CHILD- AND YOUTH-FRIENDLY LAND-USE AND TRANSPORT PLANNING GUIDELINES FOR NOVA SCOTIA

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Children and youth are hard-wired to play, move, and expend their bountiful energy.

Active Kids Healthy Kids[11]

Unless effective population-level interventions to reduce obesity are developed, the steady rise in life expectancy observed in the modern era may soon come to an end and the youth of today may, on average, live less healthy and possibly even shorter lives than their parents.

New England Journal of Medicine[2]

If we can build a successful city for children we will have a successful city for all people.

Enrique Peñalosa, former mayor of Bogotá, Colombia[3]

[1] Superscript numbers throughout this document point to references and other notes that begin on Page 74.

Summary

This document is in three parts. The first part provides reasons as to why land-use and transport planning should be made more child- and youth-friendly. The second part sets out 19 guidelines that could be applied in the course of a municipality or other agency becoming more child- and youth-friendly in its transport and land-use planning. The third part provides some discussion of implementation issues.

The guidelines are prompted by disturbing trends in young people's transport activity and related matters. These trends include decreasing levels of physical activity, increasing levels of obesity, increasing incidences of traffic fatalities, increasing exposure to air pollution, reduced independent mobility for youth and subsequent concerns over their emotional well-being.

For example, children and youth appear to be travelling much more by car, reducing their opportunities for exercise via walking or bicycling to their destinations. Furthermore, decreased independent mobility and increased reliance on automobile use may be associated with weight gain and compromised emotional development for youth.

Compared to adults, young people are especially vulnerable to the adverse health effects of motorized traffic, including poor air quality inside vehicles and poor air quality outdoors that results from motorized traffic in the community.

The transport needs of young people differ from those of adults, partly because their destinations are different and partly because they travel using different modes. On schooldays, for example, the majority of walking and cycling trips are still made by young people notwithstanding the notable increases in travel by car. Thus, facilities for non-motorized modes are much more important for young people's travel than they are for adults.

Overall, about 20 per cent of all local trips may be made by young people, a significant share that impels attention to their transport needs.

The guidelines maintain that land-use as well as transport is a key factor in determining the transport patterns of young people as it is for adults. Nova Scotia has a unique configuration of large rural areas, small, medium and large towns as well as two urban centres, Halifax and Sydney. Communities situated in small towns and rural areas may find that the guidelines developed for rural areas more suitable. These are available at www.kidsonthemove.ca.

The 19 guidelines are grouped into six categories: putting young people first in land-use and transport planning, providing for them as pedestrians, as cyclists, and as transit users, providing for journeys to and from school, and reducing the impacts of all transport activity on young people.

Several barriers regarding young people and transport are noted, along with suggestions on how they might be overcome. Opportunities for including young people in decision-making about transport and land-use are noted, and other pointers towards application of the guidelines are elaborated. The guidelines have been prepared chiefly for use by municipalities and their agencies as a resource in making their land-use and transport planning more child- and youth-friendly. They may well find application in other contexts including the work of school boards and relevant parts of provincial governments. The guidelines could be used to complement planning for active transport (i.e., non-motorized transport or human-powered), efforts towards attainment of more sustainable communities and the development of Integrated Community Sustainability Plans.

The guidelines complement many provincial initiatives such as the following:

- Increasing physical activity of children and youth as laid out in the *Active Kids Health Kids*[4] and the Health Promoting Schools[5] by allowing more students to walk or wheel to school.
- Increasing safety for vulnerable road users – especially children and youth pedestrians – as described in the Crosswalk Safety Task Force Final Report[6] and the emerging Road Safety Strategy.
- Increasing sustainable transportation in accordance with the Environmental Goals and Sustainable Prosperity Act[7], the Climate Change Action Plan[8] and The Sustainable Transportation Strategy[9] by promoting safe active transportation.

Use of the guidelines could result in communities that are not only more child- and youth-friendly but are more agreeable for persons of all ages, and—through their emphasis on active transport—more sustainable. They are an ideal complement to age-friendly planning.[10]

Versions françaises et anglaises des documents du projet

Un manque de ressources nous a empêché de traduire dans les deux langues officielles les documents sur les lignes directrices pour l'ensemble des provinces. Le document sur le Québec n'est disponible qu'en français, alors que ceux pour les neuf autres provinces le sont seulement en anglais. Tous ces documents sont disponibles sur le site Web du projet (www.jeunesenmouvement.ca ou www.kidsonthemove.ca).

Au site Web, on peut aussi trouver le document qui présente les lignesdirectrices canadiennes, en français et en anglais. En outre, il y a un sommaire en français de neuf pages du rapport sur les lignes directrices pour les communautés rurales. Une traduction française de ce rapport, qui compte environ 60 pages, suivra sous peu.

PART I. TOWARDS GUIDELINES

1. Why have these guidelines

1.1. Concerns about young people and today's transport and land-use

There are several compelling reasons to be concerned about transport, young people and land-use:

- Young people appear to be spending growing amounts of time in cars.
- Some car travel has replaced walking and bicycling, removing valuable opportunities for physical activity.
- Some car travel has replaced transit use, reducing both the present and the future viability of transit systems, and further reducing young people's opportunities for physical activity.
- Growth in young people's travel by car may contribute to growth in the overall amount of motorized transport activity and thus increased emissions of globally active pollutants, including those associated with climate change.
- Being in cars can be harmful to occupants, because in-car air quality can be poorer than the ambient air quality and because the view of the passing world through a windshield can limit opportunities for young people to explore and become acquainted with the physical geography and environment of their local neighbourhoods and communities.
- Increased car travel (and car idling) around schools and other places where youth congregate will lead to increases in air pollution within these vicinities.
- Whether or not young people travel by car, they are especially susceptible to pollution from traffic and thus from the increased pollution that results from traffic growth.
- Reducing motorized transportation is a central goal of most climate change strategies and will contribute to healthier environments for young people today as well as future generations.

Section 3 below expands on these and other concerns.

Background: The concerns were highlighted during a project to address the transport needs of children and youth conducted in the Ontario Regions of Halton and Peel, located just west of Toronto.[11] A feature of the several hundred consultations conducted during that project was expression of the need to make land-use and transport planning more 'child- and youth-friendly'. This meant two things: (i) arranging land uses and transport facilities so as to reduce transport's adverse effects on children and youth when they are travelling and when they are doing other things; and (ii) improving the travelling experience for children and youth, which could mean, for example, making it more enriching for children and providing more independence for youth.

What was required, the project's consultations suggested, was introduction of two perspectives into land-use and transport planning. One is the perspective that the planning should take account of the particular needs of children and youth. The other is the perspective of the children and youth themselves. A contribution towards embracing these two perspectives would be development of a set of guidelines to be considered and even followed by land-use and transport planners as they develop plans for the future.

Thus, a further phase of the project—with the continuing support of the Ontario Trillium Foundation—involved development of a set of such guidelines. The resulting document is entitled *Child- and Youth-Friendly Land-Use and Transport Planning Guidelines*. It is available at http://cst.uwinnipeg.ca/. The Ontario guidelines have been officially endorsed by the Ontario Professional Planners Institute. While the guidelines were being developed, it was realized that they would be somewhat specific to Ontario, and that there could be merit in versions that served other provinces. The Public Health Agency of Canada agreed to support the development of guidelines for every province.

For Nova Scotia, eleven professionals in transport and land-use planning, health promotion, physical education, and other sectors commented on a draft of the Ontario document in 2005. Comments were made in terms of the document's applicability to all children and youth and its applicability to the particular circumstances in Nova Scotia. On March 31, 2008, Cape Breton University hosted a workshop on the topic of these guidelines. We are grateful for the participation and feedback from all forty participants who attended the workshop. A further contribution to this document has been made possible with support from the Nova Scotia Department of Health Promotion and Protection, which provided support for research on active transportation, youth, and rural communities.

1.2. Rural children and youth need guidelines too

Because of their provenance, the guidelines may have the most application in larger urbanized communities. They may also be of value to planners working in rural and northern communities. Residents of rural communities in particular are likely to be more car-dependent, travelling longer distances for most purposes including attendance at school.[12] Young rural residents are less likely to walk or bike to school than their urban or suburban counterparts.[13] Transit services are generally unavailable in rural areas. Nevertheless, most of the 19 guidelines could be helpful in refashioning rural communities to be more child- and youth-friendly.

Additional information for rural communities is available in the *Guidelines for Child- and Youth-Friendly Land-Use and Transport Planning for Rural Areas*, available at www.kidsonthemove.ca.

In many respects, children and youth in rural areas may be *more* in need of guidelines such as those presented in Part II. Although young people in rural areas may not have lower physical activity overall than young people in non-rural areas,[14] they may travel more by car and suffer more from the already-noted effects of car travel. Data are clear on one matter. Several studies have shown that young people living in rural areas have much higher than average rates of traffic-related fatalities and injuries.[15] See Section 5.2 for a more detailed discussion of active transportation in rural areas.

2. Transport and land-use

> *Communities are traditionally built with one transportation mode and user in mind – the adult automobile driver.* [16]

Land-use features almost equally with transport as a topic of the guidelines set out here. How land is used is a key factor in how people and freight move. The more settlement is spread out, the more cars are likely to be used, for two reasons. The first, which applies to most communities, is that when settlements are spread out, distances can be too far for practicable access other than by motorized means. The second is that low densities in larger urban areas make transit alternatives financially difficult to sustain. Transport and land-use in rural areas present additional challenges for non-motorized transportation.

Also in play are two processes whereby car use reinforces itself. One is the fundamental synergy between the automobile and low-density development. The car makes low-density development possible; otherwise there would be no ready access to the development. Once constructed, such development encourages car use that in turn reinforces the place of the car in society, making more low-density development feasible and likely. The second mechanism of self-reinforcement arises from the way the car takes over the landscape. Where there is much car traffic, travel by foot or bicycle—and even access to transit—can be challenging, less secure, and less enjoyable, thereby reinforcing further use of and provision for the car, and reducing the likelihood of travel by foot, bicycle or transit.

Another relevant aspect of land-use concerns smaller communities and the extent to which they have the facilities and resources needed for everyday living. Without nearby facilities and resources, journeys must be made to what are often quite distant communities, usually by car. For the present guidelines, the most relevant facilities and resources are schools. Elementary and secondary schools are encountering declining enrolments and are gradually being centralized in Nova Scotia and elsewhere in Canada.[17] This means that on average, young people make longer journeys to and from school and are more likely to travel by car or school bus than by foot or bicycle.

It's not only schools that have been centralized. Small local stores have been replaced by stores in malls, usually at a greater distance from customers, or by larger stores serving a broader catchment area. Children who might once have learned much from running errands to a local store now find themselves accompanying parents on long shopping trips by car.

Density may be the most important factor influencing car use, but there are others. How land uses are mixed can be important. If schools, workplaces, and stores are near residences, the result may be more walking and wheeling.[18] If uses are clustered into nodes, transit may be viable along connecting corridors, even though overall urban densities are low.

As well as more general factors influencing overall use of the different modes, there can be local features that favour one mode over another. An example is provision of sidewalks and bicycle lanes and paths. Another is the particular positioning of schools and community facilities which can be on main roads to facilitate access by motorized vehicles, or within neighbourhoods to facilitate access by pedestrians and cyclists.[19]

In summary, land-use and transport affect each other powerfully. It makes sense to have guidelines that address both factors.

3. Transport and young people's health

The strongest reason to provide special attention to children's needs in relation to transport is the possibility that current arrangements are harming them more than they might be harming adults.

3.1. Young people are especially vulnerable

Evidence of special harm need not be surprising. Here's what the Canadian Institute of Child Health has said about the physical vulnerability of children.

> *The developing body systems of the child, particularly tissues and organs, are more sensitive to environmental toxicants. Tissues that are under development are more susceptible to toxic effects because they rely on chemical messengers for growth. Organ development begins during early foetal life and continues into adolescence.*
>
> *Children receive greater exposures than adults because they eat more food, drink more water, breathe more air per unit of body weight than adults. Furthermore, depending on their age, children's ability to metabolize, detoxify and excrete many toxicants is different from that of adults.*[20]

Many of these observations would likely apply also to growing adolescents. They suggest strongly that young people are more affected than adults by transport-related impacts.

Children and youth in poverty can be additionally vulnerable. They may have greater 'passive' exposure to traffic-related pollution because they are more likely to live near high traffic areas.[21] An additional vulnerability arises when distances are large, facilities are centralized, and transport opportunities are limited. Access to health care can be compromised.[22]

3.2. Links among transport, physical activity, overweight, and health in young people

> *Changing the built environment to increase children's physical activity for recreation and transportation, to improve access to healthful foods, and to reduce access to less healthful foods can help provide long-term solutions to the childhood obesity epidemic. Unlike the often-transitory effects of motivational and education approaches to addressing obesity, changes in behavior prompted by changes in the built environment should be long lasting.*[23]

Poor nutrition and sedentary lifestyles that revolve around television and video games have been blamed for young people's reduced physical activity and rising average body weights.[24] Recent evidence from Canada,[25] the United States,[26] and the United King-

dom[27] suggests that dependence on automobiles to transport children to school and leisure activities may also be a factor. These are some relevant findings:

- In 2004, 26% of Canadian children and youth aged 2 to 17 were overweight or obese with 8% being obese.[28]
- Over 50% of Canadian children and youth rely solely on inactive modes of transportation to travel to and from school, with a further 21% using inactive modes for at least part of the journey. Adolescents are more likely than children to commute to school using sedentary forms of transport.[29]
- Less than half of Canadian children and youth are active enough to ensure proper growth and development. Among teenagers, less than 20 per cent do sufficient exercise.[30] An extensive study of physical activity levels for children and youth in Nova Scotia[31] found that daily physical activity decreased between 2001 and 2005 for all grades and sexes. It also found that boys were more physically active than girls. Furthermore, there was a trend toward less physical activity in higher grades. (See Box 1).

Box 1. Physical activity levels of Nova Scotia children and youth[32]

When compared to the recommended level of physical activity (60 minutes or more of moderate or vigorous activity for at least 5 days of the week), it was found that:

- over 96% of both boys and girls in grade 3 attained this criteria
- 45.3% of grade 7 boys and 23.8% of grade seven girls attained this criteria
- 9.7% of grade 11 boys and <1% of grade 11 girls were active enough

- The study noted above also found that "Comparing 2001 data with 2005 data reveals that fewer grade 3 (10.0%) and 7 (3.6%) boys were classified with a healthy weight in 2005. In contrast, the 2005 sample for grade 11 boys showed that 3.3% more were classified with a healthy weight compared to 2001. Girls in all grades displayed the opposite trend with more girls in grades 3 (4.2%) and 7 (9.6%) classified with a healthy weight whereas 5.2% fewer were of a healthy weight in grade 11 in the 2005 sample."[33]
- The Canadian Fitness and Lifestyle Research Institute (CFLRI) reported that "parents in the Atlantic provinces and in Quebec are less likely than others to report that playgrounds and parks are located within one or two blocks of their home;" and that "More than three-quarters of parents (79%) report that there are other local places available for their children to be physically active, such as school yards that can be used after hours."[34]
- The same CFLRI study found that "According to parental reports, 70% of Canadian children play outdoors between the time they get home from school and the time they

eat dinner. Two-thirds of parents report that their children participate in unorganized physical activities after school; these activities might include bicycling, walking, or running"[35] and 24% of Nova Scotia parents of children aged 5-17 use entirely active modes to travel to and from school each day. A recent review of student walking distances for the Nova Scotia Department of Education stated that more than 60% of the population of Nova Scotia school boards are bussed from home to school each day. This involves more than 80,000 students.[36] Table 1 indicates the school day travel patterns of students in 2001 and 2005.

Table 1.Comparison of *transportation to school* in good weather between 2001 and 2005, percentage and number (n) in Nova Scotia[37]

Transportation to School in good weather	**Grade 3**		**Grade 7**		**Grade 11**	
	2001	2005	2001	2005	2001	2005
Take the bus	58.2% (329)	65.5% (537)	70.9% (395)	59.5% (484)	57.6% (300)	52.9% (393)
Walk	25% (141)	15.4% (126)	18.5% (103)	20% (163)	18.8% (98)	15.2% (113)
Driven by someone	14.7% (83)	14.8% (121)	8.1% (45)	12.1% (98)	18.6% (97)	16.0% (119)
Bike	2.1% (12)	0.1% (1)	1.8% (10)	0.9% (7)	1.3% (7)	0.7% (5)
Drive themselves	N/A	N/A	N/A	N/A	3.6% (19)	6.9% (51)

- Several studies have found that children who actively commute to school are more physically active outside of school.[38]
- Adults who live in highly walkable communities report two times more walking trips per week than adults in low walkable communities[39] Furthermore, adults who are physically active are more likely to have children who actively commute[40]
- Work in the US[41] looked at pedestrian travel of children and youth aged 5-18. The study looked at five urban form variables (intersection density, residential density, mixed land-use, commercial land-use, and recreation/open space use) and found that the urban form factors that affect adult walking behaviour correspond to the factors that influence youth walking behaviour. Residential density, intersection density, and mixed land uses were all significantly related to walking for both females and males. Higher walking rates were found in areas with greater density and land-use.

- A US study found that "adolescents living in sprawling counties were more likely to be overweight or at risk of overweight than those living in compact counties."[42]
- A study by the Centers for Disease Control (CDC) investigated the impact of infrastructure changes and education regarding the Safe Routes to School Program in the United States. The CDC found that the Safe Routes to School projects in the US have improved the walking and cycling environment for adults as well as children, stating that, "investment in SRTS can contribute to increased physical activity among children and adults."[43]
- A UK study demonstrated that children who walk to school burn more calories than those who are driven. The number of calories burned weekly through walking to school is the equivalent of two hour-long classes of physical education.[44]
- The World Cancer Research Fund/American Institute for Cancer Research (WCRF-AICR) 2009 report has indicated a "high" rating for both the evidence and the potential cancer and chronic disease prevention impacts of increasing physical activity through active transportation.[45]

The World Health Organization (WHO) has published a comprehensive document entitled *A Physically Active Life through Everyday Transport*. It includes the following:[46]

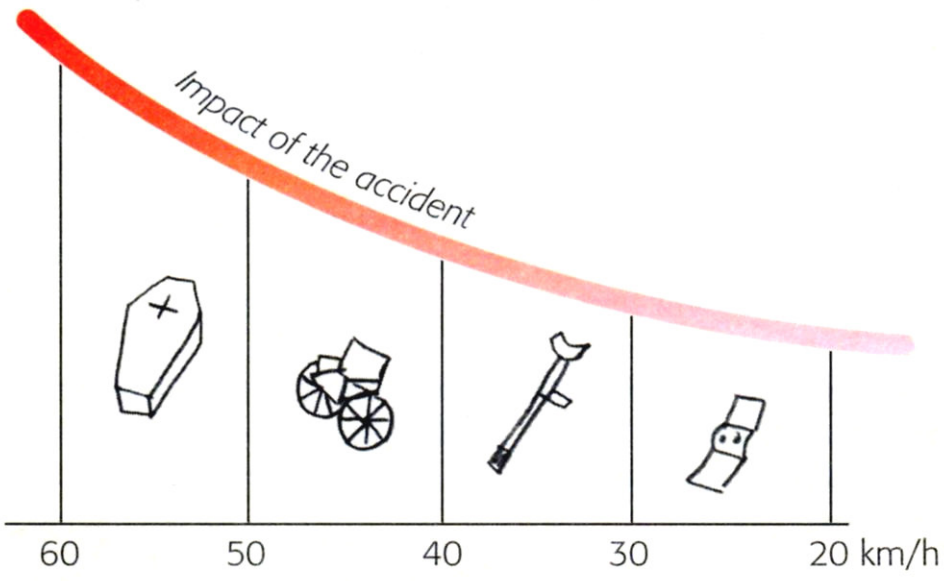
> A systematic review of strategies that promote physical activity concluded that walking is the most important form of physical activity that should be encouraged to improve public health given that it is the activity most widely available.

3.3. Traffic-related fatalities and injuries

The rates of traffic-related injury and fatality are generally lower for children than for adults. Nevertheless, the following should be considered:

- Road traffic crashes are the leading cause of injury death in Canada for children over the age of one year.[47] Many traffic injuries and fatalities are preventable.[48]
- The risk of harm to a child as a passenger in a motorized vehicle is considerably higher than the risk of harm from a stranger.[49]
- A study in the UK found that one third of children who survive traffic crashes may suffer from post-traumatic stress disorder. Symptoms include depression, recurring nightmares, difficulty attending to schoolwork, and fear of cars.[50]
- In many rural areas of Canada, communities have shared-use trails (motorized and non-motorized combined) that enter the town or village. These are potentially trails that would be used for active transportation. The Canadian Paediatric Society has taken the position that children and youth (under 16 years of age) should not be permitted to ride all terrain vehicles (ATVs), stating that children less than 16 years of age account for almost one-third of ATV injury-related emergency department visits and 30% or more of ATV injury hospitalizations.[51]

Figure 1. Schematic relationship between vehicle speed and accident severity



- Safe Kids Canada recommends that children under the age of 16 should not be using ATVs, Off Road Vehicles and snowmobiles.[52] Current legislation in Nova Scotia permits children under the age of 14 to ride ATVs if they are on an approved closed

course and 14-16 year olds may ride on other routes with the supervision of a parent/guardian.[53] Common sense also suggests that ATVs should not be permitted on active transportation routes that have a high volume of active travellers.[54]

- Injuries and fatalities resulting from traffic crashes increase dramatically with the speed of the vehicle at the time of impact. For example, one US study reported that compared with crashes involving a vehicle travelling 16-31 kilometres/hour, the risk of serious injury or death to a pedestrian aged under 20 years was 2.1, 7.2, and 30.7 times higher at vehicle crash speeds of 32-47, 48-63, and 64 km/h or more, respectively. For any given vehicle speed, children appear more able than adults to survive crashes without serious injury or death.[55] However, children are also more likely to travel by foot. The relationship between vehicle speed and crash outcome has been summarized by one source in Figure 1.[56]

Keeping Children Safe in Traffic,[57] a report by the Organization for Economic Cooperation and Development, outlines risks for children in traffic, progress made towards creating safer environments, and the best practices of countries that have made concerted efforts to reduce the risk to children from traffic. Some of the best practices include measures to reduce traffic speed, and public education for children, parents and drivers. The World Health Organization and UNICEF *World Report on Child Injury Prevention*[58] road safety recommendations include reducing speeds to 30 km/hour in residential areas, around schools and around play areas to protect pedestrians; separation of child cyclists from other road users through dedicated cycle lanes; use of bicycle helmets; and increased education for children on pedestrian and cycling skills.

A report on the built environment, physical activity, and obesity in childhood[59] noted that given the high incidence of childhood pedestrian injuries, "priority should be placed on designing roads, sidewalks, and crosswalks that make it safe for children to walk and cycle." The same report points out that in countries where there are more extensive active transportation networks and laws that protect pedestrians and cyclists, there are lower rates of pedestrian and cycling injuries.

3.4. Effects of traffic-related poor air quality, including poor in-vehicle air quality

> *Because short automobile trips tend to have particularly high emission levels, increased active transport for short trips could reduce some of the most polluting automobile trips.*[60]

Road traffic is the main cause of poor air quality in most of the urban areas of the world and many rural areas, including in Canada. There is considerable evidence that this poor air quality harms children, including the following:

- Work for the World Health Organization (WHO) has found that children may be more vulnerable to airborne pollution because their airways are narrower than those of adults.[61]
- The same work for WHO reported that there appears to be no threshold for ozone levels that are safe, and children are particularly susceptible.[62]
- Other work for WHO and for the United Nations Economic Commission for Europe (UNECE) reviewed numerous reports of significant associations between respiratory symptoms or hospital attendance and exposure to particulate matter or nitrogen dioxide, or both (two products of vehicle exhaust) in healthy children and in children with asthma or other chronic respiratory disease.[63] The same work reviewed studies of non-respiratory effects, including children's mortality and adverse pregnancy outcomes.[64]
- Work in Denver, Colorado, found that children who live near high-traffic areas (20,000 cars per day) may be six times more likely to develop childhood leukemia and other cancers.[65]
- Children living in areas of Europe and California with poor air quality have been found to have reduced lung function growth that places them at risk for future respiratory illness.[66]
- Approximately 25% of greenhouse gas emissions are produced by driving.[67]
- Children and youth who live in low-income areas may experience multiple adverse health impacts from transport because of higher traffic densities. This risk of health disparity[68] has been raised as an issue of environmental injustice.
- A Finnish study found that preschool children who were taken to day-care centres by car or bus had higher peak exposures to carbon monoxide than children who walked or who were taken by bicycle.[69]

The immediate cause of the higher exposures in the last finding was not clear. It could have been because car and bus journeys were longer, or because in-vehicle air quality was particularly poor. According to another report, "Elevated in-car pollution concentrations particularly endanger children, the elderly, and people with asthma and other respiratory conditions. While it receives little attention, in-car air pollution may pose one of the greatest modern threats to human health."[70]

Other work on in-vehicle air quality and its potential impacts includes the following.

- A study of children's exposure to diesel exhaust on school buses in the United States indicated that concentrations of fine particulates were often 5-10 times higher than average levels measured at fixed-site monitoring stations.[71]
- A similar study conducted in California found that "A child riding inside of a diesel school bus may be exposed to as much as four times the level of toxic diesel exhaust as someone riding in a car ahead of it. … these exposures pose as much as 23 to 46 times the cancer risk level considered significant under federal law. What's more,

these troubling results suggest that diesel exhaust on school buses could contribute to respiratory problems among sensitive children, such as asthmatics."[72]

- The Ontario Public Health Association investigated emissions from Ontario school buses and estimated that, "in 2004, Ontario's 15,000 school buses collectively emitted approximately: 114 tonnes of particulate matter, 718 tonnes of hydrocarbons, 2,601 tonnes of nitrogen oxides, and 285 kilotonnes of carbon dioxide."[73] The study recommended that replacing pre-1994 school buses should be a high priority for school boards and that emissions reductions devices should be installed on all school buses. School boards were also encouraged to develop anti-idling policies. There are currently 1,125 buses (with 156 spare buses) in use by Nova Scotia school boards.[74]
- One author reviewed relevant data and concluded, "Drivers and passengers in cars may inhale up to 18 times as much pollution as people outside their vehicle, the worst occurring in slow-moving driving conditions in urban areas. Levels of benzene were found to be two to 18 times higher than ambient air and levels of carbon monoxide two to 14 times higher. Nitrogen dioxide is also higher (1-2.5 times), especially during high-speed driving on motorways and during afternoon rush hours."[75]

Additional matters that may deserve more attention than they have been given are the higher-than-average concentration of vehicle-related pollution at sidewalks and the location of vehicle tailpipes in relation to pedestrian traffic. One study found that, "roadside and in-vehicle and out-of-vehicle concentrations were typically several times higher (in congested roads) than those measured at a background monitoring station."[76]

An Australian study reported that pollution concentrations in pedestrian "breathing zones" resulting from passing vehicles (travelling less than 45 kilometres/hour) were on average *six* times higher when tailpipes were located on the curb side of the vehicle than when they were located on the other side.[77] Walking children and children in strollers are generally closer to tailpipes, and for them the adverse effects of curbside tailpipe location may well be greater. In North America, vehicle tailpipes appear to be more often located close to rather than away from the curb.

3.5. Effects on emotional and behavioural development

A road traffic crash can have an extreme impact on a child's development, even if the child is not directly injured. There are more subtle effects from being in an automobile and from the effects of road traffic generally, including the effects of traffic noise and the effects of traffic on the quality of the social environment. Some relevant findings include the following:

- An Australian study found that heavy traffic reduces the independent mobility of children and youth.[78]
- An investigation in the UK found that opportunities and locations for spontaneous, non-structured play can be severely restricted by traffic.[79]

- An Austrian study found that the low-level but chronic noise of moderate traffic can be stressful for children and raise their blood pressure, heart rate, and level of stress hormones.[80]
- Clear evidence on the effects of road traffic noise on the development and behaviour of young people may result from an ongoing major European Commission project (RANCH).[81] In the meantime, work showing an adverse effect of aircraft noise on children's cognitive performance can be noted.[82]
- There is some evidence from Austrian work that young people who walk to school are emotionally healthier than children who travel by motorized means.[83]
- As noted earlier, young people who actively commute to school are more likely to engage in other forms of physical activity. The Canadian Fitness and Lifestyle Research Institute (CFLRI) asked youth to rate their quality of life and compared this to physical activity levels. Youth who were physically active in school and outside of school rated their quality of life higher than youth who were less active.[84]
- A Swiss study found that half of five-year-old children who lived on an "inadequate" street "where traffic is a nuisance and menace to children at play" never played outside, and only 10 per cent played outside for more than two hours a day, mostly in playgrounds. [85] All five-year-olds who lived on an "adequate" street played outside, most for more than two hours a day. (Whether the children were supervised was not recorded.) The report on the study concluded that the latter group had "a pool of experience that is clearly more diverse and rich". The report also noted that parents of children who go out least—mostly those who live on "inadequate" streets—had fewer social contacts with other parents and were therefore less able to meet child-care needs.
- US work on adult social bonds in neighbourhoods found that these were weaker according to the extent of automobile dependence of a neighbourhood's residents (but not according to the extent of sprawl *per se*, i.e., according to how thinly the neighbourhood was populated).[86]
- A report on a California Department of Education study suggested that physically fit students performed better academically.[87]

There appear to have been few formal studies concerning the impact of mode of travel to school on intellectual and emotional development. Common sense may suggest that walking in particular, compared with travel by car, provides a richer environment more suited to enquiry and exploration and to establishing a sense of neighbourhood identity. Neighbourhood trust and social cohesion may be contributing factors.[88]

There is a growing body of research that supports the value for children and youth to increase their exposure to the natural environment, including their neighbourhood and school.[89] A US author[90] has outlined the opportunity for communities to plan for such exposure.

> *During the next decade or two, a crush of city and county master plans will be newly drawn or updated, determining the future of our open space. All over the country, creators of these plans and the public that advises them will have an opportunity to consider whether the veins of nature and wildness will be as important as the arteries of transportation to the future of our neighbourhoods.*[91]

3.6. Concluding comment

All the foregoing taken together provide more than ample justification for considering and implementing measures designed to change how children and youth move, and move themselves, and to reduce their exposure generally to transport's adverse impacts. Guidelines can provide both a stimulus and a guide to action. The following guidelines may also be used to augment the Active Kids Healthy Kids Strategy of the Nova Scotia Department of Health Promotion and Protection. (See Box 2).

Box 2. Active Kids, Healthy Kids [92]

The purpose of the Active Kids Healthy Kids Strategy is to increase the number of children and youth who accumulate at least 60 minutes of moderate or higher intensity physical activity on a daily basis.

There has been significant progress in regard to active transportation with the launch of Pathways for People Framework and several symposia. Geographic information systems are being used to collect information that will be made available to the public to search for natural and built environments that support physical activity. The strategy also aims to develop guidelines and an educational program for municipal leaders, planners, and engineers about physical environments that make active transportation and other physical activity easier in rural, suburban, and urban areas.

A web site dedicated to active transportation was launched in November, 2006. It is tracking the development of community-based active transportation plans, resources, legislation, programs and events. See http://www.pathwaysforpeople.ca/.

4. Identifying the travel needs of children and youth

Children and youth can have different needs from adults because they are smaller, growing and developing, and generally more vulnerable. They also have different needs among themselves according to age.

What children and youth are expected to do or would like to do varies according to circumstance. A child in the inner city, in a family that travels much by transit, might begin to use transit without an adult at an earlier age than a comparable child who lives in a suburb.[93] There may also be changes over time. The first unsupervised transit use by an inner-city child may occur later today than it did 30 years ago, when transit use was relatively more common and transit may have been perceived as safer.

The fundamental considerations in developing the guidelines in Part II are firstly that the needs of children and youth are different from those of adults (although often not so different from senior citizens), and secondly that these different needs deserve as much attention as the needs of adults. This perspective is reflected in the YouthScape program. (See Box 3).

The latter point becomes the first and most important guideline, which sets the scene for the other guidelines and for their implementation.

Box 3. Across the country Youthscape programs are engaging youth[94]

Welcome to YouthScape Halifax!

Imagine acknowledging young people as competent and enthusiastic contributors. Imagine engaging young people in building and managing our communities. Imagine involving young people in policy planning and legislation. Imagine seeing marginalized and diverse youth as problem-solvers, instead of problems. Imagine inspiring young people to learn new communication and leadership skills. Imagine creating a society where the engagement of young people is an automatic reflex...

PART II. THE GUIDELINES

5. General considerations in guideline development

5.1. Overview

Although some of the guidelines proposed here are directed more to the benefit of some age groups of children and youth than others, most of the guidelines have common characteristics. They seek on the one hand to increase the amount of active transport—notably walking and cycling—by young people and also the use of public transit, and on the other hand, to reduce their travel by car. As well, the guidelines are directed towards reducing the amount of all motorized traffic where children and youth congregate.

The justification for taking these directions is set out above in Section 3. Present transport practices can damage the health of children and youth, in one or more of four ways. They can harm the young person while travelling, as in exposure to collision risk or to poor in-vehicle air quality. They can harm the young person when not travelling, as in exposure to traffic noise or to poor ambient air quality. They can harm the young person by reducing opportunities for necessary physical exercise and exploration of the neighbourhood. Finally, they can damage the environment and keep children from experiencing the benefits of direct contact with nature.

The particular vulnerabilities of children and youth, noted in Section 3.1, position them as transport's 'canaries,' providing stronger indications than adults exhibit as to whether something is wrong. This is not a reason to use them as mine canaries were used, i.e., to give them early exposure to danger. Rather, it is a reason to provide them with greater protection, when they are travelling and when they are not.

Most of the guidelines are not specific to children and youth. Indeed, many of them echo what is found in more general-purpose land-use and transport planning documents, especially those designed to move transport and land-use towards sustainability. There is widespread recognition that transport in particular, as currently practised, is not sustainable.

The guidelines cover all types of residential development, and also the places where children and youth go. Their application will vary according to whether they are used to guide green-field development or in-fill development, or to assess and remedy existing development. Application of the guidelines in rural areas is particularly challenging, though the rationale for considering the needs and aspirations of children and youth is still relevant. Consideration of how the guidelines can be applied is the concern of Part III of this document. The balance of Part II is concerned with setting out and justifying the guidelines.

5.2. Active Transportation

> *In terms of Active Transportation (AT) within Canada, Nova Scotia is ahead of the wave of change. In the past few years, AT in our province has literally grown in leaps and bounds. This is due in part to committed individuals and organizations who care about our environment and our collective health. It is also due to increased political awareness and funding at a federal and provincial level, and some elbow grease at the municipal level to make some infrastructure changes that support AT.*[95]

Planning communities for, and with, young people complements efforts to create more active living environments and to promote active transportation for all ages (see Box 4). Many municipalities are developing active transportation plans.[96] These guidelines could be used to ensure that children and youth are consulted in the development of these plans and that they reflect their needs and aspirations for active transportation.

The Cape Breton Regional Municipality (CBRM), for example, developed an Active Transportation Plan that involved broad consultation with children and youth, including an online survey. The guidelines have also been included in the CBRM plan. The Halifax Regional Municipality (HRM) active transportation plan[97] noted the value of paying greater attention to infrastructure in school zones and the value of "Walking School Bus" programs. The HRM active transportation plan also stated that "youth prefer sidewalks that link schools to bus terminals, recreation centres and shopping areas." Bridgewater's Active Transportation and Connectivity Plan notes that both children and the elderly benefit from active transportation networks that are safe and accessible.[98] Greater synergy amongst school board, municipal government and provincial government representatives could improve active transportation planning with respect to all trips made by young people.

In May of 2008, the Union of Nova Scotia Municipalities (UNSM) passed the following resolution:

> *"That the UNSM make active transportation a priority and advocate and partner to promote Active Transportation within its membership and with other government agencies to improve our roads, and other infrastructure to develop and encourage safe walking, cycling and other AT opportunities for both Nova Scotia residents and visitors."*[99]

There is notable awareness at many levels of government regarding the benefits of promoting active transportation but the lack of infrastructure in towns, and rural areas presents a significant barrier for young people and adults to safely walk, cycle or engage in other active modes of travel. A recent study[100] of active transportation in Nova Scotia

gathered data from focus groups and travel diaries to investigate the barriers and opportunities for young people and adults in rural areas, small towns and Cape Breton Regional Municipality. Results of the study are presented in Section 5.2.1.

Box 4. Nova Scotia Pathways for People Framework for Action takes the lead on Active Transportation[101]

Imagine a day when all the cities and towns in our province have bike lanes. Imagine that your employer actually encourages you to walk, run, or wheel to work by providing a change room with a shower. Imagine too that your employer gives you a bonus for not owning a car because they realize you're a more productive and ultimately less expensive employee. Imagine that the subdivision you live in has sidewalks on every street and traffic calming mechanisms, meaning your kids can walk to school. Imagine the joy your kids would feel at the daily adventure of getting themselves around on foot or scooter, bike or skateboard. Imagine safe, attractive, and convenient connections within and between rural communities.

5.2.1 Youth and Active Transportation in Nova Scotia

Forty-six youth participated in a total of 7 focus groups and 70 youth completed travel diaries for one week. The majority of youth reside in Cape Breton though one focus group was conducted in Lunenburg County. Results from the focus groups were consistent. The two greatest barriers that youth identified were distance and lack of safe infrastructure. This includes sidewalks, paved shoulders, bike paths and trails. The need for facilities such as parks and recreation areas nearby was also a concern raised by the youth. Many felt that there are few places for them to go to be with friends or to exercise. Their recommendations centred around infrastructure that would make active transportation a safe option (sidewalks, paved shoulders, non-motorized bike paths and trails), bike safety lessons for youth, bike racks at schools and other locations, youth-led activities (e.g. hiking clubs, running groups on trails) and appropriate modelling of active transportation by adults. See Tables 2, 3, and 4.

Table 2. Barriers and Recommendations for Active Transportation - Youth Focus Groups

N=46; 27 female, 19 male ages 12-18	
Barriers to Active Transportation Identified by Youth	**Recommendations from Youth**
➢ No sidewalks ➢ No paved shoulders along highways ➢ No bike paths and trails ➢ Lack of infrastructure makes routes feel unsafe ➢ Traffic speeds make routes feel unsafe ➢ Distances are often too great ➢ Few interesting facilities nearby such as parks, tennis courts, trails ➢ Shared use trails (motorized and non-motorized) make them feel unsafe ➢ Require bike safety training ➢ No forum where they can express their views and feel confident that their views will be incorporated into community plans ➢ Habits (some felt they had developed a 'lazy' habit of using cars to travel to destinations within walking or cycling distance)	➢ Build sidewalks along routes where youth and others regularly travel ➢ Pave shoulders on highways and mark shoulder clearly with yellow line (and repair potholes in roads) ➢ Make bike paths and trails a priority ➢ Separate motorized and non-motorized trails ➢ Repair damaged equipment in parks and create recreation facilities in communities (tennis, badminton, basketball, hiking and cycling trails) ➢ Offer bike training to older children and youth ➢ Establish youth-led programs that encourage physical activity and active transportation (e.g. youth running, hiking and cycling groups) ➢ Bike racks at schools and more school support for active transportation ➢ Access to recreation facilities in schools after hours ➢ Establish forums for youth to provide their views on community plans ➢ Purchase bicycles for community use ➢ More community events that encourage active transportation e.g. closing roads to motorized vehicles at specified times

Table 3 Travel Modes for Cape Breton High School Students – One-Week Travel Diary (2008)

N=38; 21 female, 17 male						
High School	**Total # of Trips**	**AT Trips**	**Car Trips ≤ 5km**	**Car Trips > 5 km**	**Bus Trips**	**Other Trips**
Number of Trips	1246	416	525	171	128	6
% of Total Trips		**33**	42	14	10.5	0.5

Table 4. Travel Modes for Cape Breton Junior High Students – One-Week Travel Diary (2008)

N=32; 14 female, 18 male						
Junior High School	**Total # of Trips**	**AT Trips**	**Car Trips ≤ 5km**	**Car Trips > 5 km**	**Bus Trips**	**Other Trips**
Number of Trips	915	346	292	146	125	6
% of Total Trips		**38**	32	16	13	1

It is important to note that in Tables 1 and 2, two schools from a residential/urban neighbourhood, strongly skew the total number of AT trips for high school and junior high students. Looking at Table 1, the average number of AT trips for all high school students is 33% but without the residential/urban high school figure (for which students indicated that 49% of their trips were AT trips) only 9.98% of high school student trips are AT trips.

Similarly, for junior high students in Table 2, the average number of AT trips is 38% but this figure would drop to 22% without the residential/urban school that reported 49% of their trips are AT trips.

It is interesting to note that both the high school and junior high school that reported the highest levels of active transportation are in fairly close proximity and would be drawing many students from a similar residential area where there are sidewalks on most roads leading to the schools and crossing guards at many major intersections. They are examples of schools that have been sited well with respect to active transportation.

The thirty-eight high school students in this study made 1246 trips in one week for an average of 33 trips per student and approximately 4-5 trips per day (the trip diary included school trips as well as all other trips). A total of 56% of their trips were made by car though three quarters of their car journeys were less than 5 km. With appropriate infrastructure, 75% of their journeys could potentially be made through active transportation. This could be higher if transit and "other" trip modes are included.

Junior high students made 915 trips in one week for an average of 29 trips per student, just over 4 trips per day. They reported using active transportation more often than the high school students (38% vs. 33%). A total of 48% of their trips were made in a car with 69% of car trips that were less than 5 km. For this study group at least 71% of their trips could have been active transportation trips if safe routes and infrastructure were available.

5.3 Rollerblading and skateboarding

Skateboarding and rollerblading are increasingly popular means of travel and fun for children and youth, and provide good exercise. Unlike bicycles, use of skateboards and rollerblades on roads is ordinarily forbidden in Nova Scotia on sidewalks and roadways, and the use of these 'small-wheel vehicles' on sidewalks can sometimes be problematic.[102] Often their use on separate bicycle paths makes sense, or limiting their use on certain roads.

With more experience on how best to accommodate their use, development of one or more guidelines for rollerblades and skateboards will be appropriate and useful. Thus, these two modes, and perhaps others, should be covered in a later version of these guidelines. In the meantime, municipalities and school boards are advised to consider whether infrastructure and facilities enable or discourage these forms of active transportation. A review of 24 large municipalities in Canada found that 75% reported having by-laws that either prohibited or restricted bicycle or skateboard use in public areas.[103] Some by-laws do not prohibit active transportation but aim to provide safe limits. Oromocto, New Brunswick has adopted such a by-law.[104] (See Box 5).

Box 5. By-Law 319, Oromocto, New Brunswick

"No pedestrian shall walk, roller blade, skateboard, bicycle, ski, run or race on any sidewalk in such as manner as to crowd or jostle any other person, or as to create any discomfort, disturbance or confusion."

In the meantime, special facilities for skateboarding are being introduced in Nova Scotia. Youth helped design the $90,000 skateboard park opened in the Cole Harbour area of Halifax in 2001.[105] In its 2005-2006 budget, Halifax Regional Council included a total of $500,000 for skateboarding facilities, including a new skateboard park on Halifax Com-

mons.[106] Infrastructure that supports active transportation on route to skateboard parks is also important, as outlined in Box 6.

Box 6. Active transportation to skateparks

The HeartWood Centre for Community Youth Development, funded by the Nova Scotia Department of Health Promotion and Protection has published *Ramping Up,*[107] a document that outlines the benefits of skateboard parks. It states that "the support of skateboarding in our communities shouldn't stop with building skateparks. Many users are too young to drive and the majority of those who do drive don't have their own cars or any transportation other than a bicycle or a skateboard. If we expect these facilities to be well utilized by skateboarders, the skatepark must be accessible without relying on parents driving to the park. The development of safe bicycle corridors and other infrastructure, policies and legislation suitable for skateboards, would support Active Transportation… safe pathways or transportation routes must be created and transportation by-laws revised to integrate skateboarding and accept it as a part of many lives, both young and old" (p. 12).

6. Putting children and youth first

Guideline 1. In transport and land-use planning, the needs of children and youth should receive as much priority as the needs of people of other ages and the requirements of business.

This is the framework guideline that sets the scene for the guidelines to follow and for the implementation of the guidelines discussed in Part III.

Putting children and youth first means that their needs—as set out in Section 4—are considered at every stage of transport and land-use planning processes. Transport systems are designed so that their needs can be met. Land uses are developed to support such transport systems.

The needs of children and youth point towards implementation of 'softer', less threatening, less intrusive, more inclusive, and more collective transport systems. At first sight, such systems may not meet ideals based only on conventional transport objectives. For example, they may involve slower movement of traffic and thus appear to reduce the level of transport service. However, implementation of all requirements for children and youth could reduce journey times. Motorized road traffic may be slower, but distances may be shorter, and rapid transit may be more available to move people quickly from one place to another.

In Box 7 on the next page, Enrique Peñalosa, former mayor of Bogotà, Colombia, draws a direct link between planning for children and making transport more sustainable.

An essential feature of putting children and youth first is that transport and land-use planning issues are seen from perspectives of children and youth. This requires the participation of young people in planning processes, or, for the youngest children, the participation of those responsible for them. How this can be achieved is set out in Part III of this document.

Guideline 2. Within each municipality, designate a staff member or council member, or both, as responsible for bringing the perspectives of young people to consideration of transport and land-use planning issues.

Implementation of this guideline may be an essential requirement for application of all or most of the other guidelines. How this guideline is implemented will depend on how the municipality is structured, and also on its size. The role of a staff member, however, could be the same in all municipalities, similar in nature to that of the fire chief who checks each plan for consistency with fire codes and access requirements for emergency vehicles.

Box 7. Planning for children and transforming transport[108]

Former Bogotà mayor Enrique Peñalosa interviewed by Susan Ives (U.S.A.)

If you could wave a magic wand and create the perfect city, what would that city be like?
We really have to admit that over the past hundred years we have been building cities much more for mobility than for people's well-being. Every year thousands of children are killed by cars. Isn't it time we build cities that are more child-friendly? Over the last 30 years, we've been able to magnify environmental consciousness all over the world. As a result, we know a lot about the ideal environment for a happy whale or a happy mountain gorilla. We're far less clear about what constitutes an ideal environment for a happy human being. One common measure for how clean a mountain stream is is to look for trout. If you find the trout, the habitat is healthy. It's the same way with children in a city. Children are a kind of indicator species. If we can build a successful city for children we will have a successful city for all people.

Given the rapid growth of Third World cities, is this possible?
Many Third World cities today are really only half built. Many are still surrounded by undeveloped land that will be overtaken by the city very soon. We still have the opportunity to learn from the successes and mistakes of other cities around the world. We need to think about how to create cities that produce more convivial, creative, and happy human beings. Where is the urban expert who decided that cities had to be structured around cars? Why not begin to think differently? Why not dream of a city where half the streets would be for pedestrians, where the heart of the city would be a giant avenue lined with benches and trees, a meeting place for the community, where people go to jog, ride bicycles, talk, kiss, eat in cafes? A city doesn't have to be a bunch of roads for cars with some buildings around them.

As mayor, you made it your platform to transform the city's transportation system.
When I got to city hall, I was a handed a transportation study that said the most important thing the city could do was to build an elevated highway at a cost of $600 million. Instead, we installed a bus system that carries 700,000 people a day at a cost of $300 million. We created hundreds of pedestrian-only streets, parks, plazas, and bike paths, planted trees, and got rid of cluttering commercial signs. We constructed the longest pedestrian-only street in the world. It may seem crazy, because this street goes through some of the poorest neighborhoods in Bogotá, and many of the surrounding streets aren't even paved. But we chose not to improve the streets for the sake of cars, but instead to have wonderful spaces for pedestrians. All this pedestrian infrastructure shows respect for human dignity. We're telling people, "You are important--not because you're rich or because you have a Ph.D., but because you are human." If people are treated as special, as sacred even, they behave that way. This creates a different kind of society.

How was your idea of putting pedestrians needs ahead of cars received?
I was nearly impeached when I said that cars shouldn't be allowed to park on the sidewalks. My opponents were business owners who said there was enough space on the sidewalks for cars to park and for people to still walk by. In Bogotá only 25 to 30 percent of the households have cars. Yet we use public money to build roads for the cars that so few people can afford, while the majority walk or use public transit. Democracy isn't just about casting a vote. It's about public good over private. If we can ban cars, isn't the majority better off?

What steps were you able to take?

We began to experiment by instituting a car-free day on a weekday. In a city of about 7 million people, just about everybody managed to get to work by walking, bicycling, bus, even on horseback--and everybody was better off. There was less air pollution, less time sitting in traffic, more time for people to be productive and enjoy themselves. Every Sunday we close 120 kilometers of roads to motor vehicles for seven hours. A million and a half people of all ages and incomes come out to ride bicycles, jog, and simply gather with others in community. We took a vote, and 83 percent of the public told us they wanted to have car-free days more often. Getting people out of their cars is a means of social integration. You have the upper-income person sitting next to the cleaning lady on the bus. This may be something you take for granted in your country. But in the Third World, society isn't so integrated. This is extremely powerful and revolutionary.

The responsible staff member would review all plans and proposals and have clear authority to advise as to their acceptance or rejection according to their compatibility with these guidelines and similar principles supporting the needs of children and youth. A further responsibility could include working with relevant school officials to encourage active transport for the trip to and from school.

This official could also have authority to examine existing arrangements and recommend greater compatibility with the needs of children and youth. A key part of the work of this staff member would involve working with the forums for young people that could be established as a result of implementation of Guideline 3.

A council member responsible for bringing the perspectives of young people to consideration of transport and land-use planning issues would, of course, act through the council and its committees and in the community. Such a council member might take a special interest in establishing and working with the municipality's forum for young people.

Guideline 3. As may be appropriate, establish or adapt one or more forums for children and youth to ensure that their perspectives are considered by land-use and transport planners.

In the case of youth—i.e., about 12 years and older—this guideline might literally involve establishing a youth advisory committee or other such group, charged with reviewing and bringing forward plans and proposals. In such cases, the mandate of the existing group could be expanded. There is more on involving children and youth in Section 13 of this document.

7. Providing for children and youth as pedestrians

Guideline 4. Identify where children and youth want to go or need to go and, to the extent possible, provide ways of getting there by foot.

Travel by foot should be the priority for children and youth who can walk. Walking can provide the maximum of exercise for the minimum financial outlay. Walkers encounter their surroundings and other people at a pace that facilitates beneficial contact. Walkers inhabit sidewalks and other paths in ways that add to the safety of other walkers. Similar considerations apply to children and youth who use wheelchairs. (Consideration for children and youth as cyclists is addressed in guidelines 8-11).

The travel patterns of children and youth can be identified by observation, by questioning them, and by questioning their parents and other household members. Such interventions have to be carried out with proper preparation and great care because of sensitivities about observing children and asking questions about them. See Box 8 for an example of travel mapping using GIS. In many cases, especially for school-related trips, the cooperation of schools could be a key factor. Education and infrastructure changes have proven effective with Safe Routes to School (SRTS) in the United States. A Centers for Disease Control study found that the Safe Routes to School projects in the US have improved the walking and cycling environment for adults as well as children.[109]

Once travel patterns have been identified, each route should be assessed as to the degree it provides continuous pedestrian access, particularly in more-urbanized rather than less-urbanized areas:

- Are there sidewalks or non-motorized off-road paths for the whole route?
- Can sidewalks or paths be installed where there are none?
- Are there pedestrian crossings or traffic signals at road crossings, however minor, or could they be installed?
- Do wide roads have two-stage crossings, with a protected island between traffic streams?

Of course, when new residential communities are being planned, there are no children to observe or household members to ask questions of. Experience with existing communities has to be applied. Destinations have to be presumed and routes figured out. Walking school bus routes can be mapped out and ready to share with parents. (See Guideline 16). The checklist above may be helpful. Some time after occupation, the new neighbourhood can be assessed using input from residents.

Identifying where children and youth want to go may also involve learning about the kinds of facilities they would like to access that do not yet exist. Are there parks or recreation facilities nearby? Are there locations where youth feel welcome and comfortable

to simply spend time with friends? Moreover, a US study[110] looked at access to physical activity-related facilities and found that having local access to such facilities was associated with decreased odds of being overweight for adolescents.

Box 8. Using GIS to Make Young People's Voices Heard in Urban Planning[111]

A study in Sweden has explored the use of GIS to incorporate the travel patterns and destinations of young people in urban planning. "Our findings suggest that GIS is effective in engaging children and a good tool for accumulating and processing children's knowledge about their environment. Students and teachers can use it with a reasonable investment of time. The results also suggested that the method could lead to trustworthy and meaningful information for improved traffic safety in children's local environments.

Guideline 5. Assess pedestrian routes used or to be used by children and youth to ensure that they are as safe and suitable for them as possible.

Availability of a route does not ensure its suitability for children. How suitable it is can be determined by walking or wheeling a child through the route or walking with a person wheeling a stroller. Here are some questions to be asked:

- Is the route clear to a child, including which part of the path is to be used?
- Are signs visible to, say, a nine-year-old child?
- At road crossings, is the pedestrian crossing area maintained at the same grade as the sidewalk, i.e., vehicles use ramps, not pedestrians?
- Where there are changes in grade, as at curbs, are there ramps for strollers and other aids used on sidewalks?
- On shared-use paths, trails and sidewalks with a high volume of travellers, are motorized vehicles prohibited, (thus decreasing the risk of injury)?[112]

The special problems posed by icy and snowy paths are addressed in Guideline 7 below.

In terms of safety of young people as pedestrians, the primary danger is usually from road traffic. There can be heightened concerns about danger from strangers and, in some places, danger due to the nature of the terrain and other features of the route. Here are some questions to consider:

- Are walking routes separated from traffic moving faster than about 30 kilometres/hour (see Guideline 6 and Guideline 18)? (This may include separating motorized and non-motorized paths and trails).

- Where walking routes must be close to traffic, can traffic speeds be reduced to safer levels for children and other pedestrians?
- Are pedestrian crossings fully visible to drivers with clear advanced signage?
- Are road crossings supervised during high traffic times, particularly on routes to school?
- Are there 'eyes' on the route; i.e., it is well travelled, or does it pass through places where people are watching who walks or wheels by?
- Are there places along the route, e.g., variety stores or Block Parent, where children could take refuge if they feel in danger?
- Are dangerous areas well fenced, e.g., construction sites, slopes, and bodies of water?
- Are walking routes illuminated for use during hours of darkness?

As well as safety from traffic and strangers, there is also concern about pollution from nearby traffic, addressed in Guideline 6 below.

Guideline 6. Separate sidewalks used by children and youth from heavily trafficked roads.

The most obvious reason to keep young people away from road traffic and other motorized vehicles is to avoid injury. Less obvious reasons are to reduce their exposure to noise, which may be harmful (see Section 3.5) and to the high levels of pollution that may exist near traffic.

Information in Section 3.4 suggests that atmospheric concentrations of harmful vehicle emissions can be higher in the breathing spaces of pedestrians on sidewalks than elsewhere, particularly in heavy traffic, and particularly when passing or idling vehicles have curbside tailpipes. The breathing spaces of walking children or children on sidewalks, especially if in strollers, may be heavily polluted because of their proximity to the vehicle tailpipes. Here are some questions:

- Where heavily trafficked roads must be used—for example, because children's destinations are located on them—are sidewalks wide enough to avoid proximity to heavy traffic?
- In new development and perhaps elsewhere, could sidewalks be separated from traffic by at least three metres, to avoid high concentrations of vehicle-related pollution?
- In other cases, would it be feasible to consider directing the operation of vehicles with curbside tailpipes away from curbside lanes where there are heavily used sidewalks?

On the last point, the ideal solution would be for manufacturers to locate tailpipes on the offside of the vehicle, i.e., away from the curb. However, the majority of vehicles on the road today appear to have nearside tailpipes, and most of these vehicles will be around for many years. Because sidewalk pollution can be extraordinarily high in the vicinity of nearside tailpipes,[113] action to separate sidewalks from such traffic may be especially important.

Guideline 7. Ensure that sidewalks are always cleared of ice and snow.

It's hard to push a stroller or wheelchair through uncleared snow on an icy sidewalk, or to expect a toddler or even a slightly older child to walk in these conditions. Thus, car journeys may be made in winter on days when walking paths are not cleared.

If accommodation of young children's needs were to have a higher priority, snow- and ice-clearing from sidewalks and trails might be given a higher priority in the setting of municipal budgets. Where sidewalk snow-clearing is the responsibility of adjacent property owners, there might be more diligent enforcement of relevant by-laws. (See Box 9 below).

It wouldn't be only young children and their caregivers who would benefit. Seniors and those with limited mobility would also benefit from proper snow and ice clearing.

Box 9. Snow-clearing helps Duluth, Minnesota, win award[114]

Walking magazine nominated Duluth as one of "America's best walking communities" in 2000, partly on account of how well sidewalks are cleared of snow. Here's the citation: "Residents here don't let the winter ice and snow keep them from walking. Downtown has a heated skywalk system. City ordinances require residents to quickly remove snow from their sidewalks, while the city takes care of public byways and the three-mile lakeshore walk. Along the scenic Skyline Drive walkway, snowshoes and cross-country skis help people exercise all winter. The city is pursuing a plan to connect all its trails.

8. Providing for children and youth on bicycles (and other wheels)

The guidelines in this section directly concern riding bicycles (and in some cases tricycles), which are the main ways young people ride between places on non-motorized wheels. Other wheels, e.g. skateboards and rollerblades, are becoming increasingly popular means of active transport and should be encouraged as such. We have not addressed these other means here because making specific provision for them can be a complex matter. Moreover, attitudes to skateboarding are changing rapidly in some parts of Canada, usually but not always towards greater acceptance.

Often, guidelines for cycling can be adapted for use with other wheeled modes of active transport. However, unlike bicycles, skateboards, rollerblades, and scooters are not classified as road vehicles and their use on roadways should not be encouraged. Often their use on separate bicycle paths makes sense. With more experience as to how best to accommodate their use, development of one or more guidelines for these other wheels will be appropriate and useful.

The guidelines below should be considered in conjunction with bicycle safety programs for children and youth such as the Making Tracks program offered by Active & Safe Routes to School, which teaches active transportation safety skills to children and youth..

Guideline 8. For older children and youth, ensure that destinations that cannot be a walk away are no more than a bicycle ride away.

In transport and land-use planning, bicycle use should have a priority similar to that for walking and wheelchair use. Indeed, for youth (about 13 years and older), bicycling could well have a higher priority to ensure as much non-motorized mobility and independence as possible.

Walking is most suitable for journeys of less than two kilometres (a 25-minute walk by a teenager), while bicycling can be appropriate for journeys of up to five kilometres (also a 25-minute trip by a teenager) and even longer.

Thus, in land-use planning:

- Ensure that pedestrian destinations are less than two kilometres distance (one kilometre for the youngest walkers).[115]
- Ensure that bicycling destinations are less than five kilometres from homes.

Guideline 9. For destinations to be reached by bicycle, provide separate bicycle paths or trails or, if not possible, install bicycle lanes on regular roads.

The best solution for all bicycle users is to have bicycle paths that are not used by motorized vehicles. [116] The bicycle paths can be alongside sidewalks and pedestrian paths or have different routings.

Where sidewalks are wide enough (four metres or more), a section could become a dedicated bicycle path. This is a frequent arrangement in other countries. Aligning bicycle riders with pedestrians rather than with motor vehicles provides for greater safety and more clearly positions bicycle riding as non-motorized transport.

As a last resort, bicycle lanes should be provided on the pavement. Here are some requirements for bicycle lanes on regular roads:

- They should not be too wide (i.e., not more than about 1.5 metres), or else motor vehicles will travel in them.
- When they are passing parked cars, each side of the lane should be marked, with the nearside line a sufficient distance from the parking areas to avoid cyclists being hit by opening car doors.

We say 'as a last resort' fully recognizing that bicycle riders have as much legal right to be on most roads as operators of other vehicles. Our words recognize the North American reality that there is less acceptance of and familiarity with bicycles in regular traffic than in other countries. Many adult cyclists argue that bicycle lanes should receive priority in transport planning because many kilometres of bike lanes can be provided for the cost of installing and maintaining one kilometre of a bike path. This argument may have less merit when children and youth are considered.

One measure of the overall acceptance of cycling could be the extent to which children are carried on adults' bicycles. Where bicycling is common, children aged 10-30 months may be carried as much on adults' bicycles as by stroller. See Figure 2. This can be a convenient and healthful way of carrying a child that may also please the child.

Figure 2. A family riding together in Kansas City, Missouri (children aged 17 months and four years[117]

Making roads safe enough for adults to be confident about riding with young children on their bikes or riding with them could be a reasonable objective for transport planners.

Children under 13 years of age generally ride on sidewalks unless there are bicycle paths. Such riding should be encouraged rather than seen as a nuisance to pedestrians.[118] Early bicycle users may be more likely to be bicycle users as teenagers and adults.

Here are some requirements for bicycle riding on sidewalks:

- Sidewalks should be wide enough (at least 3.0 metres and up to 4.0 metres) to accommodate pedestrians and young cyclists comfortably.
- Even though young cyclists should be walking their bicycles at crossings, ensure that roads are crossed at the same grade as sidewalks, or that ramps are in place. (See Guideline 5).
- Young bicycle riders should be required to give way to pedestrians at all times, to ride at a speed that is comfortable to pedestrians (i.e., less than 10 kilometres per hour), and always to stop and dismount when crossing roads. A bicycle bell or other such sounding device would help to alert pedestrians that a young rider is approaching.

Guideline 10. Ensure that bicycle riders are well provided for at intersections and have sufficient priority for forward movement.

Whether riding on bicycle paths, bicycle lanes or roads, intersections and road crossings pose the greatest challenges for bicycle riders. They are where most collisions occur.

The best solution for bicycle lanes is to provide a space in front of other vehicles with priority of movement for bicycles, whether or not the intersection is signalized. At the least, there should be a clearly marked, separate space for bicycles at the intersection. (See Figure 3 for an example. On a red traffic signal, bicycles stop at the forward line; other vehicles stop at the rear line.)

Figure 3. Priority for bicycles at an intersection in Victoria, BC[119]

The best solution for bicycle paths is to provide separate routing or signalling that guides riders safely through the intersection.

Guideline 11. At destinations, provide secure, convenient bicycle parking.

Bicycle theft is a regrettable impediment to bicycle use today, whatever the age of the rider. Several measures help, including use of older bicycles of evident little value, and double locking with removal of portable parts such as lights, saddles, and even wheels.

The strongest protection can be provided by secure bicycle storage. This should be a routine service provided by schools and other places where young bicycle riders congregate. Locating bicycle storage in a highly visible location increases security and safety for the cyclists. Ideally, there would also be provision of shower facilities and locations to store cycling gear. [120]

Regular bike posts and racks should be positioned away from walls – to allow for maximum use – and always be in highly visible locations.

9. Providing for children and youth as transit users

While transit systems may be restricted to larger cities, some rural communities are initiating limited bus service to enhance transportation networks. Bike racks on buses increases opportunities for active transportation.

Guideline 12. Ensure that every part of a transit system is safe and welcoming to young people, and affordable.

Youth can be heavy users of transit.[121] In some communities, they comprise a significant share of transit users; however, they sometimes may not be welcomed as passengers as adults are for fear that they will be rowdy, vandalize transit property or do something unsafe.

Transit managers could help ensure that children and youth are welcome on their systems by appropriate messaging in schools and on the systems themselves.

For younger teenagers, and especially for younger children who use transit without an adult, safety in relation to strangers is an important feature. Consideration of children's needs when managing transit systems would lead to provision of higher levels of supervision in places where children might be vulnerable. For example, bus shelters should be built with all parts readily visible. Moreover, a transit system that is friendlier to children will also be friendlier to other vulnerable groups.

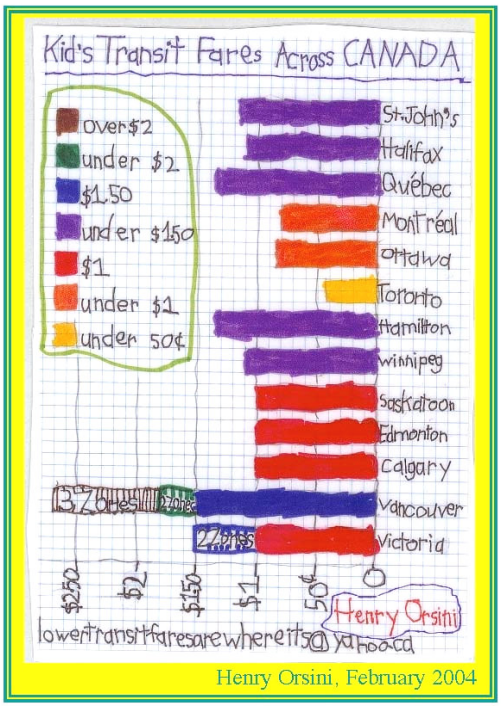


Figure 4. A 9-year-old Vancouver resident's research on transit fares[122]

Children's fares vary greatly, even between transit systems serving adjacent areas. For example, in one place the children's cash fare is 75 cents and in the neighbouring area the children's cash fare is $3.25, the same as the adult fare.[123] (See Figure 4 for the fare rates that a nine year-old investigated in 2004 in an effort to compare his local fare with other cities.)

Low fares for children can be an investment in future regular riders. They can also be of special benefit to families with low incomes.

One way of encouraging the transit habit at an impressionable age could be to provide all high-school students with a no-cost (to them) transit pass. A model could be the kind of

transit pass, known as a U-pass, available without additional charge (though may be included in the student fees) to students of many post-secondary institutions in Canada.

Municipalities and transit systems might want to consider these suggestions carefully and, if they are adopted, engage in appropriate educational campaigns, particularly in connection with providing attractive fares for young people. The result could be a generation more inclined to use transit, and thus an investment in the future. See the recommendations in Box 11 below from a Florida transit study.

Box 11. Consider Teenage Mobility Needs in Transit Service Provision[124]

A survey of transit agencies across the country was conducted to assess industry experience with promoting transit to teenagers. This survey showed that there are three main promotional program types: educational programs, reduced fares and transit passes. Major challenges identified in marketing transit to teenagers included addressing transit's negative social image, gaining the co-operation of the school system, gaining the co-operation of parents, and retaining the program budget.

Recommendations:

1. **Track Teenage Ridership**
2. **Explore External Funding Options**
3. **Form Partnerships with the School System and Other Local Organizations**
4. **Use a Strategic Approach to Developing Marketing Messages, and**
5. **Consider Teenage Mobility Needs in Transit Service Provision.**

Guideline 13. Avoid transfers by routing vehicles where children and youth want to and need to go; make transfers easy where necessary.

A challenging feature of transit systems, especially for younger children, is the frequent requirement to transfer between routes and even between modes. Multiple transfers reduce the likelihood that youth will use transit to travel to work and leisure destinations. Transfers can be avoided by more appropriate routing of vehicles.

Where transfers are nevertheless required, direction signs could be positioned to serve the needs of younger children who might need them, as well as youth and adults.

As in other respects, designing this aspect of transit systems with children and youth in mind can result in systems that are attractive to a wide range of users.

Guideline 14. Examine every aspect of a transit system from the perspective of a parent with a child in a stroller, and make adjustments to meet such a traveller's needs.

Among the most challenged users of transit systems are passengers with young children in strollers. These users have particular difficulties when there are stairs or steps and when vehicles are overcrowded.

For stairs and steps, the remedies are to change the infrastructure or the vehicles. Elevators can be added in subways and other stations. Low-floor vehicles can be used (see Box 12 on the next page). A lower-cost option can be to encourage a culture of showing consideration for persons travelling with young children. Such a culture can be of value in periods of overcrowding, when passengers with young children could be given more space, and offered help for getting on and off transit vehicles.

A transit system that is congenial to an adult pushing a child in a stroller, and to the child, will likely be congenial to a wide range of users.

Box 12. Halifax promotes its low-floor buses[125]

Accessible Low-Floor (ALF) Buses

On February 18, 2007, Metro Transit increased the number of Accessible Low Floor (ALF) bus routes from 13 to 17, in conjunction with other route and schedule changes. Metro Transit is committed to providing accessible services to its clients through its system of accessible low floor buses on both conventional and MetroLink routes, Access-A-Buses, and Harbour Ferries. As more accessible equipment is acquired, Metro Transit will continue to adapt more routes as part of the ALF program.

Seniors enjoy increased mobility with the new ALF buses. The Accessible Low Floor (ALF) bus service provides easier access for existing transit customers, and increased mobility for Metro's accessible community with features including:

* no steps - entry and exit
* bus floor lowers to curb level
* entry access ramp for quick and safe wheelchair and assisted mobility devices
* wheelchair securement provisions for two chairs
* electronically controlled heating system
* extra wide passenger doors
* large electronic destination signs
* improved panoramic windows
* improved, comfortable seating for 36 passengers, with wider aisles

10. Providing for journeys to and from school

> *If policymakers want to greatly increase the number of students walking to school, long-term strategies must encourage schools to be located near students. Addressing the spatial distribution of students and schools requires coordination of school, land use, and transportation planning.*[126]

Providing for journeys to and from school is usually regarded more as a matter for school boards. Municipalities also have an interest, because of the advantages to the community of having less motorized transport, and having children and youth who may sustain practices of active transport into adulthood. Actions by municipalities can have an impact on travel to and from school. Opportunities to collaborate with school boards are afforded through School Travel Planning (STP). Information about School Travel Planning in Nova Scotia is available at http://saferoutesns.ca/index.php/planning/the-program-five-easy-steps/. Information about STP in Canada is available at http://www.saferoutestoschool.ca/schooltravel.asp.

More person-kilometres may happen in school buses in Canada compared to the urban transit systems.[127] Where distances to school are too great for walking or cycling, and there is no feasible transit alternative, school buses can be a more environmentally sound and more convenient alternative than being driven or driving to school.

However, school buses present several problems. Children may stay in them too long because of the way routes are arranged. Air quality inside school buses may be poor. Time spent in buses is time not spent walking or cycling, or achieving independence by travelling on the regular transit system.

School buses are made necessary by large school catchment areas, which in turn may arise because residential densities are low or schools are large, or both. Distance to school and residential densities are key factors that influence active commuting to school.[128]

Land-use and transport planners can help reduce school bus travel by ensuring higher residential densities, and also by routing transit so that it can be readily used for travel to and from school. School boards and municipalities can also explore options for reducing school bus routes through strategically placed infrastructure and schools that enable students to walk or cycle safely. Rising fuel costs and increasing school board transportation budgets provide additional incentives for collaborative efforts regarding school travel demand management. Where available, transit routes could be rearranged so transit can be readily used for travel to and from school.

Parents could be encouraged to take their young children to school by regular transit by not requiring them to purchase two fares to do it: one to the school and one to their place of work or back to home. Transit systems that allow a fare to apply for a fixed period af-

ter first use, rather than for a particular trip, are more convenient for dropping off children.

The guidelines in this section complement the vision of Health Promoting Schools.[129] See Box 14.

Guideline 15. Help ensure that school policies and practices favour walking, cycling and other modes of active transport for trips to and from school, and also regular public transport where this is appropriate and possible.

Recognizing the transportation responsibilities of school boards and the concerns regarding physical activity of children and youth, it would seem advisable for school boards and municipalities to work together towards enabling students to travel through active means of transportation. School boards could advance this work through the creation of active transportation policies. This would include, for example, the provision of bicycle racks and storage at all schools, as well as policies that enable students to travel to school using a skateboard.

Children can spend long periods of time in buses, more than an hour in some cases, although there are few good relevant data. The Halifax Regional School Board's 'Pupil Transportation Policy' indicates that "where possible," school-bus journeys should not last longer than an hour (i.e., two hours a day).[130] Nevertheless, more than four hundred students have school bus journeys that are longer than one hour each way with some students (166) travelling prior to 7 a.m.

Considering the potential for poor in-vehicle air quality noted in Section 3.4, a limit of 20 minutes per trip, or 40 minutes per day, could be set as a desirable goal. Achieving this could be costly in terms of the need for additional buses and operators, though efforts to increase opportunities for active commuting to school may offset some costs. On the other hand, given the evidence noted on air quality in school buses, not reducing children's exposure to pollutants in these vehicles could be more costly in the long run.

Alternatives would be to design school buses so that there is little infiltration of polluted air or to ensure adequate ventilation. See Box 13 for a list of recommendations from a New Brunswick study.[131] However, these options would not reduce the time children spend in buses, forfeiting the opportunity for children to exercise or interact with the natural world.

Yet another alternative would be to reduce the availability of school buses, especially for older students where shorter distances are involved. The Halifax Regional School Board's Pupil Transportation Policy speaks to eligibility for travel by school bus of secondary school students where the distance is at least 3.2 kilometres (or less if there is room on a bus). For elementary students, the current distance is 2.4 km.[132] Annapolis Valley

Regional School Board transports students who live more than 3.6 km from their school, regardless of their grade.[133] This is the policy of most Nova Scotia boards with the exception of the Cape Breton Victoria Regional School Board which provides bussing for elementary students who live more than 1.0 km. from the school or bus stop and for junior high and secondary students who live 2.5 kilometres from their school or bus stop. The Student Walking Distance Review, a report of the Nova Scotia Department of Education recommends that the distance for secondary students be 3.0 km., and the distance for elementary school students be 1.6 km.[134]

At a minimum, and where feasible, bus routes could be arranged so that a child does some walking at one or both ends of the school bus journey. Presently, standards concern the *maximum* distance of school bus stops from homes: no more than about 0.8 kilometres. From a public health perspective, it could be more healthful to set these as *minimum* rather than maximum distances, and then to require that buses discharge students at least this distance from schools if this can be done safely.

Transportation of students by school boards is recognized in the Education Act [135] which states:

Transportation of students

6 (1) A school board pursuant to clause 64(2)(g) of the Act shall make provision for the transportation of students either by providing the service itself, or making arrangements with some other person for such service, if

(a) one or more students reside more than 3.6 km from the school to which they are to be transported; or

(b) one or more students, because of special needs, require transportation irrespective of the distance; and

(c) the school board determines that transportation of the students is necessary.

Box 13. Recommendations from New Brunswick school bus study [136]

- Eliminate bus idling
- For short bus routes, consider reducing the number of stops or relocating stops to areas of lower traffic density
- Consider re-engineering bus exhaust pipes to extend to the left rear-end of the bus, so that exhaust will not be emitted on the same side of the bus as the doors (an even better location to release exhaust is from a stack above the back of the bus)
- Investigation of alternative methods of the ventilation of the bus cabin is needed and air-filtering systems should be considered
- It is strongly recommended that retrofitting of buses be given priority to reduce emissions
- Whenever a new bus is purchased or contracted, only low emission vehicles should be chosen
- Avoid caravanning. Buses leaving school in the afternoon should leave at staggered departure times to avoid tailgaiting.

Guideline 16. For younger children, help arrange walking school buses and other means of supervision.

This guideline applies mainly to regular journeys to and from school, kindergarten, and day care, and might be best arranged through those organizations. It can also apply less regularly for trips to neighbourhood events and birthday parties, and then would be arranged directly by parents and caregivers. In all cases, municipalities could offer encouragement and even facilitation.

Figure 5. A walking school bus at Maurice Cody Public School, Toronto, Ontario

One method that is commonly used for supervised active transportation is the "walking school bus." (See Figure 5). The essential feature of a walking bus is a line of children, even holding a rope if they are under five years, led by and followed by one or more adults with perhaps another one or more adults roving the line. Older children and youth are an option as leaders as well. An example of this is the Westvale Public School in Waterloo, Ontario. Details of the student-led walking school bus may be found at http://www.saferoutestoschool.ca/downloads/guide/wsb_westvale_trailblazers.pdf. A walking bus shares responsibility for children's travel and provides social interaction for children and their caregivers. It helps teach traffic safety. Above all, it adds to the opportunities for children to travel by walking.

Walking school buses are promoted by the national Active & Safe Routes to School program, which in is coordinated by the Ecology Action Centre (see Box 15).

Box 14. Health Promoting Schools

Health promotion in schools is not just about encouraging children and young people to eat well and to exercise; it encompasses a much broader approach, which includes promoting the physical, social, spiritual, mental and emotional well-being of all students and staff.

Schools in Nova Scotia are working hard to have health promotion as an important aspect of their every day life. Students whose schools promote good health and provide programs and services to the school population are more effective.

A strong focus on health contributes to higher academic achievement and increases educational equity for all students. The many interventions that are a part of this approach can help children and youth live healthier lives, learn and develop to their fullest potential, and to establish productive and satisfying relationships.

Ultimately, this comprehensive school health approach can reduce or defer health care and other human services costs.

Nova Scotia Health Promoting Schools is a partnership led by the Department of Education and the Department of Health Promotion and Protection, and comprising Nova Scotia's eight school boards, the Mi'kmaw Kina'matnewey, the province's district health authorities, and community members.

Excerpt from the following web site: http://nshps.ca/about

Box 15. Active & Safe Routes to School in Nova Scotia

Active & Safe Routes to School (ASRTS) is a comprehensive approach to increasing the use of active transportation by children and youth, and making it safer for them to do so. The Active & Safe Routes to School vision is a Nova Scotia where walking, cycling or using other forms of active transportation is a popular and safe choice made by children, youth and their families for the trip to school and other places kids go. www.saferoutesns.ca

It aims to:

- Reduce greenhouse gas emissions and air pollution from cars
- Increase physical activity
- Increase traffic safety

Overall, ASRTS fosters community cohesion and produces safer, calmer streets and neighbourhoods for active transportation. ASRTS is coordinated in Nova Scotia by the Ecology Action Centre in partnership with the Nova Scotia Department of Health Promotion and Protection as part of the Active Kids Healthy Kids Initiative.

ASRTS has promoted active transportation to school across Nova Scotia since 2002. During this time it has influenced over 200 schools with some aspect of the program.

ASRTS offers in-depth support, called School Travel Planning, to schools looking to make walking and cycling to school safer for more students. School Travel Planning is a five-step process taking place over a one to two year period:

Step 1: Identify a Program Team Step 4: Implement and Celebrate
Step 2: Gather Information Step 5: Evaluate
Step 3: Create an Action Plan

ASRTS works in policy-development and advocating for places for walking & wheeling. It also offers various school and community initiatives:

Walking & Wheeling
- Walking/cycling School Buses
- WOW – We Often Walk (or Wheel)

Safety
- Making Tracks: active transportation safety skills education
- Neighbourhood Pace Car: anti-speeding initiative

Special Events
- International Walk to School Month
- Winter Walk Day

11. Reducing transport's adverse impacts on children and youth

The guidelines in this section are directed towards reducing all adverse traffic impacts on young people (and others), whether or not they are in a vehicle. Children and youth appear to be particularly vulnerable to traffic impacts. Therefore, reducing traffic impacts could have an especially beneficial effect on young people. Similarly, communities designed around the automobile may be less child- and youth-friendly than communities with a low dependence on automobile use. To the extent this applies, it may follow that all steps taken to reduce road traffic can be steps in the direction of child- and youth-friendly planning.

It is not a coincidence that implementation of the guidelines in this section (and some of the other guidelines) could make a substantial contribution to progress towards sustainable transport and particularly towards a transport system that requires reduced levels of fossil fuel use and produces lower emissions of greenhouse gases (GHGs). Transport that meets young people's needs is generally more sustainable than transport that does not meet their needs. Meeting young people's needs would help Canada meet its international obligations to reduce GHG emissions.

Guideline 17. Where destinations cannot be reached by foot, bicycle or transit, arrange land uses so that in-car time is reduced.

To the extent that children's travel by car is undesirable—because of poor in-vehicle air quality, and opportunities lost to exercise, gain independence, and experience neighbourhoods—land-use and transport planners should help ensure that the distances children travel by car are kept as short as possible.

The desirability of compact urban form applies even where automobile use is required because, other things being equal, a more compact urban form is associated with shorter journeys.

Mixing uses can also help reduce travelling time. When uses are mixed, destinations are likely—although not certain—to be nearer.

Finally, specific knowledge of where children and youth travel—as could be mapped for journeys by foot or wheelchair in respect to Guideline 4—can contribute to locating facilities in ways that reduce travel time. Such facilities would include recreation centres and parks, and even shopping malls, as well as after-school use of schools.[137]

Guideline 18. Post and enforce much lower speed limits, particularly in urban areas.

Other things being equal, collisions are more likely to occur and more likely to be severe when speeds are high. Moreover, speeding traffic, and other motorized vehicles, frighten cyclists and pedestrians and generally reduce the congeniality of streets, rural roads, and paths. Major reductions in maximum speeds could significantly improve the quality of life for everyone, while having only a relatively small effect on overall journey times for motorized vehicles.

To provide a better, safer environment for children and youth, and also provide a better urban environment generally, maximum traffic speeds should be much lower than are presently permitted. Based on the information in Section 3.3, reasonable limits might be 40 kilometres an hour on arterial roads, and 25 kilometres an hour on other roads. In this way, damage might be limited to scrapes and broken bones. Achievement of significant changes in traffic speed may require additional measures. The Pace Car program (see Box 16) is an initiative that strives to reduce speeding on neighbourhood streets. Further support for this guideline can be found in the *World Report on Child Injury Prevention.*[138]

Box 16. The Pace Care Program Helps to stop speeding[139]

The Pace Car program helps stop speeding on neighbourhood streets. By agreeing to drive within the speed limit, cars become “mobile speed bumps,” slowing the traffic behind them. Drivers agree to be more aware of and courteous to other road users, especially pedestrians and cyclists. When drivers sign the Pace Car pledge they receive two Pace Car emblems to place on the back of their cars. Lawn signs are also available to residents to let others know they are passing through a Pace Car Community where everyone is expected to drive the limit. Communities form Pace Car Teams and receive support from Active & Safe Routes to School in launching the program.

First piloted in late 2006, the program has grown to 20 schools or communities. Pace Car is an initiative of Active & Safe Routes to School of the Ecology Action Centre in partnership with Canada’s home, car and business insurers and the Nova Scotia Department of Transportation and Infrastructure Renewal. Pace Car’s popularity continues to grow; new schools and communities are signing on every month. www.pacecar.ca

This may be the most controversial guideline of the present set because it speaks to a radically different relationship between motorized vehicles and the urban environment. The speed at which vehicles move becomes more strongly subordinated to other requirements, notably (but not only) those of children and youth. Nevertheless, some Canadian municipalities have established lower speed limits. The city of Airdrie, Alberta has set a city-wide speed limit of 30 km/hour.[140]

In Europe, low speed limits in residential and other areas are common. However, speed limits on urban arterial roads are as high as or higher than they are in Nova Scotia (see Table 5).

It's not necessary to go to Europe to experience a community with low speed limits. Since 1982, there has been a 30-kilometre/hour speed limit on all municipal roads in Airdrie, Alberta (33 kilometres north of Calgary; 2009 population, 38, 091).

Children in cars may not be as secure as adults (because seats and seatbelts are designed for adults) and they may be more fearful of speeds. Moreover the consequences of collisions may be more devastating with respect to children in terms of years of life lost, years of life enduring major disability, and years of life suffering from major trauma. An additional point is that the ability to view and reflect on the scenery passing by is reduced with speed. Thus, a child travelling in a slowly moving vehicle can gain more familiarity with a neighbourhood, although this is much less than if the route were walked or cycled.

Table 5. Traffic speed limits in Europe and Nova Scotia (kilometres/hour)[141]

	Residential areas	Traffic calming zones	School areas	Pedestrian streets	Arterial roads
Austria	10	30, 40		6	
Denmark	30	30	30	30	60, 70, 80
Finland	20, 30, 40	30, 40	30, 40		60, 70
Germany		6, 30	30	6	60, 70
Greece	30	20, 30			70, 80
Netherlands	30	30	30		70
Portugal					
Spain					
Sweden	30	30	30	30	70
UK	32	32	32		64, 96
Hungary	20, 30	20, 30			60, 70, 80
Iceland	50	30			60, 70
Latvia	20		30, 40		
Lithuania	50	40			60
Norway	30, 40	30	30		60, 70
Romania	30				60
Slovakia	20, 30	20, 30		40	60, 80
Slovenia		20, 30, 40	40		
Switzerland	20	30			60, 70
Nova Scotia	*50*	*50*	*50*		*80*

Guideline 19. Do what is possible to reduce amounts of motorized traffic generally and minimize its adverse impacts.

Actions that may reduce the amount of motorized traffic overall include:

- Discouraging car ownership (in that ownership is a major factor determining car use).[142,143]
- Discouraging car use when a car is owned.
- Facilitating alternatives, including provision of pedestrian and bicycling infrastructure and provision of adequate, comprehensive public transport.
- Ensuring that shared-use paths and trails give priority to active transportation modes.
- Passing legislation that prohibits the use of all-terrain vehicles by children under 16 years of age.[144]
- Giving priority to active transportation infrastructure.
- Deploying land-use arrangements that support low levels of car ownership and use, chiefly high residential densities but also a mix of uses and other arrangements that support non-motorized travel and transit use.

Another action that a municipality can take is to use or require the use of low-emission rather than regular diesel vehicles for urban transit or, where possible, electric vehicles.

Electric vehicles are more 'at home' in the city because they emit almost no pollution where they move (and little elsewhere if the electricity is generated from renewable resources).

Diesel-powered buses, by contrast, can be major sources of pollution along urban and other roads. Indeed, a regular diesel bus carrying fewer than six passengers can produce more pollution per person-kilometre than the average single-occupancy automobile.

Electric vehicles—trolley buses, streetcars, and electric trains of various kinds—are usually more expensive than buses because of the special infrastructure required; however, for given levels of ridership, they generally have lower operating costs. High settlement densities are required to justify electric transit over buses.

Electric vehicles can also be more suited to urban situations because they can be quieter than buses. Moreover, they often provide a more comfortable ride. Their evident infrastructure can be useful as clues to the availability of transit service when negotiating unfamiliar parts of a city.

Lower air pollution and noise, and visibility of electric transit can all be conducive to children's health and well-being. In a city where children are put first, transit might make more use of electric vehicles.

Where installation of infrastructure for electric vehicles is not possible, the best use should be made of low-emission diesel buses, including hybrid buses, which can result in considerably lower pollution along bus routes (although in some cases higher fuel use and higher rates of emission of greenhouse gases).

Freight transport, notably trucking, is a major source of pollution and noise in urban areas. Movement of more goods by train could be beneficial in this respect, although the first and last few kilometres of each freight movement (usually in an urban area) might still have to be performed by truck, except where major shippers are involved and have their own rail sidings.

Finally, a municipality can seek to influence the way freight moves. It can encourage use of rail for freight, and use of electric vehicles, including hybrid vehicles, where road freight must be used.

Hybrid trucks, which use electric motors to supplement their diesel engines, are coming onto the market. From a child- and youth-perspective, their use can be encouraged as they have considerably lower fuel consumption and consequent lower emissions of pollutants. Moreover, within limits, they can operate entirely on battery power, which would be desirable, for example, when operating near schools.

Once again, if the needs of children and youth were put at the forefront, shifts to rail and adoption of new technologies may be implemented earlier.

PART III. APPLYING THE GUIDELINES

12. Barriers, and actions to overcome the barriers

Table 6, beginning on the following page, lists several potential barriers to implementing a set of guidelines such as those set out here. The barriers are grouped into three main challenges: 1. Increase children's active transport for the trip to school, 2. Increase active transport for children on non-school trips, and 3. Reduce adult automobile and motorized vehicle use (and thus children's exposure in and outside vehicles). For each barrier, there are suggestions for how they might be overcome, and which stakeholders may be in a position to take action.

Table 6. Barriers, actions to overcome barriers, and who might be able to act

BARRIERS IDENTIFIED	*ACTIONS RECOMMENDED TO OVERCOME BARRIER*	*WHO IS TO ACT*
Challenge 1: Increase children's active transport for the trip to school		
Lack of sidewalks and paved shoulders.	Construct sidewalks on safe routes to school. Retrofit roads by adding paved shoulders.	Municipality Dept. of Transportation & Infrastructure Renewal NS HPP
Lack of bike paths on route to school.	Construct paths that lead to schools.	Municipality Community Trails Committee NS HPP
Traffic safety fears.	Implement Walking School Bus programs to help children learn safe walking behaviour and provide adult supervision for school trips. Create disincentives for car use. Educate drivers to respect cyclists and pedestrians. Educate cyclists and pedestrians on safety skills.	School School board Municipality Dept. of Education NS HPP Ecology Action Centre Bicycle NS
Neighbourhood safety fears and fear of abduction.	Implement Walking School Bus programs (Active and Safe Routes to School). Facilitate community development. Encourage more 'eyes on the street'. Promote Neighbourhood Watch.	School School board Municipality Police
Lack of parental awareness regarding short- and long-term health impacts of driving their children rather than supporting active transport.	Introduce curriculum material that helps children to understand links between transport, physical activity, and health and then empowers them to discuss these issues with their parents. Introduce awareness strategies to inform the general public. Introduce active transportation concepts through early years programs and day care centres.	Department of Education School board NS HPP Public Health
School funding that encourages construction and use of large schools with more traffic congestion than smaller schools.	Work with the Dept. of Education, school board trustees and planners towards developing land-use and transport solutions that encourage active transport. Facilitate community use of schools.	Department of Education School board Public Private Partnership companies that build some schools Dept. of Transportation and Infrastructure Renewal (builds schools)
Kiss 'N Ride facilities at schools that reduce congestion but encourage car use.	Provide disincentives for dropping children by car while maintaining safe school sites.	School board School Traffic Authorities Municipal Planners
Educators who do not see transport to school as their responsibility.	Ask school boards, principals and teachers to reinforce messages regarding active transport and make safety education mandatory.	School board School Dept. of Education NS HPP
Parents who pressure school boards for more bussing so that their children will not have to walk or cycle to school.	Introduce education and public awareness programs that emphasize positive health outcomes from physical activity and reduced motorized transport.	District health authority School board NS HPP

Challenge 2: Increase active transport for children on non-school trips		
Lack of awareness across sectors regarding significance of links between land-use planning, transport, and children's health.	Develop child-friendly planning guidelines. Provide professional development and formal education at college and university levels reinforcing links between land-use planning, transport planning, children, and health.	Departments of Education, and of Service Nova Scotia and Municipal Relations
Lack of sidewalks and bicycle paths to destinations where children like to travel.	Identify destinations frequented by children and create safe routes with sidewalk and bicycle paths; consider children's travel patterns in planning processes.	Municipality
Neighbourhood design that is not conducive to walking, wheelchair use, and cycling (e.g., lack of sidewalks, indirect routes, traffic noise).	Give greater attention to infrastructure that supports physical activity when building new neighbourhoods and retrofitting old ones.	Municipality Department of Service Nova Scotia and Municipal Relations
Recreation programs that are not located within easy walking and cycling distance.	Consider and promote options for carpooling and transit when recreation facilities cannot be located within the community.	Municipality
Security fears.	Conduct public awareness campaigns regarding actual vs. perceived risk of abduction. Increase efforts to promote active transport leading to more 'eyes on the street'. Support Neighbourhood Watch programs.	Municipal police agency RCMP Municipality
Traffic safety fears and concerns about other motorized vehicles.	Design routes to children's preferred destinations that help keep them away from busy roads. Support traffic safety programs. Deploy infrastructure that slows down traffic, and reduces the amount of road space dedicated to automobile-use. Restrict high volume shared-use paths and trails to non-motorized vehicles.	Municipality Department of Service Nova Scotia and Municipal Relations NS HPP
Lack of parental awareness regarding short- and long-term health impacts of motorized transport, ATV use, and lack of physical activity.	Introduce public awareness and education programs (see Challenge 1).	District health authority NS HPP
Time pressures and trip-chaining by parents.	Expand teleworking to alleviate time-pressures for parents and advocate for flexible work hours.	Parents Employers

Challenge 3: Reduce adult automobile and motorized vehicle use (and thus children's exposure in and outside vehicles)		
People who live far from where they work.	Increase opportunities for higher 'live-work' ratios: in new and older developments.	Municipality, parents, employers
Transport needs that are complex and cannot be handled adequately by existing transit services.	Require dedicated, sustainable financing for expansion of transit	Service Nova Scotia and Municipal Relations Municipality Conserve NS
Adults who do not consider the impact of their vehicle use on their health or on the health of children and youth.	Provide education and public awareness strategies regarding transport and children. Reframe thinking from time-saving measures to health-saving measures. Introduce incentives and disincentives favouring sustainable transport.	District health authority Service Nova Scotia and Municipal Relations Ecology Action Centre NS HPP Conserve NS
Highways and busy arterial roads that bisect walking and cycling routes, causing them to be seen as unsafe or unpleasant.	Give higher priority to walking (including wheelchair use) and cycling as modes of transport. Design routes that are safe and pleasant for pedestrians and cyclists.	Municipality Department of Transportation and Infrastructure Renewal
Adults and youth who feel they lack transport options beyond the car.	Design new developments that are less auto-dependent.	Municipality
Multiple transfers on transit.	Increase financial support to make transit more accessible and convenient for users.	Department of Service Nova Scotia and Municipal Relations Municipality

13. Involving children and youth in identifying and resolving problems

> *To increase the chances that youth participation will be a positive experience and achieve significant community change, planners looking to create processes should select 'win-win-win' projects that clearly serve the interests of planners, youth, and the community. Such projects would be of direct concern to youth, likely achieve improved design and implementation with youth involvement (and thus be attractive to planners) and be less controversial within the community.*[145]

Children and youth already have a lot of information and ideas about land-use and transport, especially the latter. Children and youth often see the world differently from adults, and do not always share their attitudes. Even though young people necessarily pick up a lot from everyday life, formal education about land-use and transport can help them learn about some of the more complex relationships. For land-use, the Canadian Institute of Planners has developed a good resource that can help planning professionals and educators provide instruction about urban planning and community development. It is called, *A Kid's Guide to Building Great Communities: A Manual for Planners and Educators*.[146]

There is no equivalent resource for transport issues, and the *Kid's Guide* only briefly touches on the powerful interactions between transport and land-use. However, there are teaching resources available on transport. A good example is *You Can Clean the Air*, a CD-ROM produced by the Region of Waterloo (see Box 17).

Box 17. Region of Waterloo's statement concerning its teaching resource for use with Grade 3 students: *You Can Clear the Air*[147]

The Region of Waterloo wants to encourage the use of alternative transport, moving away from total dependence in this Region on motorized personal vehicles—cars, vans, trucks, SUVs, etc.—and moving toward a community where more people walk to where they want to go, bike, take the bus, or carpool. The expected outcome of this classroom program from the Region's perspective (Planning, Housing & Community Services and the Transportation and Environmental Services Departments) is to increase the knowledge, skills, and understanding among Grade 3 students with respect to:

- transport options available, including driving, busing, biking, walking, and choosing the alternative best suited to specific needs;
- air quality and the impact they can have as individuals and groups on local and regional air quality through their own transport choices;
- understanding the impact of transport choices on air quality within our communities, Ontario, and globally;
- understanding the relationship of air pollution to personal and environmental health;
- understanding differences and the relationships and links between air quality, climate change, ozone depletion, and environmental and human health, and how transport choices impact these issues; and
- understanding the relationship between transport and land-use planning/design of urban communities.

What may be needed are resources suitable for high-schools that could help students extend their thinking about land-use and transport. Examples of such resources are available at http://www.ywalk.ca/step_project.asp.

With or without formal education about the issues, there is a need to involve young people more in transport and land-use planning. There are at least three good reasons for doing this.

The first is that there is a set of problems concerning transport and young people, and young people who are affected can contribute to solutions.

The second is that some transport modes involve substantial numbers of young people. A large share – perhaps the majority – of all walking and bicycling trips are made by young people, and a significant proportion of transit trips are made by young people.[148] Therefore, it's a good strategy to involve youth in figuring out how things can be improved. (See Box 19).

The third reason is that transport and land-use provide good issues around which to introduce young people to the practice of government and democracy. Early involvement in government is becoming a recognized tool for education about these practices. Transport and land-use issues often affect young people directly in ways they can feel quite strongly about, and the competing positions and trade-offs are usually easy to grasp.

The United Nations Children's Fund (UNICEF), through its Child-Friendly Cities program, places much importance on involvement of young people in local decision-making. Indeed, such involvement comprises the first two items in the program's definition of a child-friendly city (see
Box 18).

Box 18. UNICEF's concept of a Child Friendly City[149]

A Child Friendly City is a local system of good governance committed to fulfilling children's rights. It is actively engaged in fulfilling the right of every young citizen to:

- Influence decisions about their city
- Express their opinion on the city they want
- Participate in family, community and social life
- Receive basic services such as health care and education
- Drink safe water and have access to proper sanitation
- Be protected from exploitation, violence and abuse
- Walk safely in the streets on their own
- Meet friends and play
- Have green spaces for plants and animals
- Live in an unpolluted environment
- Participate in cultural and social events
- Be an equal citizen of their city with access to every service, regardless of ethnic origin, religion, income, gender or disability.

Box 19. Glace Bay Youth Action Committee provides input to Cape Breton Regional Municipality Active Transportation Plan

The Glace Bay Youth Action Committee met with the active transportation consultants and active transportation committee members to lead them on a “walkabout” of their community. The youth took turns leading segments of the walk and asked the consultants to rate the segment that had been traversed. Then the youth offered their rating and suggestions for improving the route. The youth have plans to adopt a park in their community and are working to engage youth in other communities to be active participants in creating active living environments. Their views were incorporated into the Cape Breton Regional Municipality Active Transportation Plan.

14. Towards implementation of the guidelines

The key guidelines are the first two, set out in Section 6.

Guideline 1. In transport and land-use planning, the needs of children and youth should receive as much priority as the needs of people of other ages and the requirements of business.

Guideline 2. Within each municipality, designate a staff member or council member, or both, as responsible for bringing the perspectives of young people to consideration of transport and land-use planning issues.

The first steps towards application of any of the other guidelines could be adoption by the municipal council of a resolution that embodies the spirit of Guideline 1 accompanied by a by-law that appoints the official contemplated by Guideline 2. Among the first tasks of such an official would be to consider the issues concerning involvement of young people raised here in Section 14.

These actions would be only the beginning of the process of making the municipality child- and youth-friendly, a process that could take several years.

Implementation of the guidelines could be facilitated further by provincial recognition or endorsement. Recognition could involve posting the guidelines at the government website. Endorsement could involve provincial approval of the guidelines, or some of them.

A stronger step would involve adoption by the provincial government of an appropriate 'Statement of Provincial Interest Regarding Children and Youth' as provided for in Section 193 of the *Municipal Government Act*.[150] In doing this, the government would be deeming the welfare of children and youth, as it might be affected by land-use and transport planning, to be a matter of provincial importance for which municipalities and other planning agencies must have regard. Some or all of the present guidelines could be incorporated into the Statement.

If such a Statement were adopted it would in effect become policy to be followed by all municipalities and other land-use and transport planning agencies in the province. Such a requirement might seem to some to be excessive. Others would argue that protecting the interests of young people should be a paramount societal responsibility. In our consultations with municipal officials, we were told that they have many sets of guidelines they could attend to, but they are so busy that only the ones they *have* to attend to get their attention. Land developers are not likely to consider the needs of children and youth unless provincial and municipal governments do so themselves.

If there were no action by the provincial government, it could still be in order for municipalities to endorse or adopt the guidelines, or a version of them, as part of a Municipal Planning Strategy, provided for in Sections 212-214 of the *Municipal Government Act*, most particularly Section 214(1)(q). Then, the concerns for and of children and youth would be at the forefront of the municipality's approach to its land-use and transport planning responsibilities.

An element in further development of an implementation strategy would be the conduct of a proper legal analysis of required municipal and provincial legislation and its implications.

A youth-oriented initiative in Nova Scotia in 2003 was the 'Pathways for People Active Transportation Tour' that visited eleven communities and stimulated considerable activity. The document produced following the Tour is in Box 20. Legacies of the Tour include the Ecology Action Centre's 'Pathways for People" program and its quarterly publication *Walking and Wheeling*.[151]

Box 20. Pathways for People, Nova Scotia [152]

The Nova Scotia Department of Health Promotion and Protection published *Nova Scotia Pathways for People: Framework for Action*, a document that provides an overview of active transportation (AT) in the province. It outlines the need for active transportation, the benefits, recent events, the state of existing research and provides a vision for active transportation in the province. The document states that:

"Nearly every sector of our society and economy stands to gain by embracing and promoting AT. The health sector knows that choosing an active form of transportation can help alleviate obesity and disease and contribute to overall health…The energy sector understands that using human power helps retain our planet's precious non-renewable resources. The environmental movement is committed to cutting emissions from cars to slow down global warming and make our air safer to breathe. City planners and engineers are investigating ways to cut down on traffic congestion and maintain green space in our cities. In addition, we all care about greater safety and security while commuting or while moving around our communities."

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End Notes

[1] This quotation is from the Active Kids Healthy Kids web site, available at the first URL below. See also the Active Kids Healthy Kids Strategy of the Nova Scotia Department of Health Promotion and Protection available at the second URL below.
1. http://www.gov.ns.ca/hpp/pasr/akhk-overview.asp. Retrieved April 8, 2010.
2. http://www.gov.ns.ca/hpp/publications/AKHK-Strategy.pdf. Retrieved April 8, 2010.

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[3] The second epigraph is from 'The Politics of Happiness' by Susan Ives based on a conversation with Enrique Peñalosa, in *Land & People*, Fall 2002, available at the URL below (see also Box 7).
1. http://www.tpl.org/tier3_cd.cfm?content_item_id=10710&folder_id=2225. Retrieved April 8, 2010.

[4] This is a comprehensive physical activity strategy for children, youth and families in Nova Scotia. It was released in Autumn 2007 by the Nova Scotia Department of Health Promotion and Protection. It is available at http://www.gov.ns.ca/hpp/publications/AKHK-strategy.pdf. Retrieved April 8, 2010.

[5] Further information on Health Promoting Schools may be found at http://www.gov.ns.ca/hpp/healthy_development/health-promoting-schools.asp. Accessed April 8, 2010.

[6] This report is available at http://www.gov.ns.ca/tran/hottopics/crosswalksafety/CrosswalkSafetyTaskForceFinalReport.pdf. Retrieved April 8, 2010.

[7] The Environmental Goals and Sustainable Prosperity Act is available at http://www.gov.ns.ca/legislature/legc/bills/60th_1st/3rd_read/b146.htm. Accessed April 8, 2010.

[8] Nova Scotia's Climate Change Action Plan and other relevant documents may be accessed at http://www.gov.ns.ca/energy/energy-strategy/. Accessed April 8, 2010.

[9] See the Sustainable Transportation Strategy for the Department of Transportation and Infrastructure Renewal. Retrieved April 8, 2010 from http://www.gov.ns.ca/tran/hottopics/SustainableTransportationStrategy2008.pdf.

[10] See two key documents on age-friendly planning: 1) WHO (2007). *Global age-friendly cities: A guide.* Available at http://www.who.int/ageing/publications/Global_age_friendly_cities_Guide_English.pdf, and 2) Federal/Provincial/Territorial Ministers Responsible for Seniors. (2007). *Age-friendly rural and remote communities: A guide*. Available at http://www.phac-aspc.gc.ca/seniors-aines/publications/public/healthy-sante/age_friendly_rural/index-eng.php. Retrieved April 8, 2010.

[11] The report on the *Kids on the Move in Halton and Peel* project is available at the URL below. Peel is the administrative urban region immediately west of Toronto, embracing the Cities of Brampton and Mississauga, and the Town of Caledon. Halton region is immediately west of Peel. It includes the City of Burlington and the Towns of Halton Hills, Milton, and Oakville. 1. http://cst.uwinnipeg.ca/completed.html#child_friendly. Retrieved April 8, 2010.

[12] See Herold, M & Kaye, K (2001) Rural youth and mobility: An emerging rural transportation issue. Rural Transportation Series No. 2.

[13] See Robertson-Wilson, J, Leatherdale, S & Wong, S (2008). Social-Ecological correlates of active commuting to school among high school students. *Journal of Adolescent Health*, Volume 42, Issue 5, 486-495; and Papayo, R, Gauvin, L (2008). Proportions of students who use various modes of transportation to school in a representative population-based sample of children and adolescents, 1999, *Preventive Medicine*, 46, 63-33;

[14] See Loucaides, C, Plotnikoff, R, & Bercovitz, K (2007). Differences in the correlates of physical activity between urban and rural Canadian youth, *Journal of School Health*, April, Vol. 77, No. 4, 164-170.

[15] See, for example, Kmet, L & Macarthur, C (2006). Urban-rural differences in motor vehicle crash fatalities and hospitalization rates among children and youth. *Accident Analysis and Prevention*, 38, 122-127.

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[25] See Pages 28-29 and Page 54 of Raine RD, *Overweight and obesity in Canada: A population health perspective*. Canadian Institute for Health Information, Ottawa, August 2004, available at the URL below. See also Pabayo R, Gauvin L. Proportions of students who use various modes of transportation to and from school in a representative population-based sample of children and adolescents, 1999. *Preventive Medicine* 2008;46(1):63-66.
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[28] Shields, M, *Measured Obesity: Overweight Canadian children and adolescents.* Statistics Canada. Retrieved April 8, 2010 from www.statcan.ca/english/research/82-620-MIE/2005001/articles/child/cobesity.htm.

[29] This is an excerpt from the Canadian Fitness and Lifestyle Research Institute. (2006). *Physical activity of Canadian youth — An analysis of 2002 health behaviour in school-aged children data. The source for this data was referenced as Craig, CL, Cameron, C, Russell, SJ, & Beaulieu, A (2001). Increasing physical activity: Supporting children's participation, Ottawa, ON: Canadian Fitness and Lifestyle Research Institute.* Retrieved April 8, 2010 from http://www.cflri.ca/eng/statistics/surveys/2006HBSC.php.

[30] For children aged 4-11, this statement is based on a report on the National Longitudinal Survey of Children and Youth in *The Daily* (Statistics Canada), October 18, 2002, available at the first URL below. It states that only 38% of obese children and 47% of non-obese children were active (1998/99 survey). For youth aged 12-19, the statement is based on analysis of data from *Health Indicators*. Statistics Canada, vol. 2004, No. 1, available at the second URL below. According to information provided by the Canadian Fitness and Lifestyle Research Institute at the third URL below, "For the purpose of these analyses, the term physically inactive is equivalent to an energy expenditure of less than three kilocalories per kilogram of body weight per day (KKD). International guidelines for youth require a much higher level of activity (6-8 KKD). … Over half of Canadian teenagers are sedentary, accumulating the equivalent of less than one hour of walking a day (3+METS). Furthermore, only 18% are accumulating enough daily activity to meet the international guidelines for optimal growth and development."
1. http://www.statcan.ca/Daily/English/021018/d021018b.htm. Retrieved April 8, 2010.
2. http://www.statcan.ca/english/freepub/82-221-XIE/00604/nonmed/behaviours3.htm. Retrieved April 8, 2010.
3. http://www.cflri.ca/eng/statistics/surveys/pam2002.php. Retrieved April 8, 2010.

[31] Nova Scotia Department of Health Promotion and Protection and the Nova Scotia Department of Education report, *Physical activity levels and dietary intake of children and youth in the province of Nova Scotia – 2005*, p. 65. Retrieved April 8, 2010 from http://www.gov.ns.ca/hpp/publications/PACY_2005_Report.pdf.

[32] This quotation is from Page 4 of the source detailed in Note 31.

[33] This quotation is from Page 5 of the source detailed in Note 31.

[34] *2005 Physical Activity and Sport Monitor*. Physical activity and sport: Encouraging children to be active, Canadian Fitness and Lifestyle Research Institute, pp.71-73. Retrieved April 8, 2010 from http://www.cflri.ca/eng/statistics/surveys/pam2005.php.

[35] This quotation is from *2005 Physical Activity and Sport Monitor*. Physical activity and sport: Encouraging children to be active, Canadian Fitness and Lifestyle Research Institute. Retrieved April 8, 2010 from http://www.cflri.ca/eng/statistics/surveys/pam2005.php, p. 59.

[36] *Student walking distance review*. The review was compiled by Chester Sabean for the Nova Scotia Department of Education. The report is available at http://www.ednet.ns.ca/events/walkingdistance/. Retrieved April 8, 2010.

[37] This Table is from page 65 of the Source detailed in Note 31.

[38] See Heelan, K, Donnelly, J, Jacobsen, D, Mayo, M, Washburn, R & Greene, L (2005). Active commuting to and from school and BMI in elementary school children – preliminary data. *Child Care, Health & Developmen*t, 31, 3, 341-349.

See also, Dollman, J & Lewis, N (2007). Active transport to school as part of a broader habit of walking and cycling among South Australian youth. *Pediatric Exercise Science*, 19, 436-443.

[39] Sallis, JF, Frank, L, Saelens, B, & Kraft, M (2004). Active transportation and physical activity: Opportunities for collaboration on transportation and public health research. Transportation Research Part A 38, 249-268.

[40] Martin, S, Lee, S, & Lowry, R (2007) National prevalence and correlates of walking and biking to school. *American Journal of Preventive Medicine,* 33(2), 98-105.

[41] Kerr, J, Frank, L, Sallis, JF, & Chapman, J (2007). Urban form correlates of pedestrian travel in youth: Differences by gender, race-ethnicity and household attributes. *Transportation Research Part D-Transport and Environment, 12*(3), 177-182.

[42] Ewing, R, Brownson,R & Berrigan, D (2006). Relationship between urban sprawl and weight of United States youth. *American Journal of Preventive Medicine,* 31(6) 464-474.

[43] This is a quote from page 1 of Watson, M, & Dannenberg, A. (2008). Investment in safe routes to school projects: Public health benefits for the larger community. Centers for Disease Control and Prevention. Retrieved April 8, 2010 from www.cdc.gov/pcd/issues/2008/jul/07_0087.htm.

[44] Mackett, RL (2004). *Reducing children's car use: the health and potential car dependency impacts*. Report on a program of research, May. Available at the URL below.
1. http://www.cts.ucl.ac.uk/research/chcaruse/Trandh90.pdf. Retrieved April 8, 2010.

[45] World Cancer Research Fund/American Institute for Cancer Research. Policy and Action for Cancer Prevention, Food, Nutrition, and Physical Activity: a Global Perspective. Washington DC: AICR, 2009, p 47.

[46] The quotation is from Page 9 of Davis, A (ed.), *A physically active life through everyday transport*. World Health Organization, 2002, available at the URL below.
1. http://www.euro.who.int/eprise/main/WHO/Progs/TRT/modes/20030121_1. Retrieved April 8, 2010.

[47] The statement is a quotation from *Measuring Up: A health surveillance update on Canadian children and youth*. Ottawa, Ontario: Public Health Agency of Canada, 1999, available at the first URL below. See also the source detailed in Note 14 and also *Canadian Motor Vehicle Traffic Collision Statistics: 2006*. Ottawa, Ontario: Transport Canada, 2009, available at the second URL below. See also, Ramage-Morin P. *Motor-vehicle accident deaths, 1979-2004*. Ottawa, Ontario: Statistics Canada, Catalogue no. 82-003-X, 2008, available at the third URL below. And also, Public Health Agency of Canada. *Leading causes of injury death in Canada, 2004.* Ottawa, Ontario: Public Health Agency of Canada, 2008, available at the fourth URL below. Also see Snowdon AW, Hussein A, Slater M, Kolga C, Boase P, Howard A. *A national study of Canadian children's safety in vehicles*. Paper presented at the Canadian Multidisciplinary Road Safety Conference. Montreal: June 3-6, 2007, available at the fifth URL below. See also Injury Prevention Committee. Transportation of infants and children in motor vehicles. *Paediatrics & Child Health (Journal of the Canadian Paediatric Society)* 2008;13(4):313-318, available at the sixth URL below.
1. http://www.phac-aspc.gc.ca/publicat/meas-haut/mu_x_e.html. Retrieved April 8, 2010.
2. http://www.tc.gc.ca/roadsafety/tp/tp3322/2006/menu.htm. Retrieved April 8, 2010.
3. http://www.statcan.gc.ca/pub/82-003-x/2008003/article/10648-eng.pdf. Retrieved April 8, 2010.
4. http://dsol-smed.phac-aspc.gc.ca/dsol-smed/is-sb/c_mort_matrix_e.html. Retrieved April 8, 2010.
5. http://auto21.ca/uploads/publications/mediareleases/Canadian_Children_In_Vehicle_Safety_Study.pdf. Retrieved April 8, 2010.
6. http://www.cps.ca/english/statements/IP/IP08-01.htm. Retrieved April 8, 2010.

[48] Safe Kids Canada (2004). *Making it happen: Pedestrian safety*. Available at http://www.safekidscanada.ca/SKCForPartners/custom/PEDestrianGuide05.pdf. Retrieved April 8, 2010.

[49] A report prepared for the Royal Canadian Mounted Police (Dalley ML, Ruscoe J, *The abduction of children by strangers in Canada: Nature and scope*. RCMP, Ottawa, 2003, available at the URL below), stated that only five cases of abduction of children by strangers could be identified for 2001 and 2002. In three cases, the abduction was from the child's home; in none was it while walking or cycling to another place. The sources detailed in Note 47 reported 282 traffic-related fatalities of children and youth aged 0-14 years in 2000-2001 and 21,827 traffic-related injuries. See also Howard AW. (2006). Injury in childhood: a vexingly simple problem. *Canadian Medical Association Journal*, 175(8):899-900. And also Birken CS, Parkin PC, To T, Macarthur C. (2006). Trends in rates of death from unintentional injury among Canadian children in urban areas: influence of socioeconomic status. *Canadian Medical Association Journal,*175(8):867-868.
1. http://www.rcmp-grc.gc.ca/pubs/omc-ned/abd-rapt-eng.htm.Retrieved April 10, 2010.

[50] Stallard, P, Velleman, R, & Baldwin, S (1998). Prospective study of post-traumatic stress disorder in children involved in road traffic accidents. *British Medical Journal, 317*, 1619-1623.

[51] Canadian Paediatric Society position statement. (2004). Preventing injuries from all-terrain vehicles. *Paediatric and Child Health*, 9(5), 337-341.

[52] Safe Kids Canada (2009). *Child & youth unintentional injury: Atlantic Canada, 10 years in review*. Available at http://www.safekidscanada.ca/safekidsCanada/. Accessed April 8, 2010.

[53] Safe Kids Canada. ATV Provincial legislation chart. Available at http://www.safekidscanada.ca/SKCPublicPolicyAdvocacy/section.asp?s=All+Terrain+Vehicles+(ATVs)&sID=22252. Retrieved April 8, 2010.

[54] See information on the network of trails in the Collingwood, Ontario area at the first URL below. More than 60 km of trails are used for active transportation and recreation. No motorized vehicles are permitted on these trails. http://www.collingwoodtrails.ca/. See also p. 128 the Official Plan for the Town of Collingwood which states: "The establishment of an interconnected system of trails throughout the municipality and into the surrounding region is an objective of this Official Plan. It is intended that separate trail networks for non-motorized activities (walking/jogging/bicycling/cross-country skiing) and motorized use be separately interconnected to provide continuous passage across the municipality and into the surrounding region" available at the second URL below.
1. http://www.collingwoodtrails.ca/.
2. http://www.collingwood.ca/node/713 Retrieved April 8, 2010.

[55] The data in this paragraph are summarized in *Literature review: Vehicle travel speeds and pedestrian accidents*. U.S. Department of Transportation, National Highway Traffic Safety Administration, October 1999, available at the URL below. See also *Health Impact Assessment of Transport Initiatives: A Guide*, Health Scotland, Edinburgh, 2007, 110 pp, available at the second URL below.
1. http://www.nhtsa.dot.gov/people/injury/research/pub/HS809012.html, Retrieved April 8, 2010.
2. http://tinyurl.com/amlxqj, Retrieved April 8, 2010.

[56] Figure 1 is a reproduction of Graph 2.2 on Page 25 of European Commission, Directorate-General for the Environment, *Kids on the Move*, Office for Official Publications of the European Communities, Luxembourg, 2002, available at the URL below.
1. http://tinyurl.com/bgxqol. Retrieved April 8, 2010.

[57] Organisation for Economic Co-operation and Development, *Keeping children safe in traffic*. OECD, Paris, France, 2004. Available for a fee at the URL below.
1. http://www.oecdbookshop.org. Retrieved April 8, 2010.

[58] WHO (2008). *World report on child injury prevention*. Available at http://www.who.int/violence_injury_prevention/child/injury/world_report/en/index.html. Retrieved April 8, 2010.

[59] Sallis, JF, & Glanz, K (2006). The role of the built environments in physical activity, eating and obesity in childhood, *The Future of Children*, Vol. 16, (1), Spring.

[60] Sallis, JF, Frank, LD, Saelens, BE, & Kraft, MK (2004). Active transportation and physical activity: opportunities for collaboration on transportation and public opportunities health research. *Transportation Research Part A-Policy and Practice, 38*(4), 249-268, p. 263.

[61] See *Health aspects of air pollution: Results from the WHO project 'Systematic review of health aspects of air pollution in Europe'*. Copenhagen, Denmark: World Health Organization Regional Office for Europe, June 2004, available at the first URL below. Also see more specific information about the WHO project at the second URL below. See also Makri A, Stilianakis NI. (2008). Vulnerability to air pollution health effects, *Int. J. Hyg Environ Health*, 211(3-4),

326-336. And also Ashmore, MR, Dimitroulopoulou C, Personal exposure of children to air pollution. *Atmospheric Environment* 2009;43(1):128-141.
1. http://www.euro.who.int/document/E83080.pdf, Retrieved April 8, 2010.
2. http://www.euro.who.int/air/activities/20050512_1, Retrieved April 8, 2010.

[62] See the sources detailed in Note 61.

[63] The work on appearance of respiratory symptoms is summarized in Table 1 of Transport, Health and Environment, Pan-European Programme. *Transport-related health impacts with a particular focus on children*. Geneva, Switzerland: World Health Organization, Europe and United Nations Economic commission for Europe, 2004, available at the URL below. Ten studies concerned children with asthma or other chronic respiratory disease. Of these, six reported a significant association between occurrence of respiratory symptoms and exposure to particulate matter, and three reported no significant association. (One had no data on this matter.) Three of the ten studies reported a significant association with exposure to nitrogen dioxide, and five reported no significant association. (Two had no data on this matter.) The work on hospital attendance is summarized in Table 2 of the same source. Six studies concerned hospitalization for asthma. Three of these reported a significant association with exposure to particulate matter; three reported no significant association. Three reported a significant association with exposure to nitrogen dioxide; one reported no significant association; two had no data on this matter. Also see Table 5 of the same source, which summarizes work using traffic intensity indices to estimate health effects in children.
1. http://www.euro.who.int/Document/trt/PEPSynthesis.pdf. Accessed April 8, 2010.

[64] See Tables 3 and 4 of the source detailed in Note 63. Significant associations in children have been reported between exposure to particulate matter or nitrogen dioxide, or both, and cancer, immune response effects, eye irritation, growth rate effects, intrauterine mortality, and low birth weight, among others. In several cases there have also been reports of non-significant associations.

[65] Pearson, R, Wachtel, H, & Ebi K (2000). Distance-weighted traffic density in proximity to a home is a risk factor for leukemia and other childhood cancers, *Journal of the Air & Waste Management Association*, 50, 175-180.

[66] See the sources detailed in Note 63. See also Peters et al., (May 2004), *Epidemiologic investigation to identify chronic effects of ambient air pollutants in Southern California*. California Air Resources Board and the California Environmental Protection Agency, Contract No. 94-331, available at the URL below.
1. http://www.arb.ca.gov/research/abstracts/94-331.htm#Executive. Retrieved April 8, 2010.

[67] This quotation is from the Department of Environment web site document "Toward a greener future: Nova Scotia's climate change action plan" found at http://www.gov.ns.ca/enla/air/action.asp. Retrieved April 8, 2010.

[68] Schweitzer, L, & Valenzuela, A. (2004). Environmental injustice and transportation: The Claims and the evidence. *Journal of Planning Literature*, 18, 383-398.

[69] Alm, S, Mukala, K, & Jantunen, MJ (2000). Personal carbon monoxide exposures of preschool children in Helsinki, Finland: levels and determinants. *Atmospheric Environment*, *34*, 277-285.

[70] This quotation is from International Centre for Technology Assessment (2000). *In-car air pollution: The hidden threat to automobile drivers*. International Centre for Technology Assess-

ment, Washington DC. Available at the URL below.
1. http://tinyurl.com/b77hy7. Retrieved April 8, 2010.

[71] Wargo, J, *Children's exposure to diesel exhaust on school buses, environment and human health, report*, 2002, available at the URL below.
1. http://www.ehhi.org. Retrieved April 8, 2010.

[72] The quotation is from Page 1 of Solomon G, Campbell T, Rudeman Fener G, et al, *No breathing in the aisles, diesel exhaust inside school buses*. Washington DC: National Resources Defense Council, 2001, available at the URL below.
1. http://www.nrdc.org/air/transportation/schoolbus/schoolbus.pdf. Retrieved April 8, 2010.

[73] Perrota, K (2005). *School buses, air pollution & children's health: Improving children's health & local air quality by reducing school bus emissions.* Ontario Public Health Association. Retrieved April 8, 2010 from http://www.healthyenvironmentforkids.ca/img_upload/13297cd6a147585a24c1c6233d8d96d8/OPHA_School_Bus_FINAL.pdf.

[74] See *Student walking distance review*. The review was compiled by Chester Sabean for the Nova Scotia Department of Education. The report is available at http://www.ednet.ns.ca/events/walkingdistance/. Retrieved April 8, 2010.

[75] The quotation is from Page 44 of Elsom D. (1996). *Smog alert*: *Managing urban air quality.* London, UK: Earthscan Publications Ltd.

[76] Leung, PL, & Harrison, RM (1998). Traffic-related exposure to benzene and toluene. *International Journal of Vehicle Design*, 20, 55-59.

[77] The study in question is *Review of vertical exhausts*. Austroads (Association of Australian and New Zealand road transport and traffic authorities), Sydney, Australia, January 1993, available for a fee from the first URL below. The report is summarized in *Report on the protection of the environment operations (Clean Air) Regulation 2002*, Parliament of New South Wales, Australia, November 2002, available at the second URL below. A November 2004 press release by Isuzu Australia (see the third URL below) argues that requirements for vertically located exhausts in two Australian states are obsolete because "the current crop of [diesel] engines produced very low emissions and no visible black smoke". The press statement does not indicate where the tailpipes should be located. The Austroads study had noted that a vertical location reduced pollution in the pedestrian breathing zone to about 50% of that caused by an offside location. As a preliminary test of the prevalence of each tailpipe position, one author noted the distribution among the first 280 road vehicles encountered one Sunday morning parked or moving in an area close to downtown Toronto. Of these one was a heavy duty truck; it had a vertical tailpipe, eight were medium-duty trucks; all had curbside tailpipes, and 271 were light-duty vehicle, i.e., regular automobiles, light trucks, vans or sport-utility vehicles. Of the light-duty vehicles 191 had their tailpipe on the curb side and 80 had it on the other side. (Note that 'curb side' here means positioned closer to the curbside rear wheel than to the offside rear wheel. Several cars with twin exhausts were counted among the curbside group.) Thus it appears that more than two thirds of the vehicles on the road may have their tailpipes located on the side that produces the greater exposure of pedestrians to their pollution.
1. http://www.onlinepublications.austroads.com.au/script/home.asp. Retrieved April 8, 2010.
2.http://www.parliament.nsw.gov.au/Prod/parlment/committee.nsf/0/145AAD0DACA500F4CA256C780013CC65. Retrieved April 8, 2010.

[78] Tranter, PJ, & Malone, K, *Out of bounds: Insights from children to support a cultural shift towards sustainable and child-friendly cities*. State of Australian Cities National Conference, University of Western Sydney, Urban Frontiers Program, 2003, available at the URL below.
1. http://tinyurl.com/d3qfav. Retrieved April 8, 2010.

[79] See Hillman, M, Adams, J, & Whitelegg, J (1990). *One false move: A study of children's independent mobility*. London, UK: Policy Studies Institute. Available through the first URL below. See also Hillman, M (ed.), *Children, transport and the quality of life*. London, UK: Policy Studies Institute, 1993, available through the second URL below. See too Hillman, M, & Adams, J (1992). Children's freedom and safety. *Children's Environments*, *9(2)*, 10-22.
1. http://www.psi.org.uk/publications/ENVIRON/onefm.htm. April 8, 2010.
2. http://www.psi.org.uk/publications/publication.asp?publication_id=26. Retrieved April 8, 2010.

[80] See Evans, G, Lercher, P, Meis, M, Ising, H, & Kofler, WW (2001). Community noise exposure and stress in children. *Journal of the Acoustical Society of America*, *109*, 1023-1027. (The results of this study could be interpreted to suggest that children should not live in high-density development; but it could be equally interpreted to suggest that steps be taken to reduce traffic intensities).

[81] See van Kempen E, Van Kamp I, Fischer P, Davies H, Houthuijs D, Stellato R, Clark C, Stansfeld S. (2006) Noise exposure and children's blood pressure and heart rate: the RANCH project. *Occupational and Environmental Medicine*, 63(9):632-639.

[82] Hygge, S, Evans, GW, & Bullinger, M (2002). A prospective study of some effects of aircraft noise on cognitive performance in schoolchildren. *Psychological Science*,*13*, 469-474.

[83] The evidence is reported in the source detailed in Note 63. Of 244 young people aged 9-16 years, those who always walked showed lower scores concerning depression, aggression/hostility, anxiety, and psychosomatic symptoms compared with children who never or seldom walked. But, were the children healthy because they walked, or did they walk because they were healthy?

[84] Canadian Fitness and Lifestyle Research Institute. (2006). *Physical activity of Canadian youth — An analysis of 2002 Health Behaviour in School-aged Children Data.* Retrieved April 8, 2010 from http://www.cflri.ca/eng/statistics/surveys/2006HBSC.php.

[85] This quotation is from page 18 of Physical activity of Canadian youth – An analysis of 2002 health behaviour in school-aged children data. Ottawa, Ontario: Canadian Fitness and Lifestyle Research Institute, 2006 available from the URL below. In that document, the source of this information was given as Craig, CL, Cameron, C, Russell, SJ & Beaulieu, A. Increasing physical activity: Supporting children's participation. Ottawa, Ontario: Canadian Fitness and Lifestyle Research Institute, 2001.
1. http://www.cflri.ca/eng/statistics/surveys/2006HBSC.php.
2.

[86] Freeman, L (2001). The effects of sprawl on neighborhood social ties: An explanatory analysis. *Journal of the American Planning Association*, 67, 69-77.

[87] The report is discussed in some detail in a California Department of Education press release entitled *State Study Proves Physically Fit Kids Perform Better Academically* (December 10, 2002), available at the URL below. See also, Chomitz VR, Slining MM, Mcgowan RJ, Mitchell SE, Dawson GF, Hacker KA. (2009). Is There a Relationship Between Physical Fitness and Academic Achievement? Positive Results From Public School Children in the Northeastern United States. *Journal of School Health*, 79(1):30-36.

1. http://www.icsspe.org/members/bulletin/freebulletin.php?html=archiv/Bulletin37/texte/2-0- california.htm&wahl=10&No=Bulletin37&l=2&PHPSESSID=36af06b6e82540baea 386535f6fcf583. Retrieved April 8, 2010.

[88] McDonald, NC (2007). Travel and the social environment: Evidence from Alameda County, California. *Transportation Research Part D-Transport and Environment, 12*(1), 53-63.

[89] Moore, RC, & Marcus, CC (2008). Healthy planet, healthy children: Designing nature into the daily spaces of childhood. Biophilic design: the theory, science and practice of bringing buildings to life, N.J. Wiley. Available at the URL below: http://www.naturalearning.org/publications/publications.htm. Retrieved April 8, 2010.

[90] Louv, R. (2005). *Last child in the woods: Saving our children from nature-deficit disorder*. North Carolina: Algonquin Books of Chapel Hill.

[91] This quotation is from p. 258 of Louv, R. (2005). *Last child in the woods: Saving our children from nature-deficit disorder*. North Carolina: Algonquin Books of Chapel Hill.

[92] This is a quotation from Page 6 of *Active Kids Health Kids Strategy.* This is a comprehensive physical activity strategy for children, youth and families in Nova Scotia. It was released in Autumn 2007 by the Nova Scotia Department of Health Promotion and Protection. It is available at http://www.gov.ns.ca/hpp/publications/akhk-strategy.pdf. Retrieved April 8, 2010.

[93] There are no good data on this point, although there are hints of it in the analysis of relevant data for Halton and Peel Regions and the City of Toronto reported in the source detailed in Note 11. Also relevant may be the finding (for Stockholm, Sweden) that a car in the family made essentially no difference to the local travel activities of inner-city youth aged 12-16 because of their independence through their ability to walk or take transit. Youth in families with a car (34 of the 71 surveyed) said a car provides valuable experiences for young people; youth in families with no car disagreed. See Sandqvist, K. (2002). How does a family car matter? Leisure, travel & attitudes of adolescents in inner city Stockholm. *World Transport Policy & Practice*, *8*, 11-18, 2002.

[94] Information about Youthscape Halifax may be found at the first URL. There are Youthscape programs in Montreal, Thunder Bay, Saskatoon, Calgary and Halifax. The Calgary youth have chosen transportation as their focus. Information on the Calgary work may be found at the second URL.

1. http://www.youthscapehrm.ca/ys/content/view/15/43/. Retrieved April 8, 2010.
2. http://www.calgaryurbanvibe.ca/staging/cuv2006/Default.aspx?alias=www.calgaryurbanvibe.ca/staging/cuv2006/youthscape. Retrieved April 8, 2010.
3.

[95] This quotation is from p. 3 of *Environmental scan of active transportation safety education initiatives across Nova Scotia* by Renée Hartleib (January 2007) for Active & Safe Routes to School, Nova Scotia Road Safety Advisory Committee and Nova Scotia Department of Health Promotion and Protection.

[96] See the Pathways for People web site page that provides details on active transportation activities in Nova Scotia communities. Available at http://www.pathwaysforpeople.ca/ns/community. Retrieved April 8, 2010.

[97] The Halifax Regional Municipality's Active Transportation Plan is available at

http://www.halifax.ca/TDM/activetransportation/Documents/ActiveTransportationFunctionalPlan.pdf. The quote is from p.3-11 of the plan. Retrieved April 8, 2010.

[98] See Bridgewater's Active Transportation and Connectivity Plan. Available at http://www.bridgewater.ca/planning/active-transportation.html. Retrieved April 8, 2010.

[99] See the Resolution of the Union of Nova Scotia Municipalities at the following URL: http://www.unsm.ca/2008%20Resolutions/resolution_20A.htm. Retrieved April 8, 2010.

[100] Further information on this study may be obtained by contacting Catherine O'Brien at Catherine_obrien@cbu.ca.

[101] This quotation is from p. 6 of *Nova Scotia Pathways for people framework for action*, authored by Renée Hartleib, prepared by the Nova Scotia Department of Health Promotion and Protection on behalf of active transportation interests in Nova Scotia. The report outlines active transportation initiatives in the province. The document is available at http://www.gov.ns.ca/hpp/publications/P4PFramework.pdf . Retrieved April 8, 2010.

[102] The *Nova Scotia Motor Vehicle Act*, at the first URL below, appears to sanction the use of skateboards and rollerblades on sidewalks, as long as the user is wearing a helmet. Section 170B (1) of the *Act* is this: "No person shall ride on or operate a scooter, skate board, in-line skates, roller skates or other device prescribed by the regulations on a public street, lane, road, alley or sidewalk unless the person is wearing a helmet that complies with the regulations and the chin strap of the helmet is securely fastened under the chin." Section 172 clearly forbids the use of "rollerblades and skateboards" on regular roads. According to the British Columbia-based Coalition for Small Wheel Vehicle Safety, at the second URL below, Nova Scotia is the only province in which a helmet must be worn for lawful operation of a small-wheel vehicle.
1. http://www.gov.ns.ca/legislature/legc/statutes/motorv.htm. Retrieved April 8, 2010.
2. http://www.injuryresearch.bc.ca/Publications/Reports/Small%20Wheeled%20Vehicle%20Position%20Paper%20June%2003.doc. April 8, 2010.

[103] See p. 47 of Canada's Report Card on Physical Activity for Children and Youth 2008. Active healthy kids Canada. Retrieved April 8, 2010 from http://www.activehealthykids.ca/Modules/~cms.com/ecms.ashx/ExecSummary/AHK_ReportCard_ExecSummary_ENG.pdf

[104] Oromocto By-law 319. Retrieved April 8, 2010 from www.oromocto.ca/UserFiles/File/Bylaws/bylaw319.pdf.

[105] For information about the Cole Harbour skateboard park, see the URL below.
1. http://www.halifax.ca/mediaroom/pressrelease/pr2001/010810skateboardpark.html. Retrieved April 8, 2010.

[106] For information about Halifax Regional Council's 2005-2006 budget, see the URL below.
1. http://www.halifax.ca/mediaroom/pressrelease/0502222005-06Budget.html. Retrieved April 8, 2010.

[107] This document is available at http://www.swimmingmouse.ca/novascotiaskateparks/resources/sk8.pdf. Retrieved April 8, 2010.

[108] Box 7 contains several consecutive paragraphs from the source detailed in Note 3.

[109] Watson, M, & Danneberg, AL (2008). Investment in safe routes to school projects: Public health benefits for the larger community, *Preventing Chronic Disease: Public Health Research, Practice, and Policy*, 5(3), A90.

[110] Gordon-Larsen, P, Nelson, MC, Page, P, & Popkin, BM (2006). Inequality in the built environment underlies key health disparities in physical activity and obesity. *Pediatrics, 117*(2), 417-424, p.417.

[111] For information about Vestfold County Council's 'children's tracks' program, see the document at the first URL below, and Pages 35-42 of the document at the second URL below.
1. http://www.ks.no/upload/4340/EvaAlmhjell_paper.doc. Retrieved April 8, 2010.
2. http://www.norden.org/miljoe/sk/FinalreportMalm%C3%B8.pdf. Retrieved April 8, 2010.

[112] See the Canadian Paediatric Society position statement "Preventing injuring from all-terrain vehicles" in *Paediatric and Child Health*, (2004) Vol 9 No 5, 337-341.

[113] For discussion of this point, see Note 77 above.

[114] For the full list of citations as "America's best walking communities", see the URL below.
1. http://www.active.com/story.cfm?story_id=96. Retrieved April 8, 2010.

[115] Support for this may be found in McKee, R, Mutrie, N, Crawford, F, & Green, B (2007). Promoting walking to school: Results of a quasi-experimental trial, *Journal of Epidemiol Community Health*, 61(9): 818-23.

[116] WHO (2008). *World report on child injury prevention*. Available at http://www.who.int/violence_injury_prevention/child/injury/world_report/en/index.html. Retrieved April 8, 2010

[117] The photo in Figure 2 is from the URL below.
1. http://www.precisiontandems.com/art16moolddiary.htm. Retrieved April 8, 2010.

[118] The *Nova Scotia Motor Vehicle Act* (see Note 102) forbids the riding of bicycles on sidewalks except where specifically authorized, but appears to provide an exemption for children to the general prohibition (S. 171). A sidewalk where bicycle riding is authorized must first be designated as a trail. See the URL below.
1. http://www.gov.ns.ca/legislature/legc/statutes/motorv.htm. Retrieved April 8, 2010.

[119] The photo in Figure 3 is from the URL below,
1. http://www.flickr.coom/photos/Luton/504930307/in/set-72157605151132265O/.
2.

[120] Kerr, J, Rosenbert, D, Sallis, JF, Saelens, B, Frank, L, & Conway, T (2006). Active commuting to school: Associations with environment and parental concerns, *Medicine and Science in Sports and Exercise*, 787-794.

[121] Cain, A & Sibley-Perone, J (2005). Teenage attitudes and perceptions regarding transit use. State of Florida Department of Transportation, National Center for Transit Research, Center for Urban Transportation Research and University of South Florida.

[122] Henry Orsini can be reached at lowertransitfaresarewhereits@yahoo.ca.

[123] These examples are from Toronto (Toronto Transit Commission, at the first URL below), where the children's basic fare is 75¢, or 10 tickets for $5.50, and from the Region of York just north of Toronto (York Region Transit, at the second URL below), where the children's basic fare is $3.25 (the same as the adult fare), or 10 tickets for $15.00.
1. http://www3.ttc.ca/Fares_and_passes/Prices/index.jsp. Retrieved April 8, 2010.
2. http://www.yorkregiontransit.com/fares/index.asp. Retrieved April 8, 2010.

[124] Cain, A & Sibley-Perone, J (2005). Teenage attitudes and perceptions regarding transit use. State of Florida Department of Transportation, National Center for Transit Research, Center for Urban Transportation Research and University of South Florida.

[125] Many transit systems have low-floor buses. The Halifax Transit Services recognizes their value for accessibility and could add the benefits of such vehicles to people with young children. Box 12 is from the URL below.
1. http://www.halifax.ca/metrotransit/ALF.html.Retrieved April 8, 2010.

[126] McDonald, NC (2008). Children's mode choice for the school trip: the role of distance and school location in walking to school. *Transportation, 35*(1), 23-35, p.30.

[127] According to the Comprehensive Energy Use Database maintained by the Office of Energy Efficiency, Natural Resources Canada at the URL below, school buses accounted for 24.4 billion passenger-kilometres in Canada in 2007 (Table 48), while urban transit accounted for 17.1 billion passenger-kilometres (Table 50). Retrieved April 8, 2010 from: http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/trends_tran_ca.cfm.

[128] McDonald, NC (2008). Children's mode choice for the trip to school: the role of distance and school location in walking to school, *Transportation*, 35, 23-35.

[129] See Box 13 and the following web site: http://nshps.ca/about. Retrieved April 8, 2010.

[130] For the Halifax Regional School Board's Student Transportation Policy, see the URL below.
1. http://www.hrsb.ns.ca/content/id/541.html. Retrieved April 8, 2010.

[131] See the source detailed in Note 136.

[132] See the source detailed in Note 130.

[133] See http://www.avrsb.ednet.ns.ca/forms/policy/BP202.4.PDF for a copy of this board's policy. Retrieved April 8, 2010

[134] See http://www.ednet.ns.ca/events/walkingdistance/.
Retrieved April 8, 2010 for the recommendations under review.

[135] For further information see the regulation regarding "Transportation of Students" in the Governor in Council Education Action Regulations available at http://www.gov.ns.ca/just/regulations/regs/edgic.htm. Retrieved April 8, 2010.

[136] Maybee, K, MacKinnon, B, Kerr, B et al (2005). Evaluation of the levels of diesel-related pollutants from school buses while transporting children, New Brunswick Lung Association (in partnership with Health Canada, Environment Canada, NB Department of Education, Envi-

ronment and Health Inc, and the Research and Productivity Council. For further information see the URL below:
http://www.nb.lung.ca/schools/3000e/ehi_sbi_e.htm. Retrieved April 13, 2010.

[137] Cohen, D, Ashwood, J, Coot, M, Overton, A, Evenson, K, Staten, L, Porter, D, McKenzie, T, & Catellier, D (2006). Public parks and physical activity among adolescent girls. Pediatrics, vol 118 (5), 1381-1389.

[138] WHO (2008). *World report on child injury prevention.* Available at http://www.who.int/violence_injury_prevention/child/injury/world_report/en/index.html. Accessed April 8, 2010.

[139] This text is from the web page of Ecology Action Centre. Further details on the program are available at the URL below:
http://saferoutesns.ca/index.php/special/pacecar/. Retrieved April 8, 2010.

[140] See Part 3, (301) of Traffic By-law 803. Available at http://www.airdrie.ca/city_council/bylaws/bylaws.cfm. Accessed April 8, 2010.

[141] The European data in Table 5 are from Draskóczy M, Mocsári T, *Present Speeds and Speed Management Methods in Europe*, VTT, Finland, November 1997, available at the first URL below. Though this table is from 1997, the data appear to apply today. A more up-to-date source is Appendix B of *Speed Management*, Paris, France, European Conference of Ministers of Transport, 2006. See also, Nesdale-Tucker R, Boxell D, and Tiburcio D, *Advocating for Child Pedestrian Safety: The case for speed reduction.* Toronto, Ontario: Safe Kids Canada, May 2008, at the second URL below.
1. http://virtual.vtt.fi/virtual/proj6/master/rep211.pdf. Retrieved April 8, 2010.
2. http://tinyurl.com/dkhsz2. Retrieved April 8, 2010.

[142] See a Danish study by Jensen, S (2008) How to obtain a healthy journey to school. *Transportation Research Part A 42*, 475-486.

[143] McDonald, NC (2007). Active transportation to school: Trends among U.S. schoolchildren, 1969-2001. *American Journal of Preventive Medicine,* 32(6), 509-516.

[144] Efforts to reduce the environmental impact of motorized vehicles includes ATVs. Child- and youth-friendly planning also includes reducing the harm of motorized vehicles for this age group. Given the position statement made by the Canadian Paediatric Society ("Preventing injuring from all-terrain vehicles" in *Paediatric and Child Health*, (2004) Vol 9 No 5, 337-341), and statements made by Safe Kids Canada (*Child & youth unintentional injury: Atlantic Canada, 10 years in review*. Available at http://www.safekidscanada.ca/safekidsCanada/), and research evidence calling for stricter policy (Yanchar, NL, Kennedy, R. & Russell, C. (2006). ATVs: motorized toys or vehicles for children? Injury Prevention, 12: 30-34) it appears that consistent legislation on this matter is warranted.

[145] Frank, KI (2006). The potential of youth participation in planning. *Journal of Planning Literature, 20*(4), 351-371, p.369.

[146] The document, *A kid's guide to building great communities: A manual for planners and educators* (no date) is available from the Canadian Institute of Planners at the URL below.
1. http://www.ontarioplanners.on.ca/pdf/kids_guide.pdf. Retrieved April 8, 2010.

[147] Box 17 based on the 'Sponsor's Statement' found in the CD-ROM of *You Can Clear the Air*. Further information about the CD-ROM is available from JoAnn Woodhall at wjoann@region.waterloo.on.ca.

[148] These data are for the Greater Toronto Area, from the results of the 2001 *Transportation Tomorrow Survey*. Information about the TTS is available at the URL below. The data are mentioned here because there is reason to believe that in general terms they apply across Canada, including Nova Scotia.
1.http://www.jpint.utoronto.ca/dmg/tts.html. Retrieved April 8, 2010.

[149] The definition of a child-friendly city is taken from material at the URL below.
1. http://www.childfriendlycities.org/. Retrieved April 8, 2010.

[150] The Nova Scotia *Municipal Government Act 2004* can be found at the URL below.
1. http://www.gov.ns.ca/legislature/legc/statutes/muncpgov.htm.Retrieved April 8, 2010.

[151] For information about 'Pathways for People' and *Walking and Wheeling*, visit the URL below.
1. http://www.gov.ns.ca/ohp/physicalactivity/activeTransportation.asp. Retrieved April 8, 2010.

[152] See *Nova Scotia pathways for people: Framework for action.* (November, 2006) Prepared by the Nova Scotia Department of Health Promotion and Protection on behalf of active transportation interests in Nova Scotia. Authored by Renée Hartleib. The announcement of the Tour is in a press release issued by the Office of Health Promotion, Government of Nova Scotia, available at the second URL below.
1. http://www.gov.ns.ca/hpp/publications/P4PFramework.pdf. Retrieved April 8, 2010.
2. http://www.gov.ns.ca/news/printpage.asp?id=20030505004. Retrieved April 8, 2010.