municipal Affairs (**MMA**) is responsible for administering the **Ontario Planning Act**, which is legislation that provides the basis for land use planning by all municipalities in Ontario and establishes the process municipalities must follow. This includes outlining the requirements for engaging community. The Act allows the province to issue a Provincial Policy Statement (**PPS**) and requires that all decisions made in the province related to planning be consistent with the PPS (Ministry of Municipal Affairs, 2014).

The Ministries of Municipal Affairs and Housing have prepared an on-line toolkit called Citizens' Guides to Land-use Planning which describes the various stages in the land use planning processes for citizens. It is available at: http://www.mah.gov.on.ca/Page338.aspx

Ontario Ministry of Transportation

The Ontario Ministry of Transportation (**MTO**) is responsible for a number of key policies that influence how supportive roads in Ontario are for walking, cycling and public transit. Much of what falls under the influence of the MTO impacts the design and distance to travel elements of the built environment. The MTO is responsible for building all provincial roads such as highways and sets the design standards for bridges and roadways that cross over provincial highways. The Ministry also establishes guidelines and standards of practice for road building. The Ministry administers the *Ontario Highway Traffic Act*, which legislates that bicycles have the same rights and responsibilities as automobiles.

Municipal Role in Ontario

Ultimately active transportation occurs within neighbourhoods, so the municipalities' role should be considered vital for the implementation of active transportation initiatives. Provincial policies require municipalities to prepare an "official plan" or a "plan d'urbanisme" (Simmons, 2015). The official plan outlines the policies that will guide where and when development can take place within the municipality and must comply with provincial policies. The official plans usually include statements on the community's social, economic, and quality-of-life goals. Often transportation master plans, which outline the transportation systems in a municipality, are developed along with the official plan.

Official plans are broad policy documents that apply to the entire municipality. In those areas that have an upper-tier municipality, such as a region, and lower-tier municipalities, such as a city or town, the lower-tier municipality's plan must conform to the official plan of the upper-tier municipality.

The municipality's development of the official plan and transportation master plan is critical for active transportation. These documents will inform project scoping, clarify priorities, protect the land needed

to build transportation infrastructure, and uphold municipal/regional priorities and designs with developers. A municipality can also use other tools to support development and implementation of the official plan. Such tools include secondary, subdivision, and site plans that outline policies for specific areas, as well as guidelines, manuals, and strategies that guide and support the land use and infrastructure development in a community.

Metrolinx and The Big Move

The Province established *Metrolinx* as the agency responsible for coordinating and implementing the regional transportation plan for the GTHA. *The Big Move*, the name for the regional transportation plan, was originally released in 2008. It outlined the goal of building over 1,200 kilometres of rapid transit in the region by 2031 (Metrolinx, 2008).

Although much of this plan is focused on improving public transit, one of the strategies included in it – Strategy #2 - is directed at enhancing and expanding active transportation. One of the priorities identified in the plan is the completion of walking and cycling networks with bike-sharing programs, with the following two actions identified as key action items:

2.1 Plan and implement complete, integrated walking and cycling networks for the GTHA, including Toronto's PATH system, that address key barriers such as bridges over 400-series highways, rail corridors and major rivers, and missing sidewalks on major roads. The cycling networks will bring every GTHA urban resident to within a maximum of one kilometre of a dedicated bicycling facility. This will be supported by a provincial funding commitment increased over time to at least $20 million per year for municipalities to complete the walking and cycling networks.

2.2 Create pilot bike-sharing programs in major urban centres (Metrolinx, 2008).

It is estimated that 17 per cent of all trips in the GTHA are walkable (i.e. less than two kilometres in length) and 40 per cent are bikeable (i.e. less than five kilometres in length); however, walking and cycling currently account for just five per cent of all work trips and 32 per cent of all school trips in the region (Metrolinx, 2008).

In 2016, *The Big Move* underwent a full review and the new plan is expected sometime in 2017.

Places to Grow - Growth Plan for the Greater Golden Horseshoe

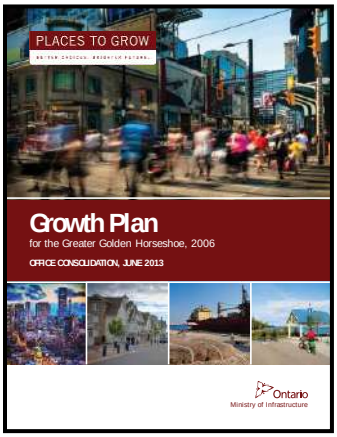
Places to Grow is the Ontario government's program to manage growth and development across the province. It aims to ensure that Ontario develops in a way that supports economic prosperity, protects the environment, and helps communities achieve a high quality of life across the province. Through Places to Grow, the Government of Ontario develops regional growth plans that guide how communities are designed and built. There are currently two Growth Plans in Ontario: The Growth Plan

for the Greater Golden Horseshoe (**GGH**), 2006, and the Growth Plan for Northern Ontario, 2011 (Ontario, 2016). This module will focus on the Growth Plan for the GGH only.

When the Growth Plan for the GGH was originally released in 2006, it was considered a bold and visionary attempt to address urban sprawl in Canada (Eidelman, 2010). The GGH is one of the fastest growing regions in North America. By 2041, this area (illustrated in Figure 1) is forecast to grow to 13.5 million people and 6.3 million jobs, which is an increase of about 50 per cent from current levels (Ontario, 2016). This is an unprecedented amount of growth with 80 per cent of Ontario's overall population growth expected to reside in the region by 2031 (Eidelman, 2010).

Figure 1 Greater Golden Horseshoe

The 2006 plan emphasizes compact, vibrant, and complete communities that support a greater range of transportation options including active transportation and transit. However, the Growth Plan addresses land use planning issues; it is not a transportation plan. It provides the land use planning policies needed to curb low-density suburban development that has historically characterized land use planning in Ontario.

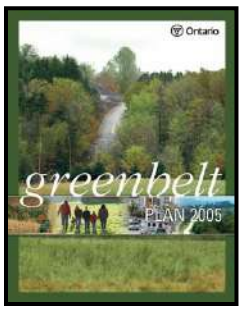


Additional Provincial Plans

In addition to the Growth Plan, there are other provincial plans that work together to help manage growth, build complete communities, curb suburban sprawl, protect the natural environment and agricultural land, address climate change, and address transportation in Ontario's GGH region. These additional plans include the following:

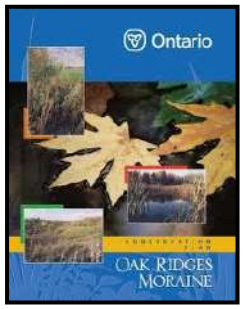
- **The Greenbelt Plan** (2005) which identifies where urbanization should not occur to provide permanent protection to the agricultural land base and the ecological features and functions occurring on this landscape.

- **The Oak Ridges Moraine Conservation Plan** (2002) is an ecologically based plan established by the Ontario government to provide land use and resource management direction for the 190,000 hectares of land and water within the Moraine.



- **The Niagara Escarpment Plan** (2005) serves as a framework of objectives and policies to strike a balance between development, preservation, and the enjoyment of the Niagara Escarpment.

- **Climate Ready, Ontario's Adaptation Strategy and Action Plan** (2016) is a five-year plan that will help Ontario fight climate change over the long term.



These plans work together, along with the regional transportation plan, *The Big Move*, to encourage communities within the GGH to grow in a sustainable way. In 2015 the Growth Plan, the Greenbelt Plan, the Oak Ridges Moraine Conservation Plan, and the Niagara Escarpment Plan underwent a review. Proposed plans are now available and it is expected that they will be approved in 2017.

Proposed Growth Plan for GGH Principles

The policies in the Proposed Growth Plan for the GGH are based on many principles, including:

- Designing complete communities which support healthy and active living
- Placing priority on intensification and higher densities to make the most efficient use of land and infrastructure and supports transit viability
- Providing for a mix and range of housing types to serve all sizes, incomes, and ages of households
- Recognizing the diversity of communities in the GGH
- Integrating climate change considerations into planning by incorporating techniques to reduce greenhouse gas emissions

The Growth Plan, Active Transportation and Transit Use

The Growth Plan has been prepared to address all major planning issues facing communities today and covers issues ranging from the preservation of natural heritage to the protection of water supplies. An important part of the Growth Plan is to ensure that it is easy for people to move about their communities. It includes land use planning policies that will help create communities that support active transportation choices. These policies are intended to ensure that public transit will be fast, convenient, and affordable and that active transportation is a practical choice.

This plan recognizes transit as a major priority for major transportation investments. The intent behind the plan is to ensure that communities grow at densities that can support efficient transit service with walkable street configurations. This means that existing and future communities will need to be compact. For walking, cycling, and public transit to be viable transportation choices, it is necessary to ensure that people's homes are near workplaces, schools, stores, restaurants, and other amenities that support daily living.

Reviewing the Growth Plan Through the Five Ds

Using the "Five Ds" – the healthy community elements outlined in **Module 3: Community Design That Supports Active Travel** – to review the Growth Plan, we can see the many ways in which it fosters community designs that support active transportation and public transit.

Density

The intensification and density requirements in the Growth Plan are very important for active transportation and transit. By increasing the number of people who live or work in an existing or future neighbourhood, we can increase the efficiency of transit service (i.e. how frequent service is) and make it easier to attract stores and restaurants and other services that people can walk and cycle to.

To provide efficient transit service and to attract amenities that people can walk and cycle to, we need a certain "density" of people in a neighbourhood.

The 2016 Proposed Growth Plan, if approved, would require higher levels of intensification. This means that municipalities would develop land use plans that would encourage new housing and employment sites to be developed in existing urban areas. This could mean adding a townhouse complex to an existing neighbourhood or increasing the height of the buildings along a main street. The idea is to increase the number of people living and working in existing neighbourhoods so they can attract amenities such as restaurants and stores and support efficient transit service. The minimum intensification target Proposed is 60 per cent meaning that 60 per cent of all new residential development should be directed towards existing urban areas (Ontario, 2016).

In addition to intensification, the Growth Plan establishes specific minimum density targets for different types of places. For urban growth centres, which are existing and emerging downtown centres, the Growth Plan requires densities between 150 and 400 residents and jobs combined per hectare depending on location. The 2016 Proposed Growth Plan would require a minimum density target of 80 residents and jobs per hectare for greenfield development (i.e., development on previously undeveloped lands) (Ontario, 2016). These densities would ensure that neighbourhoods could support efficient transit service. A neighbourhood built to a minimum density of 80 residents and jobs per hectare would support frequent bus service, while Urban Growth Centres with a minimum density of 150 to 400 residents and jobs combined per hectare could support light rail transit, bus rapid transit, or possibly a subway (Ministry of Transportation, 2012).

Land Use Diversity

The Growth Plan for the GGH also includes policies that require municipalities to plan for complete communities that feature a diverse mix of land uses. The plan includes policies that encourage communities that feature a diverse mix of land uses, including residential and employment uses, and convenient access to local stores, services, and public service facilities.

Diverse land use in Dundas, Ontario. *(Kim Perrotta)*

In addition, the plan encourages a diverse range and mix of housing, including secondary suites and affordable housing, to accommodate people at all stages of life, and to accommodate the needs of all household sizes and incomes. This allows people to "age in place". It also allows people who work in a community to live in the community they work in.

The complete community requirements in the plan are very important for active transportation. Land use diversity directly affects distance between, and availability of, a variety of services and destinations in a community. Land use diversity is important because it can reduce the need to travel outside an area for various purposes and can reduce the distance people need to travel to meet their needs. The closer different services and destinations are to one another, the more likely people are to walk or cycle to meet their daily needs. Neighbourhoods that support active transportation are places with a large number and variety of businesses in a relatively small area (Boarnet, 2010).

Design

The Proposed Growth Plan encourages, where appropriate, infrastructure to support active transportation and transit including sidewalks, bicycle lanes, bicycle parking, and transit hubs. Specifically, the plan directs municipalities to plan and provide for a range of transportation options, including options for the safe, comfortable, and convenient use of active transportation. It also encourages municipalities to consider using a complete streets approach for existing and planned street networks to ensure the needs and safety of all road users are considered and appropriately accommodated. Municipalities are to provide safe, comfortable travel for pedestrians, cyclists, and other users of active transportation.

In addition, the plan directs municipalities to ensure that transit is a major priority for transportation planning and investment. While complete communities are important, it is a reality that individuals often must travel longer distances for some activities, such as work. The transit network envisioned by the Growth Plan would support and facilitate improved linkages between and within municipalities. The plan also outlines the importance of expanding transit service to areas that have achieved, or will be planned to achieve, densities that support transit.

The design elements of the Proposed Growth Plan are important because they seek to ensure that active transportation and transit are attractive, safe, and comfortable choices. Provisions that outline the need for specific pedestrian and cyclist amenities could improve overall safety and contribute to a more comfortable environment for all users (Lee and Moudon, 2006).

Destination Accessibility

The provisions in the Proposed Growth Plan that require the development of complete, compact communities address the issues of destination accessibility. The plan directs municipalities to plan for public service facilities, such as libraries, community centres, and schools, to be co-located and integrated into community hubs that are accessible by active transportation. It directs municipalities to plan for convenient access to local, healthy, and affordable food options including urban agriculture, and to ensure that there is a supply of parks, trails, and other recreation facilities. Destination Accessibility policies are important because they reduce trip distance and reduce dependence on cars.

Distance to Transit

Transit is an important part of the Growth Plan. The plan prioritizes densities and intensification that support transit viability. The intent is to ensure that where transit exists or is planned, there are sufficient numbers of people and jobs to support the service. The Growth Plan encourages municipalities to ensure there are reasonable connections between local and regional transit services, and to infrastructure for pedestrians and cyclists, including sidewalks, bicycle lanes, and secure bicycle parking. In addition, the plan encourages municipalities to ensure that trip generators, or destinations that would be frequented by many people, are connected. Much of the Growth Plan is focused on ensuring that the densities necessary to support high quality, convenient, and efficient transit are in place. This then ensures that people are within a reasonable distance of transit to make it a viable choice.

Go Train regional transit station. *(Gaye Jackson)*

Module 5: Promoting Policies That Support Active Travel

Need Support from Public and Decision-Makers

Since the introduction of the Growth Plan in 2006, the GGH has seen a shift to more compact development patterns, a greater variety of housing types (e.g. more townhouses and apartments), more mixed-use development in urban growth centres and other strategic growth areas (e.g. stores and restaurants within walking distance of homes), and greater integration of transit and land use planning. Despite these early successes, there is still more work to do.

What do we mean by Active Transportation and Active Travel? ***The term "active transportation" is being used in this toolkit to refer to walking and cycling when used for transporting a person from an origin (such as home) to a destination (such as work, school, or the store). When we use "active travel", we are referring to transit and active***

Resistance to Densities That Support Transit and Walking

There can be challenges implementing transit supportive policies at the local level. Experience suggests that density requirements can be contentious when developing plans at a local level. Residents may be concerned about the idea of intensification for their neighbourhoods. For example, residents may resist the addition of a small townhouse or basement apartments into an existing neighbourhood because of concerns related to traffic or safety. In these cases, residents may not realize the benefits associated with increased population. They may not be thinking about how it might increase transit service or attract stores and restaurants within walking or cycling distance of their homes.

Resistance to Active Transportation Infrastructure

In addition, while public demand for active transportation could potentially encourage the development of complete streets that accommodate cyclists, pedestrians and cars, the public is not universally supportive of this notion. Some people fear that traffic congestion will increase if road space is shared with cyclists and pedestrians. Local businesses sometimes worry that the loss of road parking for cycling infrastructure will have a negative impact on business. Whitney (2012) found that a lack of public support for complete streets policies was a major barrier at the local level that could make it difficult for municipalities to meet their requirements under the Growth Plan.

Health Professionals as Advocates and Educators

As the Growth Plan is implemented at the local level through local and regional plans, advocates will be needed to support densities, diversity, and complete street targets that are needed to foster and support walking, cycling, and transit. This is where health professionals can play an important role. Doctors and other health professionals can bring the health evidence forward; they can help the public

and decision-makers to understand the health, environmental and social benefits associated with transit and active modes of transportation, and the land use planning policies and decisions that are needed to support them.

Some health professionals shy away from the idea of being advocates but to advocate is to "publicly defend, maintain, recommend, stand up for, or raise one's voice on behalf of a proposal or tenet" (Gruen, 2004). It is something that most health professionals do for their patients all the time. Physicians, and other health professionals, are natural advocates, not only because of their special knowledge, perspective, and proximity to health issues, but also because of their ability to influence public opinion (Gruen, 2004).

To become an advocate for policies that support active travel, one does not need to become an expert in land use and transportation planning. As a health professional, your expertise is health, and you can bring the weight of your knowledge and credibility to a public discussion that has impacts on the health of the public. Often the public and elected officials do not understand the health benefits associated with public policies that support and foster active transportation and transit use. As a health professional, your role is to bring the health arguments forward so that people understand the benefits of such projects for their health and for the health of residents in the broader community.

Actions That Can Be Taken

There are many ways to advocate for active transportation and transit in your community. Here are some ideas:

- Discuss the importance of transit and active transportation with colleagues, friends, and family.
- Share messages on social media.
- Write a letter to the editor of your local paper.
- Encourage your practice to write a joint letter to city or town councillors in support of a project that supports transit or active transportation in your community.
- Join the newsletter list for your City Councillor, Member of Provincial Parliament (MPP), Member of Legislative Assembly (MLA), or Member of Parliament (MP) to receive updates about projects in your area.
- Sign a petition.
- Speak at local council or board of health meetings.
- Ask for meetings with your local city councillor to discuss the importance of transit and active transportation for health.
- Phone your local urban or transportation planners and offer to support them in presentations to city council that link urban and transportation planning to health.
- Organize or participate in a community meeting or event.

Although these actions may seem small, they can go a long way to changing the way the public and decision-makers view these issues.

Lead by Example

There are lots of things that you can do to be a model within your community. By "walking your talk" or leading by example, you let your patients, colleagues, policy makers, and the public know that you are serious about the issue. Here are some ideas:

Doctors staff CAPE Conference Booth. *(Dr. Curtis Lavoie)*

- Install a bike rack outside your clinic and a shower inside for the use of active-commuting staff.
- Ride you bicycle to work and leave your bike and bike helmet in a visible location in your office.
- Post the bus routes and bike routes to your clinic/hospital on your webpage or on the wall in your office.
- Pass motions at your local hospital in support of Proposed transit or cycling infrastructure initiatives in your neighbourhood.
- Start a walking school bus in your area or act as the "Doctor Sponsor" for an existing one.
- Walk your kids to school when you can!

Take Note of Your Community

In addition, you can take a more direct approach to better understand the specific issues in your community. Consider walking, cycling, and using transit in your neighbourhood and thinking about how the existing community design, infrastructure, and services may affect your patients. Ask yourself the following questions:

- Are the transit stops close enough together?
- Do the cycle lanes and sidewalks feel safe when walking or cycling?
- Are the cycle lanes, sidewalks, and transit stops well-lit?
- Is it easy to cross the road on foot or by bicycle?
- Are there places to sit and rest?
- Is there shade and does it feel comfortable?

Take note of the design elements that could be improved and bring these up with your local city councillors, urban planners, or other decision-makers.

Get Involved with Local Groups

One of the easiest ways for you to get involved in advocating for community design changes is to find a local organization in your community that works on an issue important to you. A good first step is to look for groups that work on active transportation and transit issues in your community. These groups undertake local initiatives to raise awareness to the public and often become involved in campaigns that encourage the community design elements needed to support active transportation and transit.

Example: Cycle Toronto

Cycle Toronto organizes several opportunities for people to get involved in advocating for neighbourhood cycling infrastructure initiatives. Their Ward Advocacy Program is a way to connect with others about transforming Toronto into a more bicycle-friendly city. Ward Advocates are involved in many different activities, such as running and attending regular meetings, organizing local events (e.g. socials and group rides), engaging with other groups in the community (e.g. bike shops, Business Improvement Areas, and Resident's Associations), building a relationship with city councillors and other city representatives, and supporting the broader campaigns led by Cycle Toronto.

Doctors march for a Healthy Planet. *(Dr. Larry Barzelai)*

Example: Montreal Bike Coalition

The Montreal Bike Coalition's members support activities aimed at developing the bicycle's place as a means of transportation in the Greater Montreal region. Members have direct access to news about, and participate in, their initiatives. Several initiatives over the past few years have moved things forward in Montreal, such as participation in the working group organised by Quebec's Ministry of Transport to reform the Quebec Highway Safety Code, the 'I Love Bixi' campaign that contributed to the service being maintained in Montreal, and the organisation of a bicycle debate during the 2013 municipal elections. The Montreal Bike Coalition helps bring together all those who want to act to improve the safety of cyclists and supports different citizen and group initiatives. Notably, the Coalition offers the opportunity to members participating in the Montreal Bike Show each February.

Advocacy Steps

Advocacy requires different types of skills – strategic thinking, media skills, public speaking, creative writing, and researching. By working together, people who are interested in the same issue can benefit from the skills and expertise of others. The role of a local organization will be to help you become strategically involved in ways that make sense given your available time and expertise.

Your role, as a health professional, is to bring the health arguments to the opportunities you believe will advance the health of your patients. By highlighting the many health benefits associated with a needed change, you can help build awareness and support for the policy changes needed with the public and decision-makers. Having these arguments brought to their attention by a credible source, such as a health professional, can be incredibly valuable in changing the way people think about these issues. Physicians and other health professionals are an obvious group to talk about the ways that land use planning can impact health.

The Ministries of Municipal Affairs and Housing have prepared an on-line toolkit called Citizens' Guides to Land-use Planning which describes the various stages in the land use planning processes for citizens. It is available at: http://www.mah.gov.on.ca/Page338.aspx

If you work with a local organization, they will undertake the necessary planning for an advocacy campaign and help identify ways you can help. However, it is important to know the steps for advocacy so you understand where you fit into the process.

Understanding the Issues

To make changes to our communities, it is important to be able to show there is a problem with the current situation. Defining the problem requires understanding the facts and identifying the solutions. The advocacy-based organization you connect with should have a good understanding of the problems and solutions related to active transportation and transit in your community. Community organizations often use existing reports to help them make the case for the needed solutions. In addition, the organization you connect with may have completed its own research on a particular issue. Become familiar with these documents.

You can refer to **Module 1: Active Travel, Public Health and the Environment** and **Module 3: Community Design That Supports Active Travel** to help you outline how those problems and solutions are related to health. Your presentation of the facts related to health and your descriptions of the possible solutions will help make a strong case to the public and decision-makers.

The Ontario Professional Planners Institute, the Ontario Public Health Association, and the Public Health Agency of Canada have developed a free online training program entitled Public Health and Planning 101: An Online Course for Public Health and Planning Professionals to Create Healthier Built Environments.

This free online introductory course can be taken anytime. The course format consists of short videos, exercises, interactive activities, supporting resources, and self-assessments. It takes approximately four hours to complete.

For more information or to sign up visit: http://opha.on.ca/What-We-Do/Projects/Built-Environment.aspx

There are other resources that can help you to understand land use planning processes, policies related to complete streets, and ways to overcome resistance to change within your communities.

Making a Plan

The organization you connect with will have developed an advocacy plan that outlines the steps that need to be taken during the campaign. This plan will explain the problem or issue they are trying to address, define the solutions, outline the goals of the campaign, explain the strategies and activities that will be undertaken, and outline the ways the campaign can be evaluated to understand if it is successful. You should ask to see this plan and sit down with the organization to identify the specific ways you can get involved that fit with your interests and the amount of time you have available.

The Toronto Centre for Active Transportation (TCAT) has produced a number of resources that can be helpful including:

- ***A series of short videos by active transportation champions under the brand, It's Your Move at: http://itsyourmove.tcat.ca/video/***
- ***A Safer Streets Near School Guide with Green Communities Canada at: http://www.tcat.ca/project/guide-to-safer-streets-near-schools/***
- ***Identifying and Overcoming Barriers to Active Transportation:***
- ***The Other 25%: The Big Move and Active Transportation Investment***
- ***Complete Streets Catalogue***
- ***Complete Streets Evaluation Tool***
- ***Complete Street Transformations***
- ***All available at: http://completestreetsforcanada.ca/)***

Connecting with Others

Advocacy-based organizations often work on issues with other groups and individuals who share their interests. This makes the messages stronger as each organization brings its own network of interested supporters. Organizations that focus on health, the environment, and social issues are likely to approach an advocacy campaign using different messages that will appeal to different people. It is much harder for governments to ignore messages that are coming from a wide range of organizations and individuals. Such efforts are also much more likely to generate media attention.

Communicating Your Message

The advocacy-based organization you connect with will have developed messages related to the campaign. You can add value to those messages by bringing forward the health arguments related to the issue. It will be important for you to clearly communicate your messages if you are to have an impact on the public and elected officials. In both your written and verbal communications you will want to make sure you are clear about whom you are trying to reach. Are you trying to reach local or provincial elected officials? Are you trying to reach the public or the media? When you deliver your arguments, you will want to tailor the messages and your language to your audience

In addition to explaining the facts and health arguments, consider telling a story from your life or the life of one of your patients. Facts provide the foundation for telling a simple story, but to complete the picture, real stories and people are needed. Explain why the issue is important to you and how the solutions you present will make things better for you and your patients. Personal stories are often very influential and can help people relate to an issue that might not be well understood. This is especially

important when addressing issues related to community design. Often these issues are not well understood by the public and hearing about the ways in which people are personally affected can create a much better understanding.

How CAPE Can Help

Many health professionals who are members of CAPE find it helpful to engage with local community groups in their role as a CAPE member. This allows them to speak as a CAPE member. They find that it can add to the weight of their comments by demonstrating that their views are shared by others who all belong to this national organization that is run by physicians.

CAPE has also prepared several materials that can help you in your education and advocacy efforts:

- Pamphlets for patients that identify how they can use active transportation and transit to get the exercise they need to stay healthy
- Social media messages that can be shared
- A backgrounder that can be used to help articulate the health messages for advocacy work
- A backgrounder that can be used to identify the links between community design, transit, and active transportation

CAPE plans to add to these resources over time and to organize webinars where CAPE members can share their experience and expertise with one another.

Case Study: One Physician's Story

"I got involved in the active transportation issue 30 years ago. Wearing my CAPE hat, I participated in a coalition with many groups in Montreal. For many years, we organized around the goal of getting Montreal to commit to building at least 700 km of bike lanes. Now, our goal is to reach a minimum of 1500 km of safe bike lanes within 3 or 4 years.

During these years, my role as a doctor was often to make presentations or deputations at meetings where I spoke about the many health benefits associated with active transportation and how the absence of bike lanes was affecting the health of patients I saw in the emergency room. I found that when I identified myself as a CAPE member, it added weight to my comments. I counted on members from other organizations, such as le Conseil Régional de l'Environnement and Vélo-Québec to identify opportunities to influence policy or for policy advice.

In 2016, our Coalition was thrilled when the City of Montreal announced that it would accept all of our recommendations respecting active transportation including those related to total number of kilometres of bike lanes, safety of those lanes, winter lanes, and creating links between cycling and public transit. Now, I am involved in the implementation process.

In 2017, the Québec Government invited us to give our views on active transportation and safety. In addition, we are advocating to the City of Montreal to integrate active transportation infrastructure into the rebuilding of the Turcot Exchange in the south-west of the city. This is a major project that would benefit immensely from active transportation infrastructure." Dr. Éric Notebaert

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Transit, Active Transportation, and Public Health

Chronic Diseases Are a Costly Health Issue

Chronic diseases have reached epidemic proportions in Canada. The cost of cardiovascular disease, just one of the chronic diseases, was $12.1 billion in 2008 (PHAC, 2008). Obesity, an important risk factor for chronic diseases is also on the rise. According to the Public Health Agency of Canada, over one in four Canadian adults are obese and 8.6% of children and youth aged 6 to 17 are obese. The estimated cost of 18 chronic diseases associated with obesity is $7.1 billion in Canada (PHAC, 2011).

Physical Activity Reduces Chronic Disease

The factors—or determinants—that are linked to obesity and chronic diseases include physical activity, diet, socioeconomic status, ethnicity, immigration status, and environmental factors. Each hour of moderate or vigorous activity per week is associated with a 4% to 9% reduction in the risk of premature death from all causes (Samitz, 2011).

Active Transportation Increases Physical Activity

Walking and cycling for transportation has proven to be an effective strategy for encouraging adults to be regularly active and reducing their risk of chronic diseases. Walking or cycling to work was associated with an overall 11% reduction in cardiovascular risk (Hamer, 2008).

Transit Use Increases Physical Activity

Most transit trips begin and/or end with walking. For example, a Montreal study found that a public transit round trip averaged 2,500 steps, which accounts for 25% of the physical activity recommended each day (Morency, 2011). A US study found that adults who use public transit walk an average of 19 minutes a day in the process of taking public transit, with 29% of them achieving the 30 minutes of daily physical activity recommended (Besser, 2005).

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Vehicles Associated with a Significant Number of Injuries and Deaths

Motor vehicle collisions are responsible for a significant burden in our society in terms of lives lost, pain and suffering, and impact on the healthcare system. In 2014, 1,834 people were killed in motor vehicle collisions and 149,900 people were injured in Canada. Of those killed, 15.7% were pedestrians and 1.9% were cyclists (TC, 2016).

Walking and Cycling Reduce Road Collisions

By shifting people from cars to walking and cycling, we can reduce the number of vehicles on the road, the potential for collisions, and the number of vehicle-related injuries and deaths (Litman, 2010). Studies from Copenhagen, London, and New York suggest that when more people walk and cycle as a mode of transportation, the roads becomes safer for pedestrians and cyclists because car drivers are expecting them and become more cautious (Woodcock, 2009).

Transit Reduces Road Collisions

Public transit is an extremely safe mode of travel. The fatality rate for transit passengers is about one-twentieth of the fatality rate for those who travel in cars (Beck, 2007). Total per capita traffic fatalities (including transit and automobile occupants and pedestrians) decline significantly as transit ridership increases in a community (TC, 2016).

Mental Health Is a Costly Health Issue

Approximately 20% of Canadians will personally experience a mental illness in their lifetime. It is a leading cause of disability in Canada. The economic cost of mental illness is estimated to be $51 billion per year in Canada, which includes health care costs, lost productivity, and a reduction in health-related quality of life (CAMH, 2009).

Walking and Cycling Can Improve Mental Health

When people walk or cycle for transportation, it increases their levels of physical activity, which has a positive effect on their mental health. Physical activity has been shown to positively impact emotion and mood, self-esteem, sleep, cognitive functioning in older adults, dementia, depression, anxiety, stress, schizophrenia, and drug and alcohol rehabilitation (Bingham, 2009). In addition, communities that are designed to support walking and cycling for transport build social cohesion or a sense of community, which also produces mental health benefits.

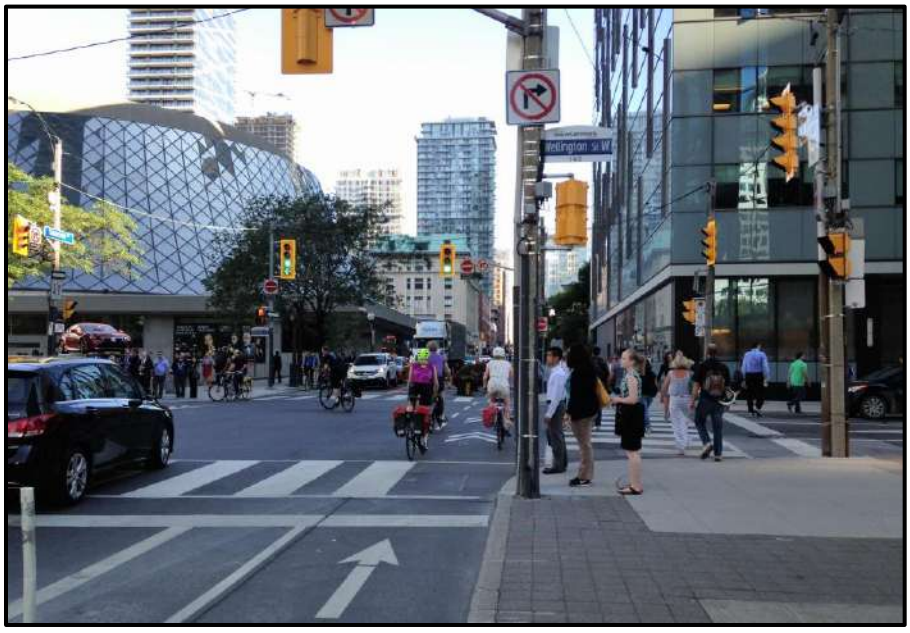
Public Transit Can Improve Mental Health

Transit can support good mental health by helping people increase their levels of physical activity. Secondly, transit-supportive communities, like walkable communities, improve social cohesion by giving people an opportunity to positively interact and engage with other people. Transit can also reduce social isolation by giving people access to jobs, services, and recreational opportunities. A reliable, safe, comfortable, and convenient public transit system has the potential to reduce the stress associated with commuting by car.

Air Pollution Is a Significant Health Problem

Air pollution is a significant health concern in a number of areas across Canada. Air pollution has been clearly linked to a wide assortment of acute and chronic adverse health impacts including the aggravation of asthma, the impairment of lung function, the development of cardiovascular diseases including lung cancer, and premature deaths from all causes and cardiovascular diseases (HEI, 2010).

Transportation Sector Is a Significant Source of Air Pollution



The transportation sector is a major source of air pollution in many urban centres. For example, Toronto Public Health has estimated that traffic-related air pollution produces approximately 440 deaths, 1,700 hospital admissions and 200,000 restricted activity days per year in the City of Toronto alone (TPH, 2007). In 2014, the Medical Officers of Health across the Greater Toronto and Hamilton Area (GTHA) extrapolated these results to estimate that traffic-related air pollution across the GTHA is responsible for approximately 700 premature deaths with an economic impact of over $4.6 billion per (Mowat, 2014). Air pollution is typically concentrated near major transportation arteries, which receive a lot of traffic and are often congested. Studies emphasize that those living on or near busy traffic roads (within 300 metres) are exposed to significantly higher levels of air pollution than those who live elsewhere (Giles-Corti, 2010).

Walking and Cycling Reduce Air Pollution

Replacing short vehicle trips with walking and cycling could significantly reduce air pollution because, in a typical 11-kilometre trip, 90% of emissions are generated in the first 1.6 kilometres before the vehicle warms up (TC, 2011).

Public Transit Reduces Air Pollution

Longer vehicle trips can be replaced by public transit which is a less polluting form of transportation. On a per passenger-mile basis, public transit tends to produce less air pollution than single-person vehicles. This is true even with trains and buses based on diesel fuel. The air pollution savings will be much greater once trains and buses are shifted to batteries run on electricity (Litman, 2010).

Climate Change Is the Greatest Public Health Issue

The World Health Organization (WHO) has declared climate change to be the greatest public health threat of the 21st Century (WHO, 2014). It estimates that, by the year 2030, an additional 250,000 will die each year from heat stress, diarrhea, malaria, and malnutrition as a result of climate change (WHO, 2014). In order for Canada to meet its commitments under the Paris Agreement on Climate Change, we must reduce greenhouse gas (GHGs) emissions by 30% from 2005 levels by 2030 and by 80% by 2050 (Canada, 2016).

Transportation Sector a Huge Contributor to Climate Change

In Canada, the transportation sector was the second largest source of GHG emissions, accounting for 26% of total national emissions in 2004 (Canada, 2016). In Ontario, the transportation sector is a particularly important source of emissions, responsible for 35% of GHGs (Ontario, 2016).

Active Transportation Reduces Greenhouse Gases

Walking and cycling produce no GHG emissions, making active transport highly desirable from a climate perspective. Public transit also has the potential to greatly reduce GHGs. Metrolinx has projected that the regional transportation plan, if implemented as developed, could reduce GHGs from passenger transportation by 30%; from 2.4 tonnes per person per year in 2016 to 1.7 tonnes per person per year in 2030 (TAO, 2016).

Poverty Has the Greatest Impact on Health

The WHO considers poverty to be the single largest determinant of health. Poverty can lead to illness due to poor nutrition, inadequate shelter, greater environmental risk, and less access to medicine (WHO, 2008). Research has found that people who receive social assistance are five times more likely than higher income earners to report their health as poor or fair and have higher rates of diabetes, heart disease, mood and anxiety disorders, and other chronic conditions than higher income earners (Wellesley Institute, 2013).

Active Transportation Can Alleviate Poverty

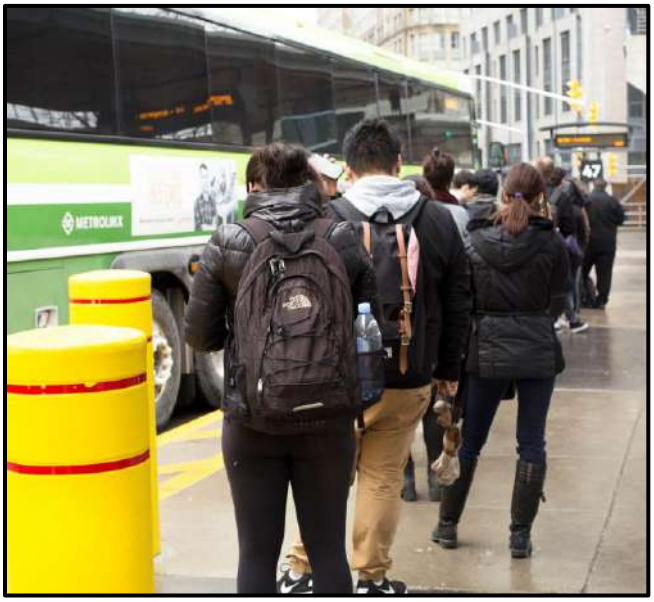
People living on low incomes often do not own a car. This means they rely on active transportation more than others in the general population and are much more reliant on local services (Frank, 2003). Families in car-dependent suburbs spend 25% of their monthly income on transportation, whereas those families living in walkable, transit-efficient neighbourhoods spend only 9% (Centre for Transit Oriented Development, 2007). Walking, cycling, and public transit give people living on low incomes transportation choices and better access to jobs, services, and recreational opportunities.

Social Inequalities Impact Health

Social inequality refers to the ways in which categories of people, such as women, children, the elderly, and new immigrants, are given different access to a variety of social goods, such as employment, education, and healthcare (Walker, 2007). There is an incredible opportunity to improve health and reduce health care costs by reducing social inequalities. For example, there could be a 45% overall reduction in the rate of hospitalizations for COPD among those younger than 75, if Canadians of all income levels experienced the same rate as those in the highest income level. This potential rate reduction represents 18,700 fewer hospitalizations in Canada per year and approximately $149 million in health system savings (CIHI, 2016).

Active Transportation Can Reduce Inequalities

Neighbourhoods that support active transportation can reduce social and health inequities by giving transportation options to those who cannot drive. According to one survey, approximately 4% of U.S. children (3.2 million) were unable to access necessary medical services at least once during 2004 because of inadequate transportation (Redlener, 2009). A study conducted in Toronto and Edmonton found that low-income residents restricted their use of health-related services due to transportation concerns (CUTA, 2010). By planning neighbourhoods to support active transportation and ensuring that low-income neighbourhoods are well served by public transit, we can prevent the marginalisation of groups that would have restricted mobility by providing access to employment, services, and retail.



Prepared by Kim Perrotta MHSc & Kristie Daniel MPH, March 2017

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Transit and Active Transportation Require Supportive Community Design

Given the many health, environmental, and social benefits associated with active transportation, it is important to encourage people to walk, cycle, and take transit as often as they are able. In order for transit and active transportation to be a reasonable choice, the communities where people live and work need to support that choice.

Community Design Affects Transit and Active Transportation

There is resounding evidence of statistically significant associations between the built environment and travel behavior. The more walkable a neighbourhood is in design, the more often people walk, cycle, and use public transit. For example, a Toronto study found that residents from the most walkable neighbourhoods walk for utilitarian reasons (rather than for pleasure) 2.7 times as often and use transit 2.5 times as often as residents in the least walkable neighbourhoods, and have, on average, a Body Mass Index (BMI) that is one point less than residents from the least walkable neighbourhoods (TPH, 2012). One study found that the built environment, which is the man-made surroundings that provide the setting for human activity, accounts for between 48% and 90% of the differences in walking levels (Ewing, 2010).

Community Design Elements

The community design elements that have been found to have the greatest impact on walking, cycling and transit use by residents include the 5 D's: Density, Diversity, Design, Destination, and Distance.

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Population Density

Population density refers to how many residents and/or employees are located within an area such as a hectare or square kilometres (McKibbin, 2011). A certain level of population density is needed to ensure that there are enough people living or working in an area to support efficient transit service and a range of retail amenities and services. However, population density on its own is unlikely to have a positive effect on active transportation if there are very few destinations, such as stores and restaurants, within a reasonable distance of homes. Density is important because it supports land use diversity and accessibility to destinations which are closely linked to travel behaviour (Ewing, 2010; Zapata-Diomedi et al., 2016).

Land Use Diversity

Land use diversity refers to the degree to which different land uses, such as residences, jobs, schools, and retail outlets, are located within close proximity to each other (McKibbin, 2011). The closer different destinations are, the more likely people are to meet their daily needs using active transportation. There is strong evidence of a positive relationship between land use diversity and active transportation (Zapata-Diomedi et al., 2016; Dunn, 2009; Saelens, 2003). Results from a California study, for example, show that neighbourhoods that support active transportation are places where there are a large number and variety of businesses in a relatively small area (Boarnet, 2010).

Design

Design refers to a range of measures that describe how easy it is to walk, cycle, and use transit. Design features include measures such as sidewalks and bicycle lanes. Having separated spaces for pedestrians, cyclists, transit, and motor vehicles improves overall safety and contributes to a more comfortable environment for all users (Lee, 2004). Cycling lanes and facilities, such as advanced stop lines for cyclists at intersections, have been shown to increase cycling in countries such as Denmark, England, the Netherlands, and the United States (NCCHPP, 2011; TPH, 2014).

Another design feature includes traffic calming measures that slow traffic, such as narrowing traffic lanes, lane restrictions, curb extensions or speed bumps, which have been found to encourage active transportation because they increase the perception of safety (NCCHPP, 2011). Intersection density, which refers to the number of intersections in a given area, and street connectivity, are also important

design features because they shorten distances and provide more route options for pedestrians, cyclists, and transit (Ewing, 2010).

Design also includes those elements such as streetscapes, lighting, street furniture (like benches for sitting and umbrellas for shade), building façades, and building setbacks that can help make people feel safe and interested while moving through public spaces in their neighbourhoods (TPH, 2014). These elements are associated with increased active transportation.

Lastly, design can include the parking requirements within communities. Parking has an impact on many other walkable community elements including density and land use diversity (Saelens, 2003). Large parking areas, like those attached to big box stores, encourage driving and create an unappealing, uninviting, and unsafe environment for pedestrians.

Destination Accessibility

Destination accessibility refers to how easy it is to reach destinations such as jobs and retail and is important because it affects how long people need to travel (McKibbin, 2011). We are more likely to choose active transportation if our destinations are easily reached by walking or cycling. There is a strong relationship between the availability of destinations and active travel (Ewing, 2010; Owen, 2010; Zapata-Diomedi et al., 2016). The destinations with the strongest links to active transport include retail, services, post offices, food outlets, transit stops, jobs, and open public spaces such as parks (Zapata-Diomedi et al., 2016).

Walking distance for retail and services is typically considered 400 metres or a 5-minute walk. However, people may be willing to walk farther for higher order transit, schools, and work (Saelens, 2003). Cycling distance is typically considered between 1 km and 5 km (Mitra, 2016). If destinations are too far apart, people are more likely to drive (Mitra, 2016).

Distance to Transit

Distance to transit refers to how far an area is from the nearest public transit stop or station (McKibbin, 2011). Having a transit stop nearby is strongly associated with the likelihood that people will take transit. There is strong evidence that shows that the shorter the distance to transit, the more likely individuals will walk or cycle to transit (Zapata-Diomedi et al., 2016). However, the quality of public transit access relative to car access is important. Being located near a transit stop is less important than where the transit can take you (McKibbin, 2011).

The ideal distance for local transit (which provides travel within a community) from origin (such as a house or job) to the transit stop appears to be 400 metres (Ewing, 2010). Regional transit (which provides travel between communities) is a destination people may be willing to travel farther to and should connect with local transit (Saelens, 2003).

Prepared by Kristie Daniel MPH & Kim Perrotta MHSc – March 2017

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Patient Factsheet

Get Healthy & Fit with Active Transportation

Don't Have Time for Exercise?

In our modern society, it can be it difficult to be physically active on a regular basis. Many have jobs that involve sitting for most of the day. Many are too busy to find time to get to a gym or participate in sports. By using active modes of transportation, such as walking and cycling, you can build physical activity into your daily life.

What Is Active Transportation?

Active transportation is any form of human-powered travel that is used to get to a destination such as work or school. Active modes of transportation typically involve walking or cycling but can include wheeling, skating, skateboarding, and even kayaking.

Active Transportation Improves Health

By allowing you to be more physically active, active transportation can reduce your risk of developing chronic diseases such as diabetes, heart disease, and some cancers. Studies have found that each hour of moderate or vigorous activity per week can reduce the risk of premature death by 4% to 9%.

Active transportation can also improve mental health because physical activity improves self-esteem, reduces stress, and enhances feelings of happiness and satisfaction.

Active Transportation Controls Weight

Active transportation can help you maintain your weight. One study found that the risk of becoming obese was reduced by 4.8% for every additional kilometre people walked each day, while the risk of becoming obese increased by 6% for every hour people spent in a car each day.

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Active Transportation Saves Money

Driving a motor vehicle can be expensive when one considers the cost to own, insure, and maintain a vehicle. Estimates suggest that it can cost about $10,000 a year to own a car. Active transportation can be a low-cost alternative way to travel.

Active Transportation Is Good for the Planet

Cars are one of the most important sources of air pollution and greenhouse gases that contribute to climate change. Active modes of transportation, such as walking and cycling, produce no air pollution and no greenhouse gases.

Active Transportation Increases Access

Not everyone can drive. Not everyone has access to a car. In fact, estimates suggest that in a typical community, 20-40% of people do not drive due to age, ability, or expense. Active modes of transportation can provide you with greater access to jobs, schools, services, and recreational opportunities even if no car is available to you.

Active Transportation Increases Sense of Community

When you walk and cycle, you have more opportunities to interact with other people. This can give you a greater sense of community and can make your community feel safer and more friendly.

Getting Started

Getting started is easy. Think of the places you regularly visit. You can easily walk to destinations that are within 1 kilometre of your home. It only takes about 12 minutes to walk 1 kilometre. Distances that are between 1 and 5 kilometres are easy to cycle. As you get more comfortable you can try walking or cycling longer distances. Consider contacting your local city or town office to find out about city programs that address bicycle lanes, sidewalks, and safe street crossings in your community.

CAPE
Canadian Association of Physicians for the Environment
Association Canadienne des Médecins pour l'Environnement
ACME

Patient Factsheet

Get Healthy & Fit: Use Public Transit

Not Enough Time to Exercise?

In our modern society, it can be difficult to be physically active on a regular basis. Many people have jobs that involve sitting for most of the day. Many are too busy to find time to get to a gym or engage in sports. By using public transit, you can build physical activity into your daily life. That is because most transit trips begin or end with walking or cycling.

Transit Use Increases Physical Activity

A Montreal study found that the average person takes about 2,500 steps for one round trip on public transit. A US study found that adults who use public transit walk an average of 19 minutes a day in the process of taking public transit, with nearly one third of them walking 30 minutes a day.

Transit Use Improves Health

By increasing your levels of physical activity, transit use can reduce your risk of chronic diseases such as heart disease, stroke, diabetes, and some cancers. Studies have found that each hour of moderate or vigorous physical activity per week reduces the risk of premature death by 4% to 9%. Transit use can improve mental health as well because physical activity improves self-esteem, reduces stress, and enhances feelings of happiness and satisfaction.

Transit Use Controls Weight

Transit use can help you maintain your weight by making you more physically active. One study found that the risk of becoming obese was reduced by 4.8% for every additional kilometre people walked each day, while the risk of becoming obese increased by 6% for every hour people spent in a car each day.

405–215 Spadina Avenue | Toronto, Ontario, Canada M5T 2C7
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Transit Use Saves Money

Driving a motor vehicle can be expensive when one considers the cost to drive, insure, fuel, and maintain a vehicle. Estimates suggest that it can cost about $10,000 a year to own a car. Public transit is a low-cost way to travel.

Transit Is Safer Than Driving

Public transit is an extremely safe mode of travel. Transit users are 20 times less likely to be involved in a fatal vehicle-related collision than those who travel in cars. Public transit is a particularly good way to travel when heading to a party or bar for entertainment.

Transit Is Good for the Planet

Cars are one of the most important sources of air pollution and greenhouse gases that contribute to climate change. On a per person basis, public transit produces fewer emissions of air pollutants and greenhouse gases than single person vehicles. By using public transit, we can reduce air pollution and slow climate change.

Transit Increases Access

Not everyone can drive. Not everyone has access to a car. In fact, estimates suggest that in a typical community, 20-40% of people do not drive due to age, ability, or income. An efficient transit system can provide you with greater access to jobs, schools, services, and recreational opportunities when a car is not available to you.

Transit Use Increases Sense of Community

When you use transit, you have more opportunities to interact with other people. This can give you a greater sense of community, making your community feel safer and more friendly.

Getting Started

Getting started is easy. Visit your community's transit website to find out about the transit routes available in your community. Consider the destinations you visit regularly such as school or work. Use a transit website or a mobile phone app to help select the best routes for your destinations.

Active Transportation Improves Health

By allowing you to be more physically active, active transportation can reduce your risk of developing chronic diseases such as diabetes, heart disease, and some cancers. Studies have found that each hour of moderate or vigorous activity per week can reduce the risk of premature death by 4% to 9%.

Active transportation can also improve mental health because physical activity improves self-esteem, reduces stress, and enhances feelings of happiness and satisfaction.

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For More Information

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ALARIS DESIGN • PHOTOS BY GAYE JACKSON

GET HEALTHY & FIT with Active Transportation

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Don't Have Time for Exercise?

In our modern society, it can be difficult to be physically active on a regular basis. Many people have jobs that involve sitting for most of the day. Many are too busy to find time to get to a gym or participate in sports. By using active modes of transportation, such as walking and cycling, you can build physical activity into your daily life.

What Is Active Transportation?

Active transportation is any form of human-powered travel that is used to get to a destination such as work or school. Active modes of transportation typically involve walking or cycling but can include wheeling, skating, skateboarding, and even kayaking.

Active Transportation Increases Access

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Active Transportation Increases Your Sense of Community

When you walk and cycle, you have more opportunities to interact with other people. This can give you a greater sense of community and can make your community feel safer and more friendly.

Active Transportation Saves Money

Driving a motor vehicle can be expensive when one considers the cost to own, insure, and maintain a vehicle. Estimates suggest that it can cost about $10,000 a year to own a car. Active transportation can be a low-cost alternative way to travel.

Active Transportation is Good for the Planet

Cars are one of the most significant sources of air pollution and greenhouse gases that contribute to climate change. Active modes of transportation, such as walking and cycling, produce no air pollution and no greenhouse gases.

Transit Use Improves Health

By increasing your levels of physical activity, transit use can reduce your risk of chronic diseases such as heart disease, stroke, diabetes, and some cancers. Studies have found that each hour of moderate or vigorous physical activity per week reduces the risk of premature death by 4% to 9%. Transit use can improve mental health as well because physical activity improves self-esteem, reduces stress, and enhances feelings of happiness and satisfaction.

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Transit Use Increases Physical Activity

A Montreal study found that the average person takes, on average, 2500 steps for one round trip on public transit. A US study found that adults who use public transit walk, on average, 19 minutes a day in the process of taking public transit, with nearly one third of them walking 30 minutes a day.

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