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

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We know that Nova Scotia has some of the poorest health statistics in the country. We recently learned we are the second most obese in the country, and childhood obesity is growing at an alarming and dangerous rate.

Rodney MacDonald, Minister of Health Promotion[1†]

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[2]

What is not so good for children is the complete loss of autonomy they suffer in suburbia. In this environment where all activities are segregated and distances are measured on the odometer, a child's personal mobility extends no farther than the edge of the subdivision. Even the local softball field often exists beyond the child's independent reach.

The result is a new phenomenon: the 'cul-de-sac kid' who lives as a prisoner of a totally safe and unchallenging environment. While this state of affairs may be acceptable, even desirable, through about age five, what of the next ten or twelve years? Dependent always on some adult to drive them, children are unable to practice being adults. They cannot run so simple a household errand as picking up a carton of milk. They cannot bicycle to the toy store and spend their money on their own. They cannot drop in on mother at work. Most cannot walk to school. Even pickup baseball games are a thing of the past, with parents now required to arrange car-pooling with near-military precision, to transport the children at the appointed times. Children are frozen in a form of infancy, utterly dependent on others, bereft of the ability to introduce variety into their own lives, robbed of the opportunity to make choices and exercise judgement.

Andres Duany, Elizabeth Plater-Zyberk, Jeff Speck[3]

† Superscript numbers throughout this document point to 80 reference and other notes that begin on Page 63.

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 27 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. They appear to be travelling much more by car, taking time that could be dedicated to exercise, including walking or bicycling to the destinations of the car journeys. As well as exercising less, and weighing more, other effects may be associated with the lost exercise associated with the increased automobile use. They include reduced academic performance and compromised emotional development.

Young people are especially vulnerable to adverse effects of automobile use. Notable are the effects of poor air quality, including poor air quality inside the vehicles they travel in and poor air quality arising from the overall level of automobile use 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 differently. On schooldays, for example, the majority of walking and cycling trips are still made by young people notwithstanding the recent large increase 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 proposed guidelines concern land use as well as transport because land use is a key factor in determining the transport patterns of young people as it is for adults.

The 27 guidelines are grouped into six categories: concerning putting young people first in land-use and transport planning; providing for them as pedestrians, as cyclists, and as transit users, concerning school buses and young people's travel in automobiles, and concerning how to reduce the impacts of all transport activity on young people.

Several barriers to addressing concerns about young people and transport are noted, and how they might be overcome. Opportunities for including young people in decision-making about transport and land use are noted, and further pointers towards application of the guidelines are elaborated.

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.

PART I. TOWARDS GUIDELINES

1. Introduction

There are several reasons to be concerned about young people and today's transport and about the related matter of how land is used. Here are some of them:

- Young people appear to be spending growing amounts of time in cars.
- Some of this car travel has replaced walking and bicycling, removing needed opportunities for physical exercise.
- Some car travel has replaced more environmentally benign transit use, adding to what may already be an excess of car use, reducing both the present and the future viability of transit systems, and further reducing young people's opportunities for exercise.
- Being in cars can be harmful, because in-car air quality can be lower and because the view of the passing world through a windshield can be limiting.
- Young people travel to where young people gather, meaning that if they travel by car pollution from traffic in the vicinity of these places—e.g., schools—will be higher.
- 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.

Section 3 below expands on these and other concerns.

The concerns were highlighted during a project concerning transport and children conducted in the Ontario Regions of Halton and Peel, located just west of Toronto.[4] 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 developed plans for the future.

Thus, a further phase of the project—also supported by 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://www.cstctd.org. 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 consideration of the development of other versions, with British Columbia and Nova Scotia selected as initial target provinces.

For Nova Scotia, eleven transport and land-use planning, health protection, physical education, and other professionals in the province commented on a draft of the Ontario document. Comments were made in terms of the document's applicability to all children and youth and its applicability to the particular circumstances of Nova Scotia. Many of the general comments are reflected in the final version of the Ontario document. Most of the particular comments are reflected in the present document, which took the final Ontario version as its starting point.

The present document is only a first or second step towards guidelines for use in Nova Scotia. Realization of a document usable in Nova Scotia will require partnership with a Nova Scotia organization and more consultation and input than available resources have permitted. Nevertheless, the authors and The Centre for Sustainable Transportation hope that the present document can serve not only as a basis for development of a true Nova Scotia set of guidelines but also, in the interim, as a stimulus to considering the needs of children and youth in transport and land-use planning.

The present document differs from the Ontario guidelines in the following ways.

- Ontario-specific references have been removed from the whole document.
- Appendices A and B are not included. (Appendix A described another set of planning guidelines for Ontario—*Transit-Supportive Land-Use Planning Guidelines*—that was part of the inspiration for the Ontario *Child- and Youth Friendly Land-Use and Transport Planning Guidelines*. Appendix B provided some data on schoolday travel by young people in the Toronto region, and some U.S. data.)
- The present section—Section 1—has been completely rewritten.
- Section 2 on land use and transport has been rewritten in part to reflect the more rural nature of Nova Scotia.
- Section 3 on transport and young people's health has been reordered to bring concerns about lack of physical fitness and overweight ahead of concerns about poor air quality, and a section on land use more relevant to Ontario has been removed. A paragraph on children in poverty has been added (which will also be added to the Ontario version when it is next revised).
- In Part II—Sections 5-12, the actual guidelines—and elsewhere, changes have been made to reflect Nova Scotia conditions and practices. *Note that the guidelines themselves have not been changed, although there may be reason to change them during a subsequent revision.*

- Section 13 on barriers to implementing the guidelines and overcoming them has been rewritten. One change is the addition of a column on responsible agencies to the long table that comprises most of the section. The other text in this section is no longer Ontario-focussed.
- Section 14 on involving children and youth in identifying and resolving problems has minor changes only.
- Section 15 on implementation has been rewritten to correspond to Nova Scotia law and practice.

One of many things we were not able to do during the development of this version of the *Guidelines* document was identify and include enough examples of good practice from Nova Scotia. Doing this should be a priority of subsequent work.

2. Transport and land use

Land use features equally with transport as a topic of the guidelines to be proposed here. It almost, but not quite, goes without saying that 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, applying 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, applying to larger urban areas, is that low densities make transit alternatives financially difficult to sustain.

Added to these basic reasons are two processes whereby car use reinforces itself. One is the fundamental synergy between the car and low-density development. The car makes low-density development possible; otherwise there would be no ready access to it. 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 the car and further provision for the car, reducing more the likelihood of travel by foot, bicycle or transit.

Another relevant aspect of land us concerns smaller communities and the extent to which they have the facilities and resources needed for everyday living. Without them, 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 gradually being centralized, in Nova Scotia and elsewhere in Canada,[5] meaning 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 bicycling, other things being equal. 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 help 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.

In summary, at both the macro scale and the micro scale, land use and transport affect each other powerfully, and it makes sense to have integrated guidelines for both.

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.[6]

Many of these observations would likely apply also to growing adolescents. They suggest strongly that young people are more affected 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.[7] An additional vulnerability arises too when distances are large, facilities are centralized, and transport opportunities are limited. Access to health care can be compromised.[8]

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

Poor nutrition and sedentary lifestyles that revolve around television and video games have been blamed for children's reduced physical activity and rising average body weights.[9] Recent evidence from Canada,[10] the United States,[11] and the United Kingdom[12] suggests that dependence on automobiles to transport children to school and leisure activities may also be a factor. These are some relevant findings:

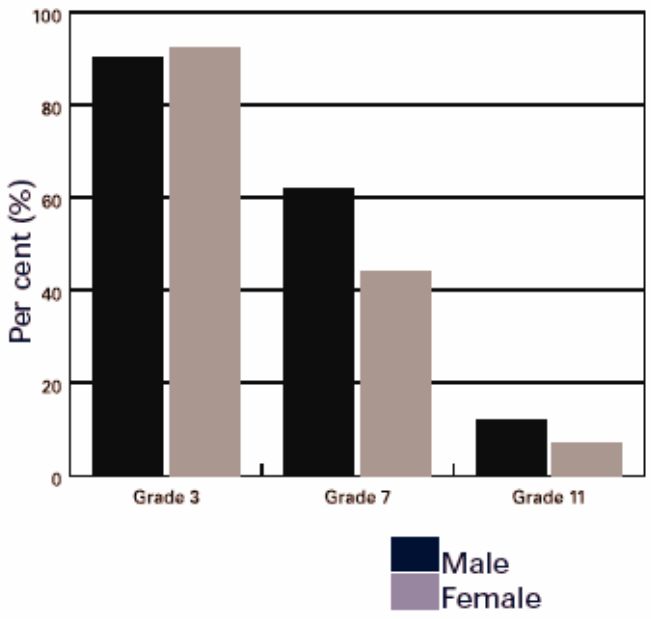
- Less than half of Canadian children walk to school, partly because schools are often too far away to walk to. (Most children who live within three kilometres of school do walk, but a sufficient number live farther from school to bring the average who walk down to less than half of all children.)[13]

- Less than half of Canadian children and youth are active enough to ensure proper growth and development. Among teenagers, perhaps less than 20 per cent do sufficient exercise, although the amount of physical activity by teenagers may have been increasingly recently.[14] Data for Nova Scotia are in Figure 1.[15]
- In 1998-1999, 37 per cent of children aged 2-11 were overweight, up from 34 per cent in 1994-1995. These included the 18 per cent of children in this age group who were obese in 1998-1999, up from 16 per cent in 1994-1995. Within this age group, the proportion overweight declined progressively with age. Thus, close to 45 per cent of two- to three-year-olds were overweight in 1998-1999, but 'only' about 30 per cent of 10- to 11-year-olds.[16]
- 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.[17]

The World Health Organization (WHO) has published a comprehensive document on this subject: *A Physically Active Life through Everyday Transport*. It includes the following:[18]

> 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.

Figure 1. Physical activity levels of Nova Scotia children and youth



*Percentage of youth who get the recommended level of physical activity each week.

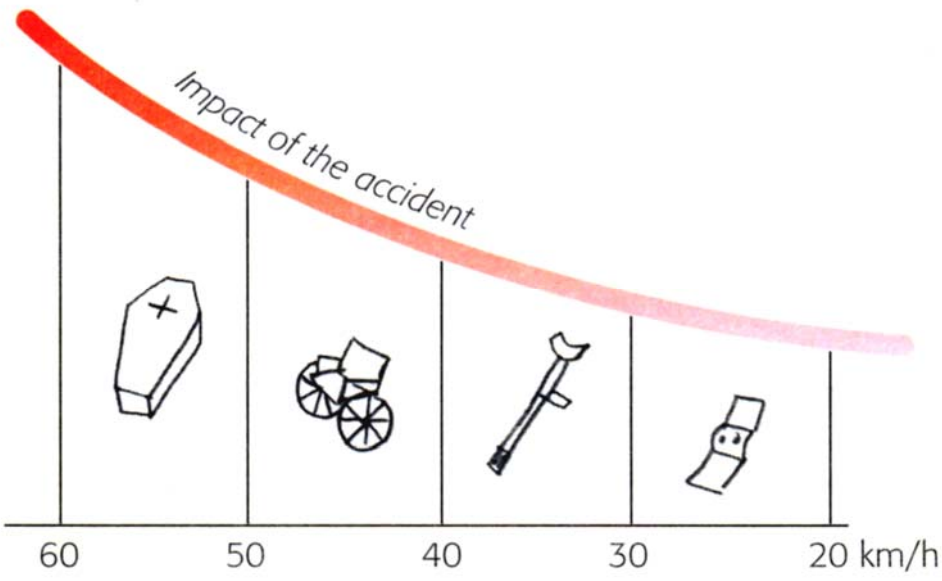
3.3. Traffic-related fatalities and injuries

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.[19]
- The risk of harm to a child from traffic is considerably higher than the risk of harm from a stranger.[20]
- 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 school work, and fear of cars.[21]
- Injuries and fatalities resulting from traffic crashes increase dramatically with the speed of the vehicle at the time of impact. For example, one U.S. 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.[22] 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 the chart in Figure 2.[23]

Keeping Children Safe in Traffic,[24] a recent report by the Organization for Economic Co-operation and Development, outlines current risks for children in traffic, progress made towards creating safer environments, and the best practices of countries that have made

Figure 2. Schematic relationship between vehicle speed and accident severity



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.

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

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.[25]
- The same work for WHO reported that there appears to be no threshold for ozone levels that are safe, and children are particularly susceptible.[26]
- 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.[27] The same work reviewed studies of non-respiratory effects, including children's mortality and adverse pregnancy outcomes.[28]
- 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.[29]
- 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.[30]
- 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.[31]

The immediate cause of the higher exposures in the last finding was not clear. It could have been because car and bus journeys are 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."[32] Other work on this topic 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.[33]

- Another such 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."[34]
- 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."[35]

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. Several studies have shown that, for example, "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."[36]

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.[37] 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. Some relevant findings include the following:

- An Australian study found that heavy traffic reduces the independent mobility of children and youth.[38]
- An investigation in the UK found that opportunities and locations for spontaneous, non-structured play can be severely restricted by traffic.[39]
- An Austrian study found that the low-level but chronic noise of moderate traffic can stress children and raise their blood pressure, heart rate, and level of stress hormones.[40]

- 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).[41] In the meantime, work showing an adverse effect of aircraft noise on children's cognitive performance can be noted.[42]
- There is some evidence from Austrian work that young people who walk to school are emotionally healthier than children who travel by motorized means.[43]
- 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. [44] 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.
- U.S. 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).[45]
- A report on a California Department of Education study suggested that physically fit students performed better academically.[46]

There appear to have been no 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.

On the negative side, common sense might also suggest that being in a car could have adverse effects on emotional development. According to the testimony of one psychologist before a U.S. Congressional committee, "Driving and habitual road rage have become virtually inseparable. Road rage is a habit acquired in childhood. Children are reared in a car culture that condones irate expression as part of the normal wear and tear of driving. Once they enter a car, children notice that all of a sudden the rules have changed. It's okay to be mad, very upset, out of control, and use bad language that's ordinarily not allowed. By the time they get their driver's license, adolescents have assimilated years of road rage."[47] However, there does not appear to be good evidence concerning the effect on children of exposure to in-vehicle aggression.

All the foregoing taken together may provide more than ample justification for considering measures that seek to change how children and youth move, and move themselves, and to reduce their exposure generally to transport's adverse impacts.

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. Table 1 on the next page sets out an assessment of their travel needs and requirements at different ages.

Except for the legal requirement concerning driving, the age grouping in Table 1 is approximate. 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.[48] 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 needs identified in Table 1 are considered when the guidelines are developed in Part II of this document.

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.

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

Table 1. Age groups of children and youth, their competencies in relation to transport, and their transport needs or requirements

Age and competences	Perspectives on transport needs/goals		
	Child/youth	**Parent/caregiver**	**Society**
Children 0-3 years: Require carrying or a stroller some or all of the time.	Infants may need to experience the passing show slowly, even interactively. They also need to be transported without harm from in-car, curb-side or other pollution.	Needs to transport child safely, quickly, conveniently, and without stress to child. Mostly, this means movement by car, and requires convenient parking, lack of congestion, and short distances. There should be ready accessibility where transit is involved, and a good pedestrian environment where walking is required.	Needs the best possible eventual adults, and the least impact on the present environment. Mostly this means transport that (a) meets the child's needs as stated to the left, and (b) minimizes travel by car.
Children 4-7 years: Mobile; need constant supervision. Never out without an adult except perhaps in the immediate vicinity of home.	As for 0-3, and there is also an evident need for physical activity.	As for 0-3, but there can be a stronger emphasis on the safety of walking and transit situations; children of this age are likely to do unpredictable things.	As for 0-3.
Children 8-11 years: Some journeys are made without supervision, perhaps stopping short of crossing main roads, making complex transit journeys, and bicycling other than on bicycle paths	As for 4-7, but children of this age may need and seek situations that provide an appropriate level of usability, e.g., easy transfers between bus routes.	There is considerable concern as the first independent journeys are made. There is also tension between allowing/praising independence and exposing children to harm or situations they can't deal with.	This is a potentially critical age for setting attitudes to transport. Society's interest could be to encourage a focus on sustainable transport modes, and even foster antipathy to car use.
Youth 12-15 years: Most daytime journeys are made without supervision. There are likely night-time restrictions, and bans on being in cars with older teenage drivers.	The young person's preoccupation is often with achieving the maximum of independence with little or no access to the car.	Tensions concerning independence are stronger. Resentment can grow about the amount of chauffeuring that this age group—and younger age groups—may require.	As for 8-11. And, more than 8- to 11-year-olds, there is a need to provide alternatives to car use to avoid extensive chauffeuring or the problems that can result from isolation.
Youth 16-19 years: All journeys are made without supervision (except the first 8+ months of driving).	A major preoccupation, except perhaps in urban areas, is with securing an automobile or access to one, and the licence and other means to drive. However, most in this age group do not have primary access to a car and rely on securing rides or on travelling by transit, cycling or walking.	Now a predominant concern is for the safety of the young person as a car driver or as a passenger of peer drivers.	When alternatives are available and attractive, the progression to car ownership and use is much slower, or altogether avoided.

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 are directed towards reducing the amount of travel by automobile by children and youth, and also towards reducing the amount of all road traffic near children and youth.

The justification for taking these directions is set out above in Section 3. Present transport practices can damage the health of children and youth, broadly interpreted, in one or more of three 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.

The particular vulnerabilities of children and youth, noted in Section 3.1, position them as transport's 'canaries', providing stronger indications than adults provide as to whether something is wrong. This is not a reason to use them as mine canaries are 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. 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. Perhaps the most compelling statement to this effect, because of its source, is in a recent report by several of the world's largest automotive and oil companies, including General Motors, Ford, Toyota, DaimlerChrysler, Honda, Nissan, Renault, Volkswagen, Shell, and BP. The statement is this: "… today's system of mobility is not sustainable. Nor is it likely to become so if present trends continue."[49]

The guidelines cover all types of residential development, and also 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. 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. Rollerblading and skateboarding

The guidelines presently address walking, cycling, transit, and car use by young people but not two increasingly popular modes: skateboarding and rollerblading. These 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, and the use of these 'small-wheel vehicles' on sidewalks can sometimes be problematic.[50] 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 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, 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.[51] In its 2005-2006 budget, Halifax Regional Council included a total of $500,000 for skateboarding facilities, including a new skateboard park on Halifax Commons.[52] The move to add skateboarding facilities may have been spurred in part by publicity in Nova Scotia about a case in Prince Edward Island, described in Box 1, in which a judge, dealing with the case of a young person ticketed for skateboarding, agreed there was a need for such facilities.

Box 1. Court case leads to construction of skateboarding facility in Cornwall, PEI[53]

Skateboarding by-laws were very restrictive in Cornwall, making it almost impossible to skateboard. The family of one youth who was ticketed for skateboarding took the issue to court and it was agreed by the judge that the needs of young people were not met. A meeting was held with Town representatives, Better Beginnings/Better Futures, police, Business Improvement Association, parents and youth to see how a skate park could be put in place. Previous skate boarding equipment put in place had been vandalized. Everyone agreed such a project could only be successful if youth were involved. The group met almost weekly for 6 months. Youth did most of the research on elements of a skate park, cost of building materials etc. Funding was provided through fundraising, building material donations, Town of Cornwall, etc. Students from the high school "shop" classes built the park, continuing on a full time basis three weeks after school had ended. The park was opened in the summer of 1999 and has had a very high usage (50-100 youth per night). It was very well received by the whole community. There has been no vandalism to date.

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 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. 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 2 on the next page, Enrique Peñalosa, 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 children and youth 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 (and perhaps also a council member) as responsible for bringing a children's perspective to 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, however, would 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 2. Planning for children and transforming transport[54]

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.

This official would 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 official would involve working with the forums for young people that could be established as a result of implementation of Guideline 3.

Guideline 3. As may be appropriate, establish or adapt one or more forums for children and youth to provide input as to the application of these guidelines.

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. Some municipalities already have such a group, e.g. the Mayor's Youth Advisory Committee in Burlington, Ontario (see Box 3). In such cases, the mandate of the existing group could be expanded. There is more in involving children and youth in Section 14 of this document (Page 56).

Box 3. Burlington's Mayor's Youth Advisory Committee[55]

MYAC is an official citizen advisory committee, comprising members aged 14-19, that reports to Burlington City Council through its Corporate and Community Services Committee. MYAC's purposes are:

- To provide a legitimate voice for young people in Burlington.
- To provide a youth perspective on municipal (and others) issues to be considered by the Mayor and Council as they carry out their political responsibilities.
- To provide input or advice to City staff as requested.
- To inform and involve the young people of Burlington on issues, events and activities in the community.

'Velocity' is one result of this Committee's work:

----------Velocity----------

Bored? Nothing to do? Tired of the same old, same old?

Check out Velocity! – A place for youth… Built **by** youth!

In 2000, MYAC initiated a survey to find out which issue was most important to Burlington youth. Most respondents said that there was no safe, fun, youth-friendly place in Burlington for youth to hang out on Friday and Saturday nights.

MYAC decided to do something about this problem. The result was Velocity, Burlington's newest City facility, built for youth BY youth. Everything from the name to the wall colours to the location was chosen by young people from across the city of Burlington.

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.

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. In many cases, especially for school-related trips, the cooperation of schools could be a key factor. (See Box 4.)

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 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. The checklist above may be helpful. Some time after occupation, the new neighbourhood can be assessed using input from residents.

Box 4. Registering ‘children’s tracks’, Vestfold County Council, Norway[56]

This local government incorporates information from children in its land-use planning. The phrase ‘children’s tracks’ is analogous to ‘game tracks’, also used in county planning. With parental approval, groups of children aged 8-13 plot their own tracks while at school , under the guidance of planning officials. The results are used to assess need and identify locations for numerous facilities. Plans that do not make use of children’s tracks and other information about the needs of children and young people are likely to be returned for further work.

Guideline 5. Explore pedestrian routes used or to be used by children to ensure that they are as usable by them as possible.

Availability of a route does not ensure its suitability for children. How suitable it is can be determined by walking 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 the area to be walked on?
- 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?

The special problems posed by icy and snowy paths are addressed in Guideline 9 below.

Guideline 6. Explore pedestrian routes to be used by children to ensure that they are as safe for them as possible.

The primary danger is from traffic but 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:

- Are walking routes separated from traffic moving faster than about 30 kilometres/hour (see Guideline 25)?
- 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 by?
- Are there places along the route, e.g., variety stores, 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 8 below.

Guideline 7. For younger children, arrange walking buses and other means of supervision.

This guideline applies mainly to regular, walkable 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.

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.

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 Nova Scotia is coordinated by the Ecology Action Centre (see Box 5)

Box 5. Active & Safe Routes to School in Nova Scotia

Active & Safe Routes to School (ASRTS) is changing how students travel to school in Nova Scotia by promoting active modes of transport such as walking and cycling to school. It is a national program of Go for Green and coordinated in Nova Scotia by the Ecology Action Centre in partnership with the Nova Scotia Office of Health Promotion, Sport and Recreation Division.

ASRTS initiatives in Nova Scotia include working with school staff, parents and students to:

- Increase the numbers of students using active transport
- Increase students' physical activity levels
- Reduce greenhouse gas emissions and pollution from cars
- Reduce traffic congestion on and around school grounds
- Improve pedestrian, cycling, and driver safety skills in school communities
- Identify safe routes to school
- Create walking or cycling school buses
- Provide curriculum resources
- Promote International Walk to School Week (October 3 to 7, 2005)

For more information about ASRTS in Nova Scotia, visit http://ecologyaction.ca/asrts/.

Guideline 8. Separate sidewalks used by children and youth from heavily trafficked roads, particularly where traffic moves slowly or vehicles are stationary with engines idling for long periods.

Information in Section 3.2 above 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 nearside tailpipes. The breathing spaces of walking children or children in strollers may be especially 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, including places where parking is permitted?

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, which should be considered. 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,[57] action to separate sidewalks from such traffic may be especially important.

Guideline 9. Ensure that sidewalks are always cleared of snow.

It's hard to push a stroller through uncleared snow, or to expect a toddler or even a slightly older child to walk. Thus, car journeys are made in winter on days when walking would be possible if paths were cleared.

If accommodation of young children's needs were to have a higher priority, snow-clearing from sidewalks and, where appropriate, 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 6 on the next page.)

It wouldn't be only young children and their caregivers who would benefit. Seniors and other frail people could benefit even more from proper snow clearing.

Box 6. Snow-clearing helps Duluth, Minnesota, win award[58]

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 as cyclists

Guideline 10. 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. Indeed, for youth (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, but see Box 10), 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 walking destinations are less than two kilometres distance (one kilometre for the youngest walkers).
- Ensure that bicycling destinations are less than about five kilometres from homes.

Guideline 11. For younger children, ensure that sidewalks are suitable for their tricycles and bicycles.

Children (under 13 years) generally ride on sidewalks unless there are bicycle paths. Such riding should be encouraged rather than seen as a nuisance to pedestrians.[59] 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.

Guideline 12. For destinations to be reached by bicycle, provide separate bicycle paths, and install bicycle lanes on regular roads only as a last resort.

Riding on sidewalks is a second-best solution, generally available only to children. The best solution, for all bicycle users, is to have bicycle paths. 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.

Figure 3. Priority for bicycles at an intersection in Münster, Germany[60]

Guideline 13. 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.)

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

Guideline 14. At destinations, provide secure, convenient bicycle parking.

Bicycle theft is a regrettable challenge 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.

Guideline 15. Encourage the carriage of very young children by bicycle, in appropriate seats or attachments.

In places where bicycling is common, children aged 10-30 months may be carried as much on adults' bicycles as they are by stroller. This can be a convenient and healthful way of carrying a child, and can provide the child with more visibility and interest. Where regular roads must be travelled, this use of a bicycle may require a higher level of acceptance of bicycle use and protection of bicycle users than is often found in Canada.

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

Figure 4. A family riding together in Kansas City, Missouri (children aged 17 months and four years)[61]

Figure 5. A mother riding with her two daughters in Amsterdam, The Netherlands.[62]

9. Providing for children and youth as transit users

Guideline 16. Ensure that every part of a transit system is safe and welcoming to a child, and affordable.

As noted above, youth can be heavy users of transit. However, they sometimes may not be as welcome as passengers as adults for fear 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. (See the example in Box 7.)

Box 7. Mississauga Transit's program to encourage use of transit for trips to school[63]

"Free Stuff" Incentive Leads to Student Transit Awareness

During this year's annual *Ride 2 School* Program, grabbing highschoolers' attention with "free stuff" was the incentive the City of Mississauga's Transportation and Works Department used to educate students about public transit being an option for school transportation.

Reaching out to approximately 10,000 students in total, the program took place during school registration and orientation week and targeted ninth graders and students new to the community.

Thirteen City staff members along with 6 student volunteers set up displays at each of the 24 participating Mississauga schools and distributed customized information packages to students which detailed school-specific transit routes, schedules and ticket/pass sale information.

"We're all ecstatic about how the annual *Ride 2 School* program has been gaining popularity over the past few years," said Transportation and Works Marketing Coordinator Pat Runzer. "I've been getting phone calls from schools just to confirm that we will be attending the orientation and distributing transit information - obviously the schools appreciate our efforts."

The "free stuff" incentive came from corporate sponsors Burger King, and Classic Bowl supported the *Ride 2 School* program by offering free French fries and half hour free bowling. The coupons were neatly packaged in prize wallets and distributed to students along side the transit packages. The Hershey Centre will provide each school with complimentary tickets to a Mississauga Ice Dogs game.

Ride 2 School packages were also distributed to post secondary students at the University of Toronto's Mississauga Campus and Sheridan College in Brampton. Students can access detailed schedule information by visiting "Ride 2 School" at www.mississaugatransit.com.

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

Children of seven or eight years and older are capable of using transit systems alone, but unsupervised use often does not start until teenage years. In many places, this represents lost opportunities for children's independent mobility.

Useful objectives for the planning of a transit system could be that eight- or nine-year-old children are confident about using it without supervision, and that the children's parents are comfortable about such use.

Municipalities and transit systems might want to consider these objectives 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.

Guideline 17. Avoid transfers by routing vehicles where children want to and need to go; make transfers easy where necessary.

A challenging feature of transit systems for younger children is the frequent requirement to transfer between routes and even between modes. Transfers can be avoided by more appropriate routing of vehicles.

Where transfers are nevertheless required, directions 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 in mind can result in systems that are attractive to a wide range of users.

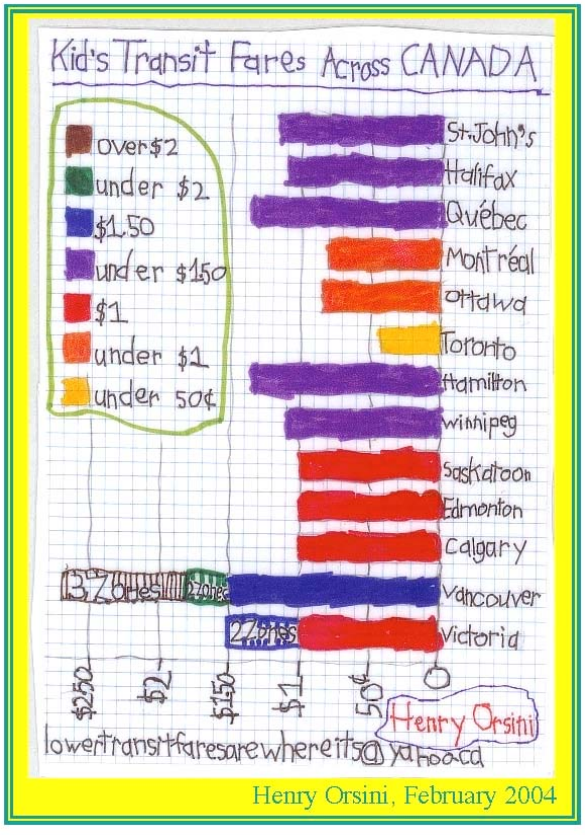
Guideline 18. Keep fares for children low, so as to encourage their use of transit systems, with or without supervision.

Children's fares vary greatly, even between transit systems serving adjacent areas. For example, in one place the children's cash fare is 50 cents and in the neighbouring area the children's cash fare is $2.25, the same as the adult fare.[64]

Low fares for children can be an investment in future regular riders.

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, along the lines of the U-pass available to students of many universities in Canada.

Figure 6. A 9-year-old Vancouver resident's research on transit fares)[65]



Guideline 19. Examine every aspect of the 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 subway stations; low-floor vehicles can be used (see Box 8 on the next page). A lower-cost option can be to encourage a culture of watching out 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 help 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 8. Saskatoon promotes its low-floor buses[66]

Low Floor Buses Make Travelling Easier For Everyone

Saskatoon Transit Services introduced Low-Floor Services in 1996 to improve access to our service for all customers, including those with canes, crutches, walkers, young children, or burdensome packages. Our Gold Leaf (acronym for Low Easy Access Floor) Service allows many more people with reduced mobility the freedom and independence of using public transit services.

In addition, our Low-Floor buses are able to provide service for up to two passengers at a time who use mobility devices such as a wheelchair or scooter.

We've dedicated these buses to certain regular routes in the city where potential demand for accessibility features are the greatest.

What's Different About a Low-Floor Bus?

The main difference with a Low-Floor bus is that there a no steps to go up or down at the front and rear doors. The floor between the front and rear doors is just 14 inches above the ground.

The front entrance is also equipped with a "kneeling" feature which, upon request, further lowers the front step to about 25 centimetres from the ground or about 10 centimetres from a curb. In addition, the bus is equipped with a driver-controlled retractable fold-out ramp, which when folded out to the curb makes for a virtually flat entrance into the bus.

Take a close look at our Low-Floor buses… they'll change the way you think about public transit!

10. Concerning school buses

More person-kilometres may happen in school buses in Canada than in the vehicles of all of Canada's transit systems. 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 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 arise because residential densities are low or schools are large, or both.

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.

Parents could be encouraged to take their young children to school by regular transit by not requiring they 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 after first use, rather than for a particular trip, are more convenient for dropping off children. (About 15 transit systems in Canada have this kind of fare system.)

Parents may sometimes welcome long school bus journeys for their children because they can leave for work earlier knowing that someone else is responsible for their children. If this is true, it would likely be less true if information about potential poor air quality inside school buses were better known (See Section 3.2 above.) Shorter school bus journeys could create a need for additional child care, perhaps at the school. The public cost of providing such care could be lower than the cost of ill-health through exposure to in-vehicle pollution.

Guideline 20. Reduce the time children spend in school buses to a maximum of no more than 40 minutes per day.

Children can spend quite long periods 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).[67] Considering the potential for poor in-vehicle air quality (see Section 3.2 above), the guideline proposed here—admittedly arbitrary—could be more reasonable.

Box 9. Guidance to school officials developed as part of the Clean School Bus USA program[68]

- Establish anti-idling policies.
- Work with bus companies to ensure anti-idling policies are adopted.
- Minimize the time that children spend outside when school buses are arriving or departing
- If possible, shorten commute times for children.
- Discourage drivers from following directly behind other large vehicles, including school buses – especially if they see visible smoke being emitted.
- Deploy cleanest buses on longest routes.
- Post no-idling signs on school grounds.
- Provide a space inside the school where drivers can wait on cold days.
- Limit idling of delivery vehicles on school grounds.
- Develop educational programs for students about air pollution.

Concern about the exposure of children to poor air quality in school buses appears to be stronger in the U.S. than in Canada. However, guidance to U.S. school officials does not propose a maximum journey time, only that commute times for children should "if possible" be shortened (see Box 9).

Achieving the proposed guideline could be costly in terms of the need for additional buses and operators, and even additional schools. On the other hand, given the evidence noted in Section 3.2 on air quality in school buses, not reducing children's exposure to pollutants in these vehicles could be more costly.

Alternatives would be to design school buses so that there is little infiltration of polluted air or to ensure adequate ventilation. However, these options would not reduce the time children spend in buses, forfeiting the opportunity of exercising, or the time during which they see the world as a passing show rather than something to be interacted with.

Yet another alternative would be to reduce 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 by secondary school students where the distance is at least 3.2 kilometres, or less if there is room on a bus.[69] Box 10 suggests that requiring longer walks could be beneficial.

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 kilometre. 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.

Box 10. Chicago 17-year-old loses 105 lb (48 kg) after being barred from school bus [70]

Caveman cure-all

Some say that if we tried the ancient hunter-gatherer lifestyle, our aches, pains and fat would vanish

Chicago Tribune

By Ross Werland
April 10, 2005

One of the best things that ever happened to 17-year-old Drew Garland was being barred from his school bus after a conflict with another student. It forced him out of a sedentary lifestyle and into a walking routine that helped him drop more than 100 pounds.

He freefell to 235 pounds from 340 in the last year.

"I had lost a little bit before that," the DeKalb High School junior said, "but when I started walking everywhere, that's when I started losing way more. I wouldn't sit around the house and eat as much."

His mother, Christine, also said he quit eating whole bags of potato chips and boxes of crackers at one sitting.

He had never thought of it this way, but having to walk to or from school 2½ miles [4 km] away, in addition to hoofing it as simple transportation around town, was taking him back toward what his body was built for: a daily workout that still would have been an easy day for his genetic ancestors, the hunter-gatherers.

Many researchers believe that the rest of us in this nation of bloated bodies could use the same sort of jolt, returning to a semblance of our genetic roots as Paleolithic pre-agricultural hunter-gatherers in daily physical routine and diet.

Being born in this modern age, we have no obvious reference point that would tell us the way we live isn't right, except our bodies are rebelling with such conditions as obesity and diabetes. To remind us, our own government is calling two-thirds of us fatsos.

Despite what our brains think, researchers say, every other fiber of our being has been fine-tuned through evolution to mount a day-to-day scramble for sustenance. Our bodies still expect it.

They were set in their ways after billions of years of evolution. Then about 10,000 years ago—a blink of an eye in that context—we began farming and eating many things we had never eaten before. For a religious reference, think of it as when Adam and Eve left the garden. Then in the last century, we even "technologized" our way of physical labor.

Yet "your body is locked back in evolutionary time," said Dr. Henry S. Lodge, a Manhattan internist on the faculty of Columbia University's College of Physicians and Surgeons.

That means our bodies expect us to cover, by modern hunter-gatherer standards, 6 to 12 miles a day on foot in a hunt for vegetables, fruits and small, lean game, none of which would lead to obesity.

…..more

11. Concerning children and youth in automobiles

Guideline 21. Where destinations cannot be reached by foot, bicycle or transit, ensure nevertheless that they are as near as possible to reduce in-car time.

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 may 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 in respect to Guideline 4—can contribute to location of facilities in ways that reduce travel time. Such facilities would include recreation centres and parks, and even shopping malls, as well as schools.

Guideline 22. When children must travel in vehicles, act to avoid poor in-vehicle air quality.

A potential hazard to children in vehicles is poor in-vehicle air quality. This can arise from the vehicle's own emissions, but it is more likely to result from emissions from other vehicles.

As well as avoiding the need for children to travel by car, and keeping necessary journeys short, the following actions can be taken to prevent the exposure of children and youth to poor in-vehicle air quality:

- Avoid driving in heavy traffic.
- Avoid driving close to other traffic, especially vehicles with diesel engines.
- Avoid idling.
- Use vehicles for which the manufacturer has considered the possibility of poor in-vehicle air quality and has taken design steps to minimize it.
- Ensure a free flow of air through the vehicle at all times.

Note that many of these suggestions match those made by the U.S. Environmental Protection Agency for of school buses (see Box 9).

Guideline 23. Drive slowly, to be safe and to facilitate an interest in the passing show.

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 in respect of children in terms of years of life lost, years of life enduring major disability, and years of life suffering from major trauma. Thus the imperative to travel slowly and carefully when children are passengers is strong, as well as the more general requirements regarding vehicle speed set out in Guideline 25.

An additional point is that the ability to view and reflect on what is being passed is reduced with speed. Thus, a child travelling in a slowly moving vehicle can gain more familiarity with a neighbourhood, although much less than if the route were walked or cycled.

Finally, driving habits in adulthood may be influenced by experiences of being driven as a child. A child exposed to speedy dangerous driving may grow up to become a speedy dangerous driver.

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

The guidelines in this section are directed towards reducing all adverse traffic impacts in a community. Children and youth appear to be particularly vulnerable to these traffic impacts. Therefore, reducing all traffic impacts could have an especially beneficial effect on children. 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 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 obligations under the Kyoto Protocol to reduce GHG emissions.

Guideline 24. Take all possible steps to reduce amounts of road traffic generally.

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

- Discouragement of car ownership (in that ownership is a major factor determining car use).
- Discouragement of car use when a car is owned.
- Facilitation of alternatives, including provision of pedestrian and bicycling infrastructure and provision of adequate, comprehensive public transport.
- Deployment of 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.

Guideline 25. In urban areas, post and enforce much lower speed limits.

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

Chiefly to provide a better, safer environment for children and youth, but also to 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, particularly Figure 2 on Page 15, 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 (see Figure 2).

This may be the most controversial guideline of the present set because it speaks to a radically different relationship between vehicles and the urban environment, in which the speed for which vehicles exist becomes more strongly subordinated to other requirements, notably but not only those of children.

Nevertheless, many municipalities are lowering traffic speed limits. Achievement of significant changes in traffic speed may require additional measures (see Box 11).

Box 11. Lowering traffic speeds in Toronto[71]

Recently, a proposed policy and evaluation criteria were presented to Toronto City Council in order to harmonize the previous traffic calming policies and practices.

During the development of the policy proposals, staff evaluated the effectiveness of recently installed physical traffic calming measures. The highlights with respect to speed control are as follows:

On suburban collector roads, where speed limits have been reduced from 50 km/h to 40 km/h in conjunction with traffic calming, 85th percentile speeds have been lowered from 61 km/h to 47 km/h where 75-mm speed humps were used approximately 75 metres apart. The use of a pinch point and median 80 metres apart decreased 85th percentile speeds from 63 km/h to 56 km/h.

On downtown collector roads (approximately 6,000 annual average daily traffic), where the speed limit was lowered from 40 km/h to 30 km/h with 75-mm speed hump installations, 85th percentile speeds between 33 and 36 km/h were obtained. The ‘before’ speeds were 44 km/h on relatively short blocks (160 m), 50 km/h on mid-length blocks (280 m), and 58 km/h on long blocks (760 m).

On suburban local roads, where the speed limit was reduced from 50 km/h to 40 km/h in conjunction with 75-mm speed humps, 85th percentile speeds of 38-42 km/h were achieved. The ‘before’ speeds ranged from 53-62 km/h.

On downtown local roads, where the speed limit was reduced from 40 km/h to 30 km/h in combination with 75-mm speed humps, 85th percentile speeds of 35-38 km/h were recorded. The ‘before’ speeds ranged from 41 km/h on short block lengths to 65 km/h on long block lengths.

On other local roads with these features—40 km/h speed limit, medium block lengths, 100-mm raised crossings at one end, 100-mm speed hump at the other end—experienced 85th percentile reductions from 51 to 44 km/h with 2 mid-block throat narrowings 75 metres apart, and experienced reduction from 50 to 40 km/h where one mid-block road narrowing combined with a 100-mm speed hump at the same location was used.

On other one-way local streets of medium (240 m) block lengths, where two 100-mm speed humps were installed 65 metres apart (one with a narrowing), 85th percentile speeds were reduced from 50-40 km/h with a 30 km/h speed limit, and from 53-43 km/h with a 40 km/h speed limit.

On another local road with a 40 km/h speed limit, intersection throat narrowings alone achieved an 85th percentile of 38 km/h on block lengths ranging from 200-250 m. ‘Before’ speeds ranged from 40- 44 km/h.

In Europe, low speed limits in residential and other areas are common. However, speed limits on urban arterial roads are as high or higher than they are in Nova Scotia (see Box 12).

Box 12. Traffic speed limits in Europe and Nova Scotia (kilometres/hour)[72]

	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 26. Use 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 subway trains—are usually more expensive than buses because of the special infrastructure required, although, for given levels of ridership they generally have lower operating costs. Quite 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 comfort about availability can all be conducive to children's health and well-being. In a city where children were 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, 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).

Guideline 27. Where possible, encourage use of rail for freight, and use of electric vehicles, including hybrid vehicles, where road freight must be used.

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, with their own rail sidings.

Hybrid trucks, which use electric motors to supplement their diesel engines, are coming onto the market. From a children's 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.

Again, if children's needs were put at the forefront, shifts to rail and adoption of new technologies could be implemented earlier.

PART III. APPLYING THE GUIDELINES

13. Barriers, and actions to overcome the barriers

Table 2, beginning on Page 53, lists several potential barriers to implementing a set of guidelines such as are set out here. There are suggestions as to how the barriers might be overcome, and an indication as to who might be able to take useful action.

Several more such actions have been identified during numerous consultations conducted by The Centre about children and transport, mostly in Ontario. Many could have application to Nova Scotia and are listed below.

Formal education and public awareness regarding children and transport

- The key to marketing change is the school system (see Box 13)
- Involve home and school associations in efforts to increase children's active transport
- Educate developers
- Couple safety strategies for seniors with safety for children
- Provide more carpooling promotion
- Use day care newsletters to provide information
- Present messages regarding children and transport at events in shopping malls
- Provide messages regarding children in the course of 'No Idling' campaigns
- Provide promotion of and help with carpooling at municipal Web sites, and also messages regarding children's transport
- The school injury prevention program provides an opportunity to present messages regarding transport
- Breast cancer prevention programs—"walking is a good preventive measure against cancer"—could add words promoting parents walking with children
- Comprehensive presentations on children and transport could be made at traffic safety events

Text continues on next page

Box 13. On the importance of schools for promoting public health[73]

> With the exception of the family, schools have more influence on the lives of children and youth than any other social institution. Canada's schools form the 'work-place' of 20 per cent of our population, including five million students and over 400,000 employees. Another 30 per cent of the population (parents) has a direct stake in schools through their children. Consequently, the school is a key site within the community for promoting health.

Land use planning and transport planning to promote active transport and reduce auto-dependency

- Develop bike/walk trails for additional modes, notably skateboards and roller-blades
- People from many sectors could be brought together to discuss this topic: health, education, transport planning, urban and regional planners, developers
- Development plans should provide locations for early childhood education centres away from arterial roads (although not so far away as to impede accessibility)
- Insert transport information into discussions and planning concerning the social determinants of health

Table 2. Barriers, actions to overcome barriers, and who might be able to act

BARRIERS IDENTIFIED	*ACTIONS RECOMMENDED TO OVERCOME BARRIER*	*RESPONSIBLE AGENCIES*
Challenge 1: Increase children's active transport for the trip to school		
Lack of sidewalks.	Construct sidewalks on safe routes to school.	Municipality
Lack of bike paths on route to school.	Construct paths that lead to schools.	Municipality
Traffic safety fears.	The Walking School Bus program helps children to learn safe behaviour and provides adult supervision for school trips. Create disincentives for car use. Educate drivers to respect cyclists and pedestrians. Educate cyclists.	School School board Municipality
Security fears related to not knowing neighbours, perhaps because of rapid turnover, and to fear of abduction.	Implement Walking School Bus programs (Active and Safe Routes to School). Organize community development. Encourage more 'eyes on the street'. Promote Neighbourhood Watch.	School School board Municipality
Lack of parental awareness regarding short- and long-term health impacts of driving their children rather than supporting active transport.	Introduce curriculum material helping children understand links between transport, physical activity, and health. They in turn may educate their parents. Introduce awareness strategies to inform general public. Introduce concepts early in life through early years programs and day care centres.	Department of Education School board
School funding formulas encourage construction and use of large schools that are more likely to have traffic congestion than smaller schools.	The Department of Education, school board trustees and planners should work towards planning and transport solutions that encourage active transport.	Department of Education School board
Kiss 'N Ride facilities at school reduce congestion but encourage car use.	Provide disincentives for dropping children by car while maintaining safe school sites.	School board School
Educators may not see transport to school as their responsibility.	School boards, principals and teachers should reinforce messages regarding active transport.	School board School
Parents 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

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 is not always conducive to walking 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 not located within easy walking and cycling distance.	When recreation facilities cannot be located within the community, consider and promote options for carpooling and transit.	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.	Design routes to children's preferred destinations that help keep them away from busy streets. Support traffic safety programs. Deploy infrastructure that increases congestion, slows down traffic, and discourages car use.	Municipality
Lack of parental awareness regarding short- and long-term health impacts of motorized transport and lack of physical activity.	Introduce public awareness and education programs (See Challenge 1).	District health authority
Time pressures: Parents chain trips; children are registered for day care near work to avoid possible late fees if the parent is delayed in traffic on the way home.	Parents would benefit from flexibility in hours of work. Expand teleworking. Parents may need to reconsider the value of involving children in structured activities (present practice results in less unstructured time for the child and more time spent travelling by car).	Parents

Challenge 3: Reduce adult automobile use (and thus children's exposure in and outside vehicles)		
In many municipalities only 50 per cent of residents work near where they live.	Increase opportunities for higher 'live-work' ratios.	Municipality
Transport needs are complex and cannot be handled adequately by existing transit services.	Require dedicated, sustainable financing for expansion of transit	Department of Service Nova Scotia and Municipal Relations Municipality
Adults do not consider the impact of their car use on their health or on children's health; mostly they think only of getting to their destinations on time.	Provide education and public awareness strategies regarding transport and children. Introduce incentives and disincentives favouring sustainable transport.	District health authority Department of Service Nova Scotia and Municipal Relations
Highways and busy arterial roads bisect walking and cycling routes, causing them to be seen as unsafe or unpleasant.	Give higher priority to walking and cycling as a mode of transport. Design routes that are safe and pleasant for pedestrians and cyclists.	Municipality Department of Transportation and Public Works
Adults and youth feel they lack transport options beyond the car.	Design new developments that are less auto-dependent.	Municipality
Transit is not perceived as convenient if user is required to transfer more than once	Increase financial support for transit.	Department of Service Nova Scotia and Municipal Relations Municipality

14. Involving children and youth in identifying and resolving problems

Children and youth already have a lot of information and ideas about land use and transport, especially the latter. It's hard to live in our society without travelling a lot and being affected by other people's travel. However, children and youth often see the world differently from adults, and do not always share their attitudes. This includes attitudes about land use and transport issues.

Even though young people necessarily pick up a lot from everyday life, formal education about land use and transport can help them figure out 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 *A Kid's Guide to Building Great Communities: A Manual for Planners and Educators*.[74]

There is no equivalent resource for transport issues, and the *Kid's Guide* mentioned in the last paragraph hardly touches on the powerful interactions between transport and land use. However, there are teaching resources on transport. A good example is *You Can Clean the Air*, a CD-ROM produced by the Region of Waterloo (see Box 14).

What may be needed are resources on land use and transport suitable for high-school use that could help take students further than the two excellent resources noted above.

Box 14. Region of Waterloo's statement concerning its teaching resource for use with Grade 3 students: *You Can Clear the Air*[75]

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.

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, as documented above, there is a set of problems concerning transport and young people, and the young people themselves, who experience these problems, are likely to be able to contribute to solutions.

The second is that some transport modes involve substantial numbers of young people. More than half of workday walk/cycle trips can be made by people aged 11-18, who can also make more than one in six transit trips.[76] As for any other activity, it's a good strategy to question the 'customers' as to how things can be improved.

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 (Box 15).

Box 15. UNICEF's concept of a Child Friendly City[77]

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 16. Announcement of the 2003 Pathways for People Tour of Nova Scotia [78]

A team touring Nova Scotia from May to November will promote the value of active transportation in improving health, physical activity, air quality and traffic congestion.

"We want to increase awareness around the benefits of being active," said Health Promotion Minister Rodney MacDonald. "The tour will promote physical activity as a low-cost method of transportation—leave the car at home and improve your overall health."

The minister said two-thirds of Nova Scotians are not active enough to achieve health benefits. Active transportation—walking, biking or using other modes of non-motorized travel for trips within the community—can make a difference.

"Walk to the corner store, cycle to school or work—these are easy ways to increase activity within the normal routine," Mr. MacDonald said.

The tour will focus on youth and challenge communities to increase active ways to travel. The tour's 25 community visits will include public forums and meetings with schools, youth groups and community decision-makers. They will distribute tool kits of best practice guides and reference materials.

"Active transportation is an easy, low-cost activity that has so many benefits," said Robynn Moody, one of two facilitators organizing the tour. "Reduced greenhouse gas emissions and parking costs are important benefits, and regular exercise has been proven to improve energy and productivity levels—it's a win-win concept."

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 Tour's announcement is in Box 16. Legacies of the Tour include the Ecology Action Centre's 'Pathways for People" program and its quarterly publication *Walking and Wheeling*.[79]

15. Towards implementation of the guidelines

The key guidelines are the first two, set out in Section 6 on Page 25. 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 by provincial recognition. This could involve posting of the guidelines at the Web site of the Department of Service Nova Scotia and Municipal Relations and other promotion by the provincial government.

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*.[80] 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.

Acknowledgements

It was a challenge to begin consideration of guidelines for Nova Scotia from distant Ontario, and we were enormously fortunate to have the help of Janet Barlow of the Ecology Action Centre in Halifax. Janet coordinated comments on an earlier Ontario-focussed draft by several of her colleagues in a way that helped us understand the scope and the nature of the changes needed to achieve a version that would be used in Nova Scotia. We know we are still quite a way from achieving such a version, but without the help of the kind people listed below we would be much further away. Subsequent stages in the development of Nova Scotia guidelines will need to be led or co-led by a Nova Scotia partner.

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Gary McLaughlin, Prospect, Nova Scotia

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Fred Sztabinski, Canadian Urban Transit Association, Toronto, Ontario

The authors and The Centre for Sustainable Transportation are entirely responsible for the content of this document, which does not necessarily reflect the views of any of the persons noted above.

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End Notes

[1] The quotation is from *Ministers' Report to Nova Scotians 2003-04*, available at the URL below.
1. http://www.gov.ns.ca/health/report/Ministers-Report-to-Nova-Scotians.pdf. Accessed April 15, 2005.

[2] 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 2 on Page 26).
1. http://www.tpl.org/tier3_cd.cfm?content_item_id=10710&folder_id=2225. Accessed April 14, 2005.

[3] The quotation is from Pages 116-117 of Duany A, Plater-Zyberk E, Speck J, *Suburban Nation: The Rise of Sprawl and the Decline of the American Dream*. New York: North Point Press, 2000.

[4] 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://www.cstctd.org/english/docs/Kids%20on%20the%20Move%20in%20Halton%20and%20Peel%20final%20report.pdf. Accessed April 14, 2005.

[5] Elementary and secondary enrolment fell in Nova Scotia between 1990 and 2000 from 169,630 to 160,844 (-5.2%) but the number of schools fell proportionately more, from 558 to 512 (-8.2%). Thus, average enrolment per school increased from 304 to 314. The trend to larger schools was evident throughout Canada, except in Alberta and Quebec. These data are from *Education Indicators in Canada*. Canadian Education Statistics Council, 2003, available at the URL below.
1. http://www.cesc.ca/pceip/PCEIP2003en.pdf. Accessed April 12, 2005.

[6] The quote is from Page 284 of *The Health of Canada's Children*, 3rd edition, Ottawa: Canadian Institute of Child Health (2000), available at the URL below.
1. http: www.cich.ca/Publications_monitoring.html#Profile3. Accessed April 14, 2005.

[7] See, for example, Evans G, Kantrowitz E, Socioeconomic status and health: the potential role of environmental risk exposure. *Annual Review of Public Health*, 23, 303-331, 2002.

[8] See, for example, Yantzi N, et al. The impacts of distance to hospital on families with a child with a chronic condition. *Social Science and Medicine*, 52, 1777-1791, 2001.

[9] Biddle S, Marshall S, Murdey S, Physical activity and sedentary behaviour in youth: issues and controversies, *Journal of the Royal Society for the Promotion of Health*, *124*, 29-33, 2003.

[10] 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.
1. http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=GR_1130_E. Accessed April 14, 2005.

[11] Evenson KR, Huston SL, McMillen BJ, Bore P, Ward DS, Statewide prevalence and correlates of walking and bicycling to school. *Archives of Pediatrics & Adolescent Medicine*, 157, 887-892, 2003.

[12] Fox K, Childhood obesity and the role of physical activity. *Journal of the Royal Society for the Promotion of Health*, *124*, 34-39, 2003.

[13] See Go for Green, *National survey on active transportation: Summary report*. Ottawa, Ontario: Go for Green and Environics International, 1998, available at the URL below.
1. http://www.goforgreen.ca/active_transportation/pdf/AT%20Survey.pdf. Accessed April 14, 2005.

[14] 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. Accessed April 14, 2005.
2. http://www.statcan.ca/english/freepub/82-221-XIE/00604/nonmed/behaviours3.htm. Accessed April 14, 2005.
3. http://www.cflri.ca/cflri/pa/surveys/2002survey/2002survey.html. Accessed April 14, 2005.

[15] Figure 1 is from Page 6 of the source detailed in Note 1, which is based on the sources detailed in Note 14.

[16] These data are from the first source detailed in Note 14.

[17] Mackett RL, *Reducing children's car use: the health and potential car dependency impacts*. Report on a program of research, May 2004. Available at the URL below.
1. http://www.cts.ucl.ac.uk/research/chcaruse/Trandh90.pdf. Accessed April 14, 2005.

[18] 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. Accessed April 14, 2005.

[19] The data on traffic injuries and mortality are from the source detailed in Note 6 and from the part of the Transport Canada Web site at the URL below.
1. http://www.tc.gc.ca/roadsafety/tp/tp13951/2001/page3.htm. Accessed April 14, 2005.

[20] In 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, December 2003, available at the URL below), 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 source detailed in Note 19 reported 282 traffic-related fatalities of children and youth aged 0-14 years in 2000-2001 and 21,827 traffic-related injuries.
1. http://www.ourmissingchildren.ca/en/publications/abduction_e.pdf. Accessed April 14, 2005.

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

[22] The data to this point 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.
1. http://www.nhtsa.dot.gov/people/injury/research/pub/HS809012.html. Accessed April 14, 2005.

[23] Figure 2 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://europa.eu.int/comm/environment/youth/air/kids_on_the_move_en.pdf. Accessed April 14, 2005.

[24] 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://oecdpublications.gfi-nb.com/cgi-bin/ OECDBook-Shop.storefront/. Accessed April 14, 2005.

[25] 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.
1. http://www.euro.who.int/document/E83080.pdf. Accessed April 14, 2005.
2. http://www.euro.who.int/eprise/main/WHO/Progs/AIQ/Activities/20020530_1. Accessed April 14, 2005.

[26] See the sources detailed in Note 25.

[27] The work on appearance of respiratory symptoms is summarized in Table 1 of *Transport-related health impacts—Costs and benefits, with a particular focus on children: Synthesis report (first draft)*. Herry Consult (Vienna, Austria) for UNECE-WHO Transport, Health and Environment Pan-European Programme (THE-PEP), 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://herry.at/the-pep/down/malta/Input-Paper_Malta_Synthesis-First-Draft.pdf. April 14, 2005.

[28] See Tables 3 and 4 of the source detailed in Note 27. 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.

[29] Pearson R, Wachtel H, Ebi K, 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, (2000).

[30] See the sources detailed in Note 25. See also Peters J and 19 other authors, *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, May 2004, available at the URL below.
1. http://www.arb.ca.gov/research/abstracts/94-331.htm#Executive. Accessed April 14, 2005.

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

[32] This quotation is from International Centre for Technology Assessment (2000). *In-Car Air Pollution: The Hidden Threat to Automobile Drivers*. International Centre for Technology Assessment, Washington DC, 2000, available at the URL below.
1. http://www.icta.org/doc/In-car%20pollution%20report.pdf. Accessed April 14, 2005.

[33] 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. Accessed April 14, 2005.

[34] 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. Accessed April 14, 2005.

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

[36] Leung P-L, Harrison RM, Traffic-related exposure to benzene and toluene. *International Journal of Vehicle Design*, 20, 55-59, 1998.

[37] 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. Accessed April 14, 2005.
2. http://www.parliament.nsw.gov.au/Prod/Parlment/Committee.nsf/b473bbb2280541a8ca256cf5002b1309/145aad0daca500f4ca256c780013cc65/$FILE/Report%2026.52%20Clean%20Air%20report%20-%20Vertical%20exhausts%20for%20diesels%20over%204.pdf. Accessed April 14, 2005.
3. http://www.isuzu.com.au/news.asp?id=146. Accessed April 14, 2005.

[38] 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://www.uws.edu.au/download.php?file_id=5009&filename=6.2_FINAL_TranterMalone.pdf&mimetype=application/pdf. Accessed April 14, 2005.

[39] See Hillman M, Adams J, Whitelegg J, *One false move: A study of children's independent mobility*. London, UK: Policy Studies Institute, 1990, 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, Children's freedom and safety. *Children's Environments*, *9(2)*, 10-22, 1992.
1. http://www.psi.org.uk/publications/ENVIRON/onefm.htm. Accessed April 14, 2005.
2. http://www.psi.org.uk/publications/publication.asp?publication_id=26. Accessed April 14, 2005.

[40] See Evans G, Lercher P, Meis M, Ising H, Kofler WW, Community noise exposure and stress in children. *Journal of the Acoustical Society of America*, *109*, 1023-1027, 2001. (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.)

[41] Information about the RANCH project (Road traffic and Aircraft Noise exposure and Children's cognition and Health) is available at the URL below.
1. http://www.ranchproject.org/. Accessed April 14, 2005.

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

[43] The evidence is reported in the source detailed in Note 27. 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?

[44] See Page 18 of the source detailed in Note 23.

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

[46] 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). The press release and an attachment are available at the URL below.
1. http://www.cde.ca.gov/nr/ne/yr02/yr02rel37.asp. Accessed April 14, 2005.

[47] From the testimony of Professor Leon James, University of Hawaii, before the Committee on Transportation and Infrastructure, U.S. House of Representatives, July 17, 1997, available at the URL below.
1. http://commdocs.house.gov/committees/Trans/hpw105-34.000/hpw105-34_0f.htm. Accessed April 14, 2005.

[48] 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 4. 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, How does a family car matter? Leisure, travel & attitudes of adolescents in inner city Stockholm. *World Transport Policy & Practice*,

8, 11-18, 2002, available at the URL below.
1. http://www.eco-logica.co.uk/wtpp08.1.pdf. Accessed April 14, 2005.

[49] The statement is on Page 58 and again on Page 98 of *Mobility 2030: Meeting the challenges of sustainability*. World Business Council for Sustainable Development, Geneva, Switzerland, May 2004, available at the URL below.
1. http://www.wbcsd.org/web/publications/mobility/mobility-full.pdf. Accessed April 14, 2005.

[50] 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/legi/legc/statutes/motorv.htm. Accessed April 12, 2005.
2. http://www.injuryresearch.bc.ca/Publications/Reports/Small%20Wheeled%20Vehicle%20Position%20Paper%20June%2003.doc. Accessed April 14, 2005.

[51] For information about the Cole Harbour skateboard park, see the URL below.
1. http://www.halifax.ca/mediaroom/pressrelease/pr2001/010810skateboardpark.html. Accessed April 14, 2005.

[52] For information about Halifax Regional Council's 2005-2006 budget, see the URL below.
1. http://www.halifax.ca/mediaroom/pressrelease/0502222005-06Budget.html. Accessed April 14, 2005.

[53] Box 1 contains text from the database of 'successful stories' in the Recreation Nova Scotia section of the Lifestyle Information Network. The actual item is available at the URL below.
1. http://www.lin.ca/rns/SStory/dsp_SStory.cfm?SStoryId=105. Accessed April 14, 2005.

[54] Box 2 contains several consecutive paragraphs from the source detailed in Note 2.

[55] For more information about Burlington's MYAC, visit the URL below.
1. http://cms.burlington.ca/English/Mayors-Youth-Advisory-Committee.html. Accessed April 14, 2005.

[56] 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. www.ks.no/upload/4340/EvaAlmhjell_paper.doc. Accessed April 14, 2005.
2. http://www.norden.org/miljoe/sk/FinalreportMalm%C3%B8.pdf. Accessed April 14, 2005.

[57] For discussion of this point, see Note 37 above.

[58] 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. Accessed April 14, 2005.

[59] The *Nova Scotia Motor Vehicle Act* (see Note 50) 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/legi/legc/statutes/motorv.htm. Accessed April 12, 2005.

[60] The photo in Figure 3 is from the URL below.
1. http://pbisotopes.ess.sunysb.edu/bicycle-muenster/bike-intersection-1_small1.jpg. Accessed April 14, 2005.

[61] The photo in Figure 4 is from the URL below.
1. http://www.precisiontandems.com/art16moolddiary.htm. Accessed April 14, 2005.

[62] The photo in Figure 5 is from the URL below. Note that none of the three is wearing a helmet, quite unacceptable for children in Canada but normal in The Netherlands, where bicycle riding is very much an everyday means of transport.
1. http://www.brooks-photo.com/images/Netherlands/SAMS0038.jpg. Accessed April 14, 2005.

[63] Information about Mississauga Transit's *Ride 2 School* program is at the URL below.
1. http://www.mississauga.ca/portal/residents/publictransit?paf_gear_id=9700018&itemId=24400009. Accessed April 14, 2005.

[64] These examples are from Toronto (Toronto Transit Commission, at the first URL below), where the children's basic fare is 60¢, or 10 tickets for $4.50, 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 $2.25 (the same as the adult fare), or 10 tickets for $12.00.
1. http://www.city.toronto.on.ca/ttc/fares.htm. Accessed April 14, 2005.
2. http://www.yorkregiontransit.com/fares.asp. Accessed April 14, 2005.

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

[66] Many transit systems have low-floor buses. Saskatoon Transit Services specifically recognizes their value to people with young children. Box 8 is from the URL below.
1. http://www.city.saskatoon.sk.ca/org/transit/low_floor.asp. Accessed April 14, 2005.

[67] For the Halifax Regional School Board's Pupil Transportation Policy, see the URL below.
1. http://www.hrsb.ns.ca/downloads/pdf/board/policy/sectionB/B.009-pupil-transportation.pdf. Accessed April 12, 2005.

[68] The Clean School Bus USA program is an initiative of the United States Environmental Protection Agency. Details are at the URL below.
1. http://www.epa.gov/otaq/schoolbus/index.htm. Accessed April 14, 2005.

[69] See the source detailed in Note 67.

[70] Box 10 contains the opening paragraphs of a *Chicago Tribune* article available at the URL below.
1. http://www.chicagotribune.com/features/lifestyle/health/chi-0504100461apr10,1,2615679.story?coll=chi-health-hed&ctrack=1&cset=true. Accessed April 12, 2005.

[71] Box 11 is from a paper *Traffic calming on residential streets* by City of Toronto official Peter Hillier presented at the North American Conference on Speed Management held by l'Association québecoise du transport et des routes in Quebec City, June 2001. It is available at the URL below.
1. http://www.aqtr.qc.ca/english/phellier_e.htm. Accessed April 14, 2005.

[72] The European data in Box 12 are based on Table 1 in Draskóczy M, Mocsári T, *Present Speeds and Speed Management Methods in Europe*, VTT, Finland, November 1997, available at the URL below.
1. http://www.vtt.fi/rte/projects/yki6/master/rep211.pdf. Accessed April 14, 2005.

[73] The text in Box 14 is from McCall D, Comprehensive school health: Help for teachers from the community. *Physical and Health Education Journal*, March 1999.

[74] The document *A Kid's Guide to Building Great Communities: A Manual for Planners and Educators* (undated) is available from the Canadian Institute of Planners at the URL below.
1. http://www.cip-icu.ca/English/images/kidsguide.pdf. Accessed April 14, 2005.

[75] The text in Box 14 is 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.

[76] These data are actually 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, i.e., 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.
1. http://www.jpint.utoronto.ca/dmg/tts.html. Accessed April 14, 2005.

[77] The definition of a child-friendly city is taken from material at the URL below.
1. http://www.childfriendlycities.org/. Accessed April 14, 2004.

[78] The announcement is in a press release issued by the Office of Health Promotion, Government of Nova Scotia, available at the URL below.
1. http://www.gov.ns.ca/news/printpage.asp?id=20030505004. Accessed April 14, 2005.

[79] For information about 'Pathways for People' and *Walking and Wheeling*, visit the URL below.
1. http://www.gov.ns.ca/ohp/srd/pathways/wwq.htm. Accessed April 14, 2005.

[80] The Nova Scotia *Municipal Government Act 2004* can be found at the URL below.
1. http://www.gov.ns.ca/legi/legc/statutes/muncpgov.htm. Accessed April 13, 2005.