Ontario Active School Travel

Making the Case for Active School Travel:
Fact Sheet & Reference List

Updated December 2018

This document is intended as a quick reference tool for STP Facilitators to extract evidence-based information supporting active school travel for communicating with stakeholders.
Please note that some of the sources listed are compilations of other research and are not necessarily the original source of the data.

An Urgent Problem

Fewer children and youth are walking and wheeling for the school journey than in the past, and more are using inactive modes of transportation, particularly getting a drive in a private vehicle.

- Only 21% of Canadian children and youth, aged 5 to 19, typically walk or wheel to and from school, while 63% use inactive modes (e.g., car, bus). 16% use a combination of active and inactive modes of transportation to/from school. Use of active modes of transportation for the school journey varies by age group:
  - 21% of 5- to 10-year-olds
  - 24% of 11- to 14-year-olds
  - 17% of 15- to 19-year-olds

  (ParticipACTION, 2018)

- Since 1986, there have been shifts away from active transportation for the school journey in the Greater Toronto and Hamilton Area (males & females, 11-17 years old).

	Walking		Cycling		Driving in a Private Vehicle	
	1986	2011	1986	2011	1986	2011
To School	44.1%	32.5%	2.4%	1.1%	14.1%	33.3%
From School	47.6%	40.4%	2.4%	1.2%	9.5%	21.1%

(Metrolinx, 2015)

- A recent national evaluation of physical activity gave Canadian children and youth a grade of D-[1] in Active Transportation (ParticipACTION, 2018).

- Eligible bussing students are often leaving their seats empty and getting a ride in a private vehicle (Metrolinx, 2011).

[1] ParticipACTION assigned a grade of D for Active Transportation in 2016. Note that the slight decline to a D- for 2018 does not represent a decline in the proportion of children and youth using active transportation for their school journey, though. The grade change reflects a change to the grading system used for the 2018 report.

Canadian children don't get enough physical activity, leading to negative health consequences.

- Only 35%[2] of Canadian children and youth, aged 5-17, are achieving the recommended physical activity levels for their age group (ParticipACTION, 2018).
- A recent national evaluation of physical activity gave Canadian children and youth a grade of D+[3] in Overall Physical Activity (ParticipACTION, 2018).
- Data from 15 countries show that children overall are not accumulating enough physical activity to improve their health (Tremblay et al., 2014).
- Insufficient physical activity is linked to adverse health effects such as weight gain and injury, as well as chronic diseases including obesity, cancer, type II diabetes, and stroke. It is also linked to poor mental health (Tremblay & Willms, 2003; Janssen & Leblanc, 2010; Warburton et al., 2006).

Increased car use raises pollution levels around schools. Poor air quality has a negative impact on children's health and cognitive development.

- Use of private vehicles for school drop-off significantly increases air pollution around schools, regardless of background conditions. Overall, increased vehicle traffic during school drop-off times increases congestion and the risk of negative health outcomes from air pollution emissions by increasing the ambient concentrations at the school site (Adams & Requia, 2017).
- More than one-third of Ontario's greenhouse gas pollution comes from transportation and vehicle emissions have been rising steadily (Ontario Ministry of Environment and Climate Change, 2015).
- Studies have identified that children suffer many negative health effects from air pollution exposure, which include respiratory health issues and allergic reactions (Kelishadi & Poursafa, 2014).
- Air pollution exposure can reduce the cognitive development of students (Annavarapua & Kathi, 2016) which can have life-long socio-economic outcomes as low performance at school can lead to poorer well-being later in life (Ross & Van Willigen, 1997).

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[2] The last version of this Making the Case document cited the number reported in the 2016 ParticipACTION report (9%). At first glance, the difference between the 2016 and 2018 numbers makes it appear that there has been an improvement in this metric. However, the change reflects new approaches used to assess adherence to guidelines and to weigh findings by age group. It does not represent an actual increase in the proportion of children and youth meeting their age-specific guidelines. See the full 2018 ParticipACTION report (pages 6 and 26) for an explanation of the difference in how the number was calculated in 2016 versus 2018.

[3] As described in footnote 2, ParticipACTION changed how overall physical activity was assessed between 2016 and 2018. So, even though the grade for this metric was D- in 2016 and is D+ for 2018, the slight improvement in mark does not represent an actual increase in the proportion of children and youth meeting the age-specific benchmarks for this indicator.

- Children experience the negative impacts of air pollution at lower concentrations compared to adults (ParticipACTION, 2016).
  - Studies find that children have enhanced vulnerability to ambient stressors compared to adults, particularly heat and air pollution (Vanos, 2014).
  - Children's increased susceptibility occurs because they are likely to be active, breathe more air per kilogram of body mass, and their bodies are still in development (Buonanno et al., 2013).
- The heart, brain, hormone systems and immunity can all be harmed by air pollution; research is now beginning to point towards effects on growth, intelligence, and development of the brain and coordination (Royal College of Physicians and Royal College of Paediatrics and Child Health, 2016).

Increased car use makes school zones congested and less safe.

- Congestion and unsafe driver behaviours are common around schools during bell times. A recent study in Toronto observed dangerous driver behaviours at 88% of participating schools. In this study, each dangerous driving behaviour during school drop-off period was associated with 45% times greater risk of collision (Rothman et al., 2016).

Traffic is a growing burden on school staff.

- Ontario's school principals collectively spend an estimated 720,000 hours a year coping with traffic problems around their schools (Green Communities Canada, 2010).

Benefits of Active School Travel

Healthier Children

- Physical activity (of any type) is associated with a wide variety of physical and mental health benefits. Research suggests that higher levels of physical activity are linked with: lower body mass index and waist circumference; healthier levels of blood pressure, blood glucose, insulin and triglycerides; better arterial and bone health; better cognitive functioning and self-esteem; and less anxiety and depression (ParticipACTION, 2018).
- Children who walk or bike to school are more physically active "A meta-analysis that combined studies on walking to/from school and physical activity measured by accelerometry found that elementary school students who walk to school get an additional 17 minutes of daily MVPA, which equates to 23% of their total daily physical activity, whereas high school students who walk to school get an extra 14 minutes of daily MVPA or 36% of their total daily physical activity." (ParticipACTION, 2018)
- The increased physical activity specifically associated with the school journey has been found to lower body mass index (BMI) over time (Mendoza & Liu, 2014) and improve cardiovascular health (Larouche et al., 2014).

- Active school travel is associated with mental health benefits including reduced stress, depression, and anxiety, and increased happiness (Lambiase et al., 2010; Ramanathan et al., 2014; Iancovich, 2015). Children and parents who walk or bike to/from school report also more positive emotions during the school trip than those who travel by car (ParticipACTION, 2018).
- Active school travel helps to meet Ontario Ministry of Education goals for student well-being and helps to build life-long habits of independent and active mobility (Ontario Ministry of Education, 2016; Ontario Ministry of Education, 2014).

Less Traffic and Pollution

- Reducing the number of children being driven to school reduces greenhouse gas emissions and particulate air pollution around the school; this improves air quality and reduces associated risks of lung and cardiovascular diseases (ParticipACTION, 2016; Royal College of Physicians and Royal College of Paediatrics and Child Health, 2016).
- Increased active school travel supports Ontario's greenhouse gas reduction target of 80% by 2050 by reducing vehicle emissions (Ontario Ministry of Environment and Climate Change, 2015).

Safer School Zones, Healthier Communities

- Reducing traffic volumes creates safer school zones. Improving walking and cycling routes to school also enhances the safety, connectivity, and quality of life for the community as a whole (Hall, 2013).
- Improving conditions for walking and biking can have a positive impact on local economies and equity (Litman, 2004) and can attract customers and new businesses to an area, making neighbourhoods more desirable places to live (Drennen, 2003).

Better Academic Performance

- The increased physical activity specifically associated with the school journey has been found to increase alertness and attention during the school day (Lambiase et al., 2010; Martinez-Gomez et al., 2011).
- Physical activity supports healthy brain development, which can lead to improved learning and academic outcomes.
    - Research has shown that children who are more physically active for as little as 20 minutes daily have more active brains and improved attention in the classroom (Hillman et al., 2009) and better standardized test scores (Donnelly & Lambourne, 2011).
    - "Many of the brain processes that make for better, more efficient learners—such as focus, memory, and recall—are enhanced after single or repeated bouts of physical activity. Overall, active children and youth make for better achieving students." (ParticipACTION, 2018)

Key Success Factors for Active School Travel Interventions

1 **Successful interventions address multiple factors, including both non-infrastructure and infrastructure measures, using the 5Es approach (i.e. education, encouragement, engineering, enforcement and evaluation).**

- Both non-infrastructure (e.g., education initiatives, enforcement of rules) and infrastructure measures (e.g., sidewalk/bike-rack implementation) are needed to increase active school travel over the long-term (Chillón et al., 2011; Mammen, 2016).
  - Small effect sizes of some active school travel interventions can be attributed to 'one-off' educational or encouragement initiatives without consideration of broader environmental factors (Chillón et al., 2011; Mammen, 2016).
  - In an international review of active school travel interventions, one common characteristic of most of the successful interventions was applying a comprehensive ecological approach in implementation. The federally funded Safe Routes to School initiative in the US is a prime example of such an intervention (Mammen, 2016).

Examples of Non-Infrastructure Measures that Work

School crossing guards can impact walking rates as well as safety.	As demonstrated by research in Toronto out of York University, Sick Kids Hospital and the University of Toronto (York University et al., n.d.): • Presence of school crossing guards was related to 14% more walking; • Most collisions that occurred during school travel times occurred in locations without crossing guards (86%); • Poor driving behaviours were observed less at schools with school crossing guards; • Presence of school crossing guards was positively correlated with walking to school, and school crossing guards may even override the influence of other roadway features on walking (Rothman, To et al., 2014).
Walking school buses can improve rates of walking to school.	Walking school buses—where children walk in groups supervised by an adult—can increase active transportation and physical activity. However, their sustainability is often compromised by the reliance on parent volunteers (ParticipACTION, 2016). A study of household attitudes in the Greater Toronto and Hamilton Area showed that parents most preferred having their child walk to school as part of an organized group (Metrolinx, 2011).
Monitoring air quality improves parents' behaviour around school zones.	A recent research study demonstrated that when researchers brought air quality monitoring equipment to schools, parents' behaviour drastically changed; for example, parents would park further away from the school and walk their students to the school (Adams & Requia, 2017).

Examples of Infrastructure Measures that Work

Many neighbourhoods are not built for active transportation. The built environment—including car-centred street design, and poor or missing walking and cycling infrastructure—can create real barriers that prevent children from walking or biking to school. It is important not to encourage active transportation without first ensuring the routes are safe for pedestrians and cyclists.

Creating walk- and bike-friendly environments encourages active transportation and makes it safer.	The spatial distance between the home and school environments, street density and connectivity, degree of pedestrian infrastructure, and environmental aesthetics have been shown to influence active school travel (Mammen, 2016). Pedestrian crossovers, traffic lights and intersection densities are positively correlated with walking (Rothman, To et al., 2014). Pedestrian safety during the trip to school is related primarily to the built environment and specifically features related to road crossing (Rothman, Macarthur et al., 2014).
Traffic calming measures can improve safety and may encourage active transportation.	Traffic-calming measures, such as speed humps and narrower intersections, can reduce vehicle speed and injury risk, and may facilitate active transportation (ParticipACTION, 2016; Lindenmann, 2005). The installation of speed humps was associated with a 45% decrease in collision rates in children (York University et al., n.d.). Speed humps have a significant protective effect on pedestrian-motor vehicle collisions on the roadways where they are installed, particularly for children (Rothman et al., 2015). An analysis reviewing 33 studies found that area-wide traffic calming reduced the number of injury accidents by 15%. Residential areas saw an average reduction in the number of injuries by about 25% (Elvik, 2001).
Lower speed limits improve safety.	Higher speeds increase the severity of crashes. In particular, pedestrian and cyclist fatalities increase as vehicle speed goes up (Toronto Centre for Active Transportation, 2016). A UK study found that the introduction of 20 mph zones in London was associated with a 41.9% reduction in road casualties. The percentage reduction was greatest in younger children and greater for the category of killed or seriously injured casualties than for minor injuries (Grundy, 2009). Lower speed limits are more effective when combined with enforcement and education. A comprehensive approach that includes local police services and other community groups is a good idea when making speed limit changes (Toronto Centre for Active Transportation, 2016).

Improving intersections and major crossings can improve pedestrian and cyclist safety.	The majority of collisions between motor vehicles and pedestrians or cyclists occur on high speed arterial streets and at intersections. Improving the safety of pedestrian crossings can help to reduce vehicle speeds, separate pedestrians and vehicles, and increase pedestrian visibility. On wider roads with heavier traffic flows or on streets where low speed limits are not feasible, the focus should be on designing safe crossings (Toronto Centre for Active Transportation, 2016). Crossings with raised medians and pedestrian-controlled flashing or solid lights that signal drivers to stop have been shown to reduce crashes involving pedestrians by 69% (Arason, 2014; Van Houten et al., 2012). Even at non-signalized intersections, a raised median with a marked crosswalk can reduce collisions between vehicles and pedestrians by 46-56% (Institute of Transportation Engineers, 2010). Without these measures, studies have found no significant difference in safety between unmarked and marked crossing sites (Toronto Centre for Active Transportation, 2016). Installing roundabouts in place of conventional intersections, including both traffic lights and stop signs, is a very effective speed control measure, and can reduce collisions with pedestrians by 75% (Retting et al., 2003).
Cycling infrastructure can prevent injuries and encourage more people to bike.	Evidence demonstrates that purpose-built cycling infrastructure can both prevent injuries and encourage more people to bike (ParticipACTION, 2016). • Purpose-built, bicycle-specific facilities reduce crashes and injuries among cyclists, providing the basis for initial transportation engineering guidelines for cyclist safety. Street lighting, paved surfaces, and low-angled grades are additional factors that appear to improve cyclist safety (Reynolds et al., 2009). • A study of different types of cycling route infrastructure demonstrated that cycle tracks—which are bike lanes on roads that are physically separated from the road by barriers—had the lowest risk, about one-ninth the risk of major streets with parked cars and no bike infrastructure. Risks on major streets were lower without parked cars and with bike lanes (Teschke et al., 2012). • In a study of 43 large cities across the United States, it was found that those with higher levels of bicycle infrastructure (lanes and paths) witnessed higher levels of bicycle commuting (ParticipACTION, 2016). • In a study of cyclists' route preferences, most respondents were likely or very likely to choose to cycle on the following broad route categories: off-street paths (71%–85% of respondents); physically separated routes next to major roads (71%); and residential routes (48%–65%). Rural roads (21%–49%) and routes on major streets (16%–52%) were least likely to be chosen (Winters & Teshke, 2010).

For a useful guide to infrastructure measures, read *The Guide to Safer Streets Near Schools*.

2 Successful interventions are tailored to the needs of each school.

- Evidence from a comprehensive review of active school travel interventions suggests that interventions that are specific to a school's specific travel barriers are more effective than those delivering more generic strategies (Mammen, 2016).
- The interventions showing no changes in active school travel focused mainly on broader strategies that were not explicitly school-specific, such as walking school bus schemes, cycling training sessions, active school travel classroom lessons and inter-school competitions (Mammen, 2016).

3 Successful interventions have involvement of the school community, including parents, students, school staff and other members of the broader community.

- Evidence from comprehensive reviews of active school travel interventions demonstrates that a having a full range of stakeholder involvement improves results (Chillón et al., 2011; Mammen, 2016).
- The quality of parent, school, and community involvement, as well as interaction among these groups, may be among the more influential components of active school travel interventions (Chillón et al., 2011).
- When designing appropriate interventions that increase walking and cycling while ensuring safety, an interdisciplinary approach including city planners, community organizations and health and planning experts is essential (Rothman, Buliung et al., 2014).
- School enthusiasm and support is critical, and implementing a program is easier when the school culture is open, accepting, and enthusiastic about active school travel. Generating a healthy school culture can be achieved via school champions (e.g., school staff, students, parents) who lead the encouragement and promotion of active school travel (Mammen, 2016).
- Research demonstrates that student involvement is a powerful interventional tool in eliciting norm, attitude and actual behaviour change (Valente et al., 2003). Children also have unique perspectives and their needs and preferences are important in effectively tailoring programs (Evans et al., 2013; Holloway & Valentine, 2000).
- Interventions including a parent engagement component have been shown to increase the likelihood of children meeting physical activity guidelines (Haerens et al., 2007; Ornelas et al., 2007) by modeling and supporting physical activity behaviours and healthy environments for the children (Michael et al., 2007).

4 Successful interventions keep up efforts over the long-term.

- It is recommended that action plans addressing active school travel be given two to three years to be implemented and ingrained into the school culture (Mammen, 2016).

School Travel Planning: A Comprehensive Solution

School Travel Planning (STP) addresses all of the success factors described in the previous section, and is a proven cost-effective intervention to get more kids walking and wheeling for the school journey.

- Large-scale studies show that school travel plans lead to an increase in active transportation (ParticipACTION, 2016).
  - A pilot of STP in four Canadian provinces showed a 2% child-reported increase in active school travel, while 13% of families reported less driving as a result of STP following one year of implementation (Buliung et al., 2011).
  - In a Canada-wide evaluation of STP conducted over one year, there was evidence of localized success at nearly half of the participating schools (Mammen, 2016).
- School Travel Planning offers a positive benefit to cost ratio. A study examining STP's cost-effectiveness in 13 Ontario elementary schools demonstrated an overall cost-benefit ratio of 2.4. When projected for a hypothetical 3- and 5-year STP implementation period by using year one data, the benefit-cost ratios were 4.5 and 6.3, respectively (Green Communities Canada, 2016).
- A study of *international best practices in active school travel* by Ryerson University identified these additional success factors:
  - Accountability to a strategic vision and objectives;
  - Government policy commitments;
  - A broad multi-disciplinary stakeholder group;
  - Initiatives that are engaging and collect data for evaluation;
  - A centralized web-based resource hub; and
  - Addressing liability concerns (Flanagan & Mitra, 2016).

Policy Interventions

Across studies, distance is consistently cited as the factor most strongly associated with travel mode to school (ParticipACTION, 2016; Mammen, 2016). The decisions that school boards make about school catchment areas, school closures, academic programs and transportation services can lead to more students travelling further to school and being driven.

As Mammen (2016) highlights in his examination of STP, "this highlights the importance in ensuring that newer schools are not constructed in remote areas where land is cheaper, but rather where the routes to school have high street connectivity and carry low traffic volumes. This is a pertinent and timely issue given that, in Canada (and internationally), economic constraints have led to several 'neighbourhood' school closures and increased enrolments in 'centralized' schools, resulting in greater catchments areas and decreased proximity of schools to residential areas."

Addressing Liability Concerns

Some have expressed concern that ASRTS initiatives could expose them to legal liability. However, experience indicates that this need not be a barrier to encouraging active school travel. In fact, Green Communities Canada's guidance note on liability concludes that school boards, municipalities and parents can actually reduce their liability exposure by taking proactive steps to reduce traffic dangers and improve school zone safety through active and safe routes to school (Wyseman, 2010).

Read More:

School Travel Planning in Action in Ontario: Successes and lessons in active and sustainable school transportation (Metrolinx, 2013)

- This report profiles successful STP programs from schools across Ontario. It summarizes success factors for STP that were common across multiple types of communities, and provides a case study of each community's STP activities and approaches.

School Travel Planning in Canada: A Holistic Examination of Program Impact on Active School Travel (Mammen, 2016)

- This doctoral thesis completed at the University of Toronto offers a comprehensive look at the factors influencing active school travel, the effectiveness of STP as an intervention to promote active school travel, and suggestions for best practices.

The Brain + Body Equation: Canadian kids need active bodies to build their best brains. The 2018 ParticipACTION Report Card on Physical Activity for Children and Youth (ParticipACTION, 2018)

- This report synthesizes data from multiple sources, including peer-reviewed research, to assign evidence-informed grades across 14 indicators.

Project BEAT (Built Environment and Active Transport) research

- Project BEAT was a multi-year research study conducted at the University of Toronto. It explored how neighbourhood type and gender relate to active school travel, trends in active school travel, barriers and facilitators to active school travel, and how active school travel relates to overall physical activity.

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