

Below is the Executive Summary from the report Promoting Better Health Through Public Transit Use. More information can also be found in **Issue Paper No. 2: Promoting Better Health Through Public Transit Use** . A complete copy of the report can be purchased by visiting <http://www.cutaactu.ca/content.asp?ID=134>.



# Promoting Better Health Through Public Transit Use

## Another Step Towards Active, Sustainable Transportation

Prepared for

**Canadian Urban Transit Association**

And

**Federation of Canadian Municipalities**

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# Executive summary

## Study purpose

This report assesses the contribution of public transit to public health in Canada. In examining how the availability and use of public transit promote public health, the report also reflects the importance of other sustainable transportation modes such as walking and cycling.

## Health and transportation

The Canadian government has adopted a “population health” approach to the health of its citizens. This perspective acknowledges that many aspects of our social, economic and natural environments affect the health of individuals. Indeed, the nine principal determinants of population health are as diverse as genetics, education, social status and working conditions. Strategies to effectively improve population health, therefore, will involve a broad range of sectors including transportation.

Transportation has a significant influence on three key health determinants: physical environment, personal health practices, and income and social status. The component factors of these determinants that relate most closely to transportation are:

- air quality;
- climate change;
- safety;
- physical activity; and
- equity.

This report examines the impacts of public transit on each factor, and how each factor, in turn, affects public health.

## Sustainable transportation and its health benefits

Canadian governments and stakeholders are faced with the challenge of making our transportation systems more sustainable. This requires us to find a better balance among our social, economic and environmental objectives. We can do so by shifting demand to more efficient modes of travel, increasing the energy efficiency of those modes, and limiting future growth in travel demand. Improved sustainability will allow us to increase economic efficiency and safety, and to reduce pollution, congestion, land consumption and noise. One important benefit that is frequently cited as a reason to pursue sustainable transportation is an improvement in population health.

Passenger travel in urban areas is a major focus of sustainable transportation policy development, since Canada’s population is largely urban and becoming even more so. There are substantial opportunities to influence urban transportation patterns towards improved sustainability, prime among them being a shift from automobile travel to public transit and active transportation (walking and cycling).

## Public transit and air quality

Several air pollutants from transportation sources have significant impacts on heart and lung health. These include carbon monoxide, nitrogen oxides, volatile organic compounds, sulphur dioxide and particulate matter; further reactions among these pollutants create ground-level ozone and smog. While air pollution is less severe than it was some decades ago, largely due to improved vehicular emission controls, additional technological gains are likely to be more than offset by increased transportation activity.

Air pollution in Canada has substantial health impacts. It causes about 8% of non-accidental fatalities, and more deaths than motor vehicle collisions and some common forms of cancer. Most Canadians are exposed to harmful levels of air pollutants, and about 20% have a respiratory problem such as asthma (6%) or chronic obstructive pulmonary disease (3%). Air pollution in Ontario alone is estimated to cause 1,900 premature deaths and more than \$10 billion in economic costs each year.

Transportation activities are the biggest cause of air pollution in Canada's urban areas: one estimate attributes 90% of carbon monoxide emissions, 83% of nitrogen oxide emissions and 60% of sulphur dioxide emissions in Toronto to that city's transportation sector.

Public transit has a positive effect on air quality in Canadian cities. While many transit users have little choice in how they travel, many others choose to take transit rather than drive. These passengers substantially reduce their travel emissions, and when thousands of people do so simultaneously a measurable effect on air quality can result.

While transit can most effectively contribute to better air quality in Canadian cities by attracting more drivers out of their cars, it can also do so by reducing emissions from transit operations. To this end, several commercially available or developing technologies for bus propulsion are less polluting than conventional diesel systems; these include clean diesel, natural gas, biomass fuels and electricity. Clean diesel requires a lower capital investment than the others, and offers substantial pollutant reductions compared to conventional diesel. Natural gas has a significant track record and offers similar benefits, but is more capital intensive. Biomass fuel applications are evolving, and have some potential. Electric fuel cells and hybrid-electric technology are still quite costly, but are rapidly being refined and offer substantial emissions benefits.

Pollutant emissions from transit can also be reduced through various other strategies including service planning, operations management, maintenance and driver training. The cost of converting Canadian transit fleets to less-polluting technologies in the near term is not manageable within today's fiscal framework. The existing capital and infrastructure needs of the transit industry are already greatly in excess of available funds. For this reason, it is realistic to expect only an incremental approach to reducing transit's emissions over time.

## Public transit and climate change

There is a widespread scientific consensus that human activities, notably the burning of fossil fuels, are causing increased atmospheric concentrations of greenhouse gases (GHG) and rising global temperatures. Continued climate change could have numerous impacts on public health in Canada due to extreme weather events, heat waves, air quality deterioration, rising sea levels, flooding and spreading of disease-carrying insects.

There is substantial potential for public transit to reduce national GHG emissions by shifting travel from the automobile. Of Canada's national GHG emissions, about 8% are from urban passenger travel, but less than 0.3% are from public transit operations. Because a passenger kilometer of travel by public transit creates 65% fewer GHG emissions than the same travel by automobile, shifting travel from automobile to transit will lead to a net reduction in emissions.

GHG emission reductions from transit operations themselves are also possible. As an alternative to buses powered by conventional diesel technology, natural gas vehicles offer some potential for reduced GHG emissions on a life-cycle basis. Biomass fuels are more promising, as are fuel cell and hybrid-electric technologies. Clean diesel provides no benefit in terms of GHG emission reductions, despite its air quality advantages.

Federal policy exercises conducted to develop a national action plan on climate change have examined urban transportation issues and identified transit as a key element of GHG emission reduction strategies. The federal Transportation Table identified several transit related measures as "most promising," including the introduction of advanced fare technologies and tax-exempt status for transit benefits. Measures found to be "promising" include transit pricing strategies, service improvements, automatic vehicle location, new transit-related infrastructure, and advanced transit vehicle and fuel technologies.

If transit plays a substantial role in reducing GHG emissions from transportation in Canada, it will likely be through a modal shift from automobile travel. Challenges to this objective are posed by suburban sprawl, poor public awareness of transit's advantages, and inadequate municipal funding mechanisms.

## **Public transit and safety**

Road safety in Canada has improved significantly over recent years, but travel on our roads still exacts a heavy toll. Motor vehicle crashes kill almost 3,000 Canadians each year – nearly half of all accidental deaths in Canada – and are the most common cause of death for people under the age of 35. Our rates of injury and death are lower than those of the United States, but higher than those of Australia, Japan, Great Britain and Sweden. The economic costs of motor vehicle crashes are also high, with an estimated burden of \$1.67 billion each year, including \$375 million in direct medical costs.

Transit makes a positive contribution to safer travel in our cities – in fact, it is the safest mode of urban transportation. The fatality rate of transit passengers per kilometre traveled is only 5% of the fatality rate of urban automobile users. Interestingly, more than 70% of transit deaths in Canada happen to passengers who are entering or exiting vehicles, rather than to passengers who are involved in crashes.

The transit industry could improve its already outstanding contribution to public safety by attracting more automobile users, and by further reducing today's low rates of transit passenger injury and death. The latter objective could be pursued through vehicle maintenance strategies, passenger education, and driver training programs that reduce the likelihood of crashes and passenger falls.

## **Public transit and physical activity**

While Canadians are more active than they were two decades ago, six in ten are still insufficiently active to achieve the numerous health benefits of physical activity. The direct economic cost of Canadians' physical inactivity is estimated to be \$2.1 billion annually, or 2.5% of health care costs nation-wide. A 10% reduction in inactivity could produce health care savings of \$150 million each year.

Health Canada advocates "active living" to encourage physical activity, and promotes the significant health benefits of spending 60 minutes daily at low-intensity activities. The use of "active transportation" modes like walking or cycling to make short trips fits well into an active living framework. Surveys confirm that many Canadians walk or cycle for non-recreational purposes at least occasionally, and that an even greater number desire to do so more often. However, statistics show that almost 80% of commute trips in metropolitan areas are by automobile. About 7% of Canadians walk or cycle to work, and on average their round trips provide about one-half of their recommended daily physical activity.

Public transit and active transportation are mutually supportive. Together, they create a "suite" of travel alternatives that enable individuals to adopt multi-modal lifestyles and minimize their automobile use; walking and cycling are also important ways for transit passengers to get to and from transit services. Indeed, the levels of walking, cycling and transit use in Canadian communities tend to rise or fall together. One reason for this is that pedestrians, cyclists and transit users respond similarly to supportive (or obstructive) land use and community design practices; there are also constructive dynamics among these modes that revolve around personal independence and travel costs.

Transit and walking have a strong relationship, and maximum desirable walking distances are used to help define transit service patterns in many cities. Research shows that the willingness of passengers to walk to transit increases with higher-quality transit service and better pedestrian environments; this serves to create larger catchment areas and higher ridership.

Cycling is growing in importance as an element of multi-modal transit trips. By combining transit's speed and efficiency with cycling's flexibility and independence, passengers achieve a level of utility that neither mode can provide on its own. Programs that make it easier for cyclists to get to transit services, and then store or bring along their bicycles, can boost transit ridership, reduce the cost of parking provision at stations, and reduce congestion and pollution. Measures like these are becoming more common throughout North America.

Patterns of suburban development in Canadian cities are a concern, since they are generally neither pedestrian-friendly nor cycling-friendly. However, active transportation and transit could benefit from a recently stronger public dialogue over development practices. Other innovations in urban transportation have also been encouraging, including transportation demand management programs, traffic calming and neo-traditional neighbourhood design.

## **Public transit and equity**

The health of individuals generally improves with higher income and social standing. However, this effect is not simply related to the provision of food and shelter; it appears that health is also a function of one's opportunity and ability to control life circumstances. Canadians could therefore benefit, in terms of health, from transportation strategies that improve their financial resources or increase the opportunities available to them.

Personal spending on transportation can compete with the need for food, shelter, education and medicine. Indeed, the average Canadian household spends more on transportation (about \$6,900 per year) than on food; in the United States, low-income families spend as much as one-third of their after-tax income on transportation. Using public transit allows families to reduce their transportation expenditures and spend more on the necessities of life. On a community-wide basis, strong transit systems may help to reduce overall social spending on transportation, thereby enabling the diversion of financial resources to health care, education and other vital services.

The quality of personal access to medical, employment and educational opportunities is partly determined by the ease of travelling to related destinations. This is particularly true for people too young or old to drive, those who are disabled, and those who face cultural or language barriers. Equity considerations dictate the need to provide a reasonable level of mobility for disadvantaged groups, particularly for important trips to work, school and health care. This mobility can be provided by a strong public transit system, and by opportunities to cycle and walk for shorter trips.

Transit's contribution to equitable mobility in Canadian cities faces several potential challenges related to inadequate funding. These include pressure to eliminate routes with poor revenue performance regardless of their social benefits; pressure to implement fare increases that affect low-income patrons more severely; and ever-increasing demands placed on costly accessible transit services. Opportunities to improve equity may arise from partnerships among transit operators and social agencies to provide disadvantaged groups with better access to essential services; many such partnerships have arisen from the welfare-to-work program in the United States.

## Research needs

A strong case can be made for public transit's contribution to health in Canada. With respect to three of the five factors examined in this report – namely air quality, climate change and safety – the benefits of transit are clear and little work is needed to complete our understanding. However, in the areas of physical activity and equity, a thorough substantiation of transit's benefits would require some additional work.

On the theme of transit and physical activity, a focused analysis of multi-modal lifestyles and multi-modal trips would be valuable. A more defined relationship between transit and active transportation would help to identify where resources could be allocated most effectively to improve facilities and services for the mutual benefit of transit, cycling and walking.

On the theme of transit and equity, a thorough examination of transportation for disadvantaged groups would be helpful. This work could establish the extent of economic hardship and restricted opportunities experienced in the absence of adequate transit service, and could also identify ways to remedy such situations through partnerships or other innovative means. Disadvantaged groups tend to be underrepresented in the decision-making process, and a check on their status is warranted in light of recent and ongoing changes to Canada's transit industry, economy and demographic profile.

A full copy of this report is available for purchase. For more information, please visit <http://www.cutaactu.ca/content.asp?ID=134>.