From: I Murray <imurray@renc.igs.net>
To: <ephipps@ccemtl.org>
Date: 2/28/02 10:41AM
Subject: FW: Children's Environmental Health Document

Dear Erica,

I will be attending the Children's Environmental Health meeting in Mexico City next week and I have just read your draft document in preparation. I've attached a report that I completed last year regarding children and sustainable transportation. The introduction outlines some of the policy and strategy omissions that I have encountered in the transportation literature. It also addresses the aspirations of children for active transportation. My impression is that children's aspirations have been missing from many discussions regarding children's environmental health and transportation.

The "Impact List" that is included as an appendix, mentions many of the points that are already stated in your report though you will see that there are more. This list needs to be updated to incorporate the recent research regarding smog and lung function growth in children as well as the new asthma research.

I collaborated on this study with "Greenest City" and the Ontario Ministry of the Environment. During a discussion with my colleague at Greenest City last week, we recognized the need for a task force to be established that explores specific transportation-related strategies with respect to children. This seems to fall within the agenda that you are considering. This would help to put children more squarely on the "radar screen" of transportation planners and bring the specific vulnerabilities of children into transportation discussions that are considering sustainable transportation strategies. My impression is that CEC is in an ideal position to spearhead this initiative. I would love to have the opportunity to discuss this further with you and hope to bring this suggestion forward at the Mexico meeting.

Kindest Regards,
Dr. Catherine O'Brien

York Centre for Applied Sustainability
York University
355 Lumbers Building, York University
4700 Keele Street, Toronto, Ontario, Canada M3J 1P3

Ph: 613-754-2559
Fax: 613-754-9923

York Centre for Applied Sustainability
http://www.yorku.ca/ycas

Ontario Walkability Study

Trip to School: Children's Experiences and Aspirations

May, 2001

The best part of walking was in the hard rain. I walked with a friend and saw some worms and birds.

Miss LaMarca's Fifth Grade, Morton Way Public School in Brampton, Ontario

We walk to school Because...

"We can stop and say hello to a kitty or a pup and sing along with the birds"

Junior Kindergarten student, Maurice Cody Public School, Toronto

Greenest City

Working for a better atmosphere

Ontario

Ministry of the Environment

Ministère de l'Environnement

THE TRILLIUM FOUNDATION

LA FONDATION TRILLIUM

Laidlaw Foundation

ACKNOWLEDGEMENTS

The Walkability Study is the result of many collaborative efforts. The York Centre for Applied Sustainability was delighted to work in partnership with Greenest City and Ontario's Ministry of the Environment. Jacky Kennedy, Project Coordinator for Greenest City, was involved from the inception of the project and her wealth of experience has been invaluable. Greenest City coordinated the distribution and collection of the Walkability Surveys, assisted with data entry and discussions regarding data analysis. Thank you also to Satya Ramen, General Manager for Greenest City, who developed additional research questions that are relevant to the Active and Safe Routes to School program. Deborah Brooker, with the Ministry of the Environment, has been a tremendous support and offered many insightful comments on this report. The data analysis team at York University was led by John Sorrell who supervised two graduate students, Tanya Anand; and Eliza Mateusz. David Bell, Director of the York Centre for Applied Sustainability, also reviewed this report and his feedback is greatly appreciated. Finally, we would like to thank all of the schools and students who participated in the study.

Catherine O'Brien, Ph.D.
York Centre for Applied Sustainability
York University

The following sponsors contributed to International Walk to School Day 2000 which made the delivery of the Walkability Survey possible.

Transport Canada Transports Canada

FRIENDS of the ENVIRONMENT Foundation

TORONTO Atmospheric Fund

Ontario Walkability Study
Trip to School: Children's Experiences and Aspirations

The best part of the walk was that we got other people involved. We got some fresh air and were with our friends!

Zoe, Mr.Morris' Gr.5-8 class,, Caramat District School in Caramat, Ontario

We usually have almost 50 cars in the lot and today we only have 5!!!! And only a handful dropped off children because of the rain. Way to go everyone !!!!

Principal of Pine Grove Public School, Pine Grove Public School in St. Catharines, Ontario

Executive Summary

Nearly 75% of Ontario elementary children surveyed would prefer to walk or cycle to school. This is a remarkable statement. Their desire for active transportation has thrived, despite the cultural trend towards driving children to school.

During International Walk to School Day 2000 event, 6369 Ontario students completed a survey that explored questions regarding their usual travel mode, preferred travel mode, and experiences during their walk to school. All of the participating schools were enrolled in the event through Greenest City's Active and Safe Routes to School program.

A striking result from this survey is the large gap between the number of students who are currently cycling to school and those who would prefer to cycle. 3.5% of Ontario students surveyed ride their bicycle to school regularly. However, ***26.8% would prefer this mode of transportation.***

Another significant area of interest relates to the comparison of children who were surveyed who stated that they currently use active modes of transportation (walking and cycling), 61.2%, compared to ***72.2% who would prefer active transportation.***

The Walkability Study tells us that children would prefer to walk or cycle to school. This presents a challenge to parents, educators, transportation planners and government representatives at all levels. Children represent approximately 20% of our population and it is very encouraging that they still prefer active transportation. John Adams, of the Policy Studies Institute in London, England investigated the trip to school trends in Britain during the early

1990s. He warns that we may soon have a generation in Britain that no longer remembers walking to school. Canadian children have not yet followed that disturbing trend – though failing to remove barriers to walking and cycling could lead us in that direction.

Government bodies are developing sustainable transportation strategies and emphasizing the need for public education and awareness. While reports have touched on strategies which will benefit children, four key points appear to have been neglected:

1) the extensive impact of traffic on children, beyond basic air quality discussions;
2) children's aspirations regarding transportation choices;
3) specific strategies that would benefit children and meet their mobility needs, as well as educating the general public regarding risks and costs of current transportation trends, sustainable transportation choices and building public support;
4) opportunities to influence passenger travel related to the trip to school.

The Ontario Walkability Study provides information regarding these omissions and may be helpful for provincial and municipal strategy plans regarding sustainable transportation. Too often, the mobility needs of children are absent from these discussions.

This report provides survey results for the entire sample as well as a comparison of results for 12 municipalities – Toronto, Perth, Oshawa, Markham, North York, Vaughan, Richmond Hill, Oakville, Etobicoke, Mississauga, St. Thomas, and Kitchener.

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Ontario Walkability Study
Trip to School: Children's Experiences and Aspirations

Introduction

Reports from Transport Canada (1), the National Roundtable on the Environment and the Economy (2), the Centre for Sustainable Transportation (3), and many others, have outlined the pressing need to move towards more sustainable transportation. Outstanding groundwork has been accomplished with excellent recommendations offered. Moving from recommendations to action, and specifically influencing behaviour in the direction of sustainable transportation is critical. Passenger travel is a particular area of concern.

> ***Total demand for travel, as measured in passenger-kilometres (one passenger travelling one kilometre) reached 542 billion in 1997, an increase of four per cent in the last two years… urban travel accounts for 60 per cent of the GHG emissions from passenger travel, because urban passenger travel produces twice the amount of GHG emissions per passenger-kilometre*** . (4)

While many technology solutions are welcome, a sustainable transportation future will require more than simply transferring our auto-dependency to cleaner vehicles. Research regarding the impacts of cars on children suggests that reducing our car use is also an important goal (5). Otherwise, the sedentary lifestyle that children and youth have adopted, the number of traffic fatalities and injuries, restricted independent mobility and impoverishment of childhood experiences are likely to persist. Therefore, our efforts towards technology-based solutions must be coupled with strategies to influence driver behaviour and encourage non-motorized transportation.

There is a further consideration. Although technology that improves air quality and reduces greenhouse gases will mitigate some of the negative impacts on children, the acceptability of cleaner vehicles will likely reinforce auto-dependency. There is even evidence that past technological improvements have been offset by changed patterns of automobile use.

> ***Canada is facing continued growth in the number of vehicles, and each vehicle is being driven farther. Although energy efficiency in transportation is forecast to improve by 0.7 per cent per year between 2000 and 2020, this is likely to be overwhelmed by the increased use and number of vehicles. Past improvements in vehicle fuel economy have also been eroded due to consumer preferences for vehicle performance and size, as well as regulated changes to improve air quality and safety, which add weight to the vehicle and reduce fuel efficiency. (Transportation and Climate Change: Options for Action)*** *(6)*

The Transportation and Climate Change: Options for Action paper (6) outlines a study that explored strategies for reducing greenhouse gas emissions from urban passenger travel in the three largest centres (Toronto, Vancouver and Montreal), six large centres and 16 small centres. The study looked at possible emissions reductions through increasing budgets for pedestrian and cycling infrastructure, enhancing transit options and telecommuting. Incentives for discouraging single-occupant vehicle travel were also considered. The report concludes that no one single measure will reduce greenhouse gas emissions but an integrated approach will be most effective. The "Most Promising" measures the report recommends involves tax-exempt transit benefits, telecommuting, driver education, transit fare smart-card and car sharing. The report states that these are

> ***actions that would increase public awareness and send signals to change travel behaviour, primarily in urban areas. Combined, these measures could reduce emissions by 3.7 Mt, or about 7 per cent of Canada's Kyoto target in transportation, and generate a net benefit of $100/tonne.*** *(7)*

The "Promising" measures recommended include many transit-related options, parking prices and incentives to encourage pedestrian and bicycle travel.

> ***The promising measures are a more aggressive effort to promote cost-effective, quality alternatives to automobile use. The package combines strong incentives for alternatives such as transit and biking, while discouraging car use through charges on parking. Taken together, the promising measures would achieve an estimated GHG reduction of 10.1 Mt, or 19 percent of the transportation target, at a cost of $49 per tonne***.(8)

Some provinces and municipalities are already making progress in these directions. Examples include, initiatives regarding clean vehicles, mandatory vehicle inspection and municipal plans that integrate principles of sustainable transportation. Some government departments have launched green commuting programs for their departments and are actively improving the fuel efficiency of their fleets.

Expanding our efforts towards sustainable transportation requires greater public awareness and education. The Transportation and Climate Change Collaborative (9) proposed a number of education and awareness strategies. The National Round Table on the Environment and the Economy's "The Road to Sustainable Transportation in Canada: State of the Debate" (10) says the following:

> ***Increasing public awareness is the most significant step needed to lay the groundwork for effective action. As part of a sustainable transportation strategy, public education is needed to:***
>
> > ***inform individuals of the risks and costs of current transportation trends;***
> >
> > ***educate individuals about steps they can take to***

contribute to sustainable transportation; and

build public support for the political actions that will be necessary for sustainable transportation.

While all of these reports have touched on strategies which will benefit children in general, four key points have been neglected:

1) the extensive impact of traffic on children, beyond basic air quality discussions;
2) children's aspirations regarding transportation choices;
3) specific strategies that would benefit children and educate the general public regarding risks, sustainable transportation choices and building public support;
4) opportunities to influence passenger travel related to the trip to school.

The Ontario Walkability Study provides information regarding these omissions and may be helpful for provincial and municipal strategies regarding sustainable transportation. (See Appendix for "Impact of Traffic on Children").

> ***During rush hour (peak period) 20-25% of person trips are travel to and from school in a typical community. A generation ago, most of these were walking or biking trips.*** **(**Way to Go web site www.waytogo.icbc.bc.ca)

Canadians are fortunate to have an exceptional opportunity to implement strategies related to the trip to school through an increasingly popular school-based program: Active and Safe Routes to School (ASRTS). In Canada the ASRTS program is managed at the national level by Go for Green and there are two successful autonomous programs in British Columbia and Ontario; the Way to Go! School Program and Greenest City's ASRTS program. ASRTS is educating Canadian children, teachers, parents, health professionals, police, transport planners and the media about the benefits of active modes of transportation. The program is influencing the travel behaviour of children with all of the corresponding development benefits of walking and cycling. Adults who are involved in the program have been influenced to consider their travel behaviour beyond the trip to school.

Greenest City's extensive experience with a community-based approach to children's mobility has identified a number of barriers that prevent children from walking or cycling to school. Dr. O'Brien, Canadian Pacific Post-Doctoral Fellow in Sustainable Transportation at the York Centre for Applied Sustainability (York University) has also recognized that children's aspirations and mobility needs are rarely addressed in policy documents and strategies regarding sustainable transportation and climate change.

As part of the International Walk to School Day 2000, and with the support of the Ministry of the Environment for Ontario, Greenest City and the York Centre for Applied Sustainability (YCAS)

developed a Walkability Survey for Ontario's elementary school children. The intent of the survey was to:

- Gather province-wide data on the walkability of communities;
- Establish dominant travel modes used to get to school;
- Student preference for mode of travel to school;
- Identify the spatial distribution of participating schools across the province;
- Help to build the case for community action on making communities more "walkable"; particularly for children and to decrease related automobile use for short trips;
- Assess the nature of the local environment to include, but not be limited to:
    - Type of surfaces used (paved vs. unpaved)
    - Land use and land type of area traversed in journey to school;
    - Intermediate destinations or activities;
    - Room to walk safely and ease of crossing streets (pedestrian infrastructure);
    - Behaviour of drivers.
- Compile a database to help facilitate future risk assessments around child exposure to potential environmental threats.

Method

Greenest City and YCAS developed a Walkability Survey that modeled the Partnership for a Walkable America's "Walkability Checklist" and a similar study carried out in California in 1999 by the Center for Health Training. (See Appendix for Walkability Survey). Surveys were included in the registration materials of every school in Ontario who registered for International Walk to School Day. Many schools supported this project through copying and distributing the surveys. Students were asked to complete the surveys during their trip to school on October 4, 2000 (International Walk to School Day 2000). Primary-aged students completed the survey with the assistance of an adult.

More than 400 Ontario schools participated in International Walk to School Day 2000 and over 78 schools completed the Walkability Survey for a total of 6369 valid surveys. All of the surveys were analysed and results were summarized for the entire sample, by census division and also for each participating school.

<u>Limitations and Biases of Data</u>

Every survey that deals with non-motorized travel behaviour in Canada is bound to be affected by the time of year the survey is taken. The Ontario survey took place in October. Certainly, the results would be different in mid-January when the number of walkers and cyclists drops and other hazards come in to play, such as sidewalks blocked by snow. Also, participants came from schools that were registered in the International Walk to School Day event and thus reflect a population that may be more inclined to choose active transportation modes than the general student population. Finally, the surveys were completed by students themselves. Primary students were assisted by the adults who walked with them or by their teachers. Analysing the

data by grade level was beyond the scope of this study but may yield interesting patterns according to age.

Despite these limitations, the Walkability Survey provides highly significant information. Government bodies are developing sustainable transportation strategies and emphasizing the need for public education and awareness. Too often, the mobility needs of children are absent from these discussions. The Walkability Survey gives a voice to the aspirations and mobility needs of children and conveys some of their experiences on their route to school. If we can make these routes safer, we can then encourage more families to use active modes.

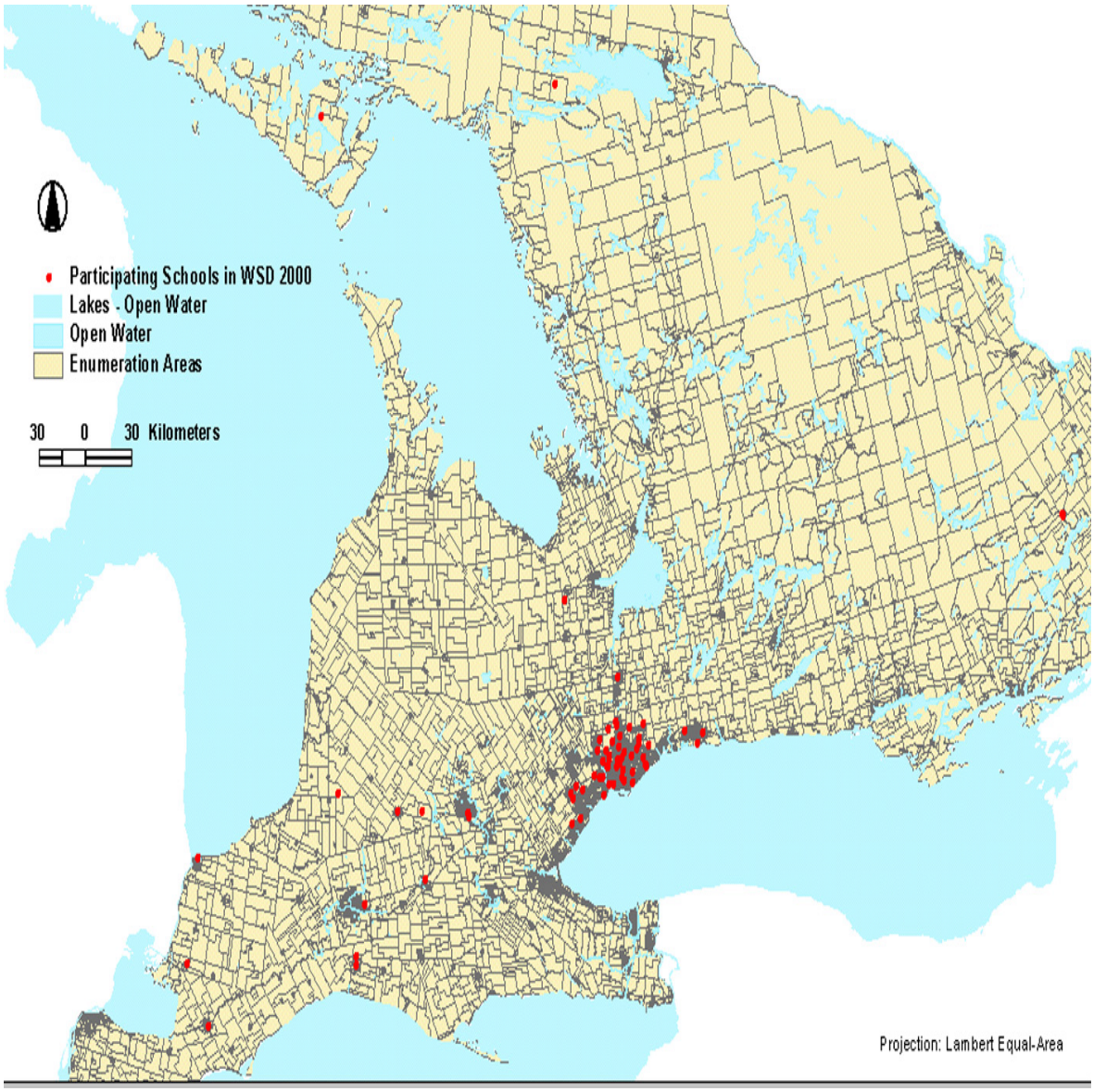


Figure 1.0 – A point map indicating distribution of the 70 schools across Southern Ontario that participated in the 2000 Walkability Survey. Over 6000 student responses were complied into a database with georeferrnced variables (e.g., student home postal codes).

Results

Results have been analysed across the entire sample for Ontario (6369 surveys). However, most participating schools are clustered near Toronto where Greenest City originally focussed its ASRTS program. 2000 marked the first year that Greenest City expanded throughout the province.

Questions #1 and #2 asked for postal codes and school names. The results below begin with question #3.

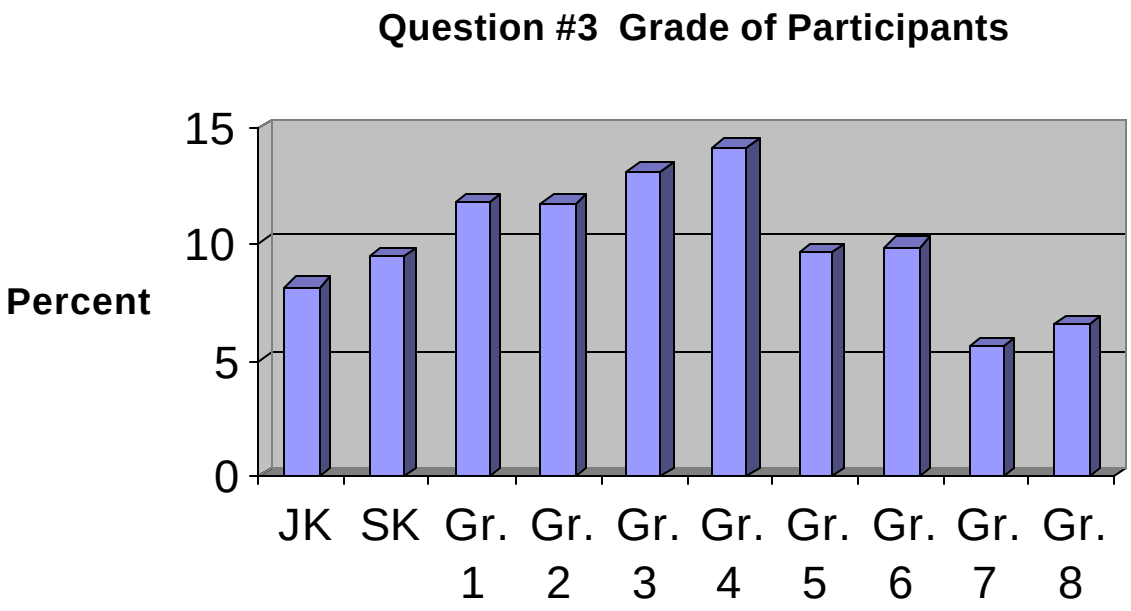
Aggregate Results

Question #3a What Grade are you in?

Grades 1-4 were the dominant age groups which participated.

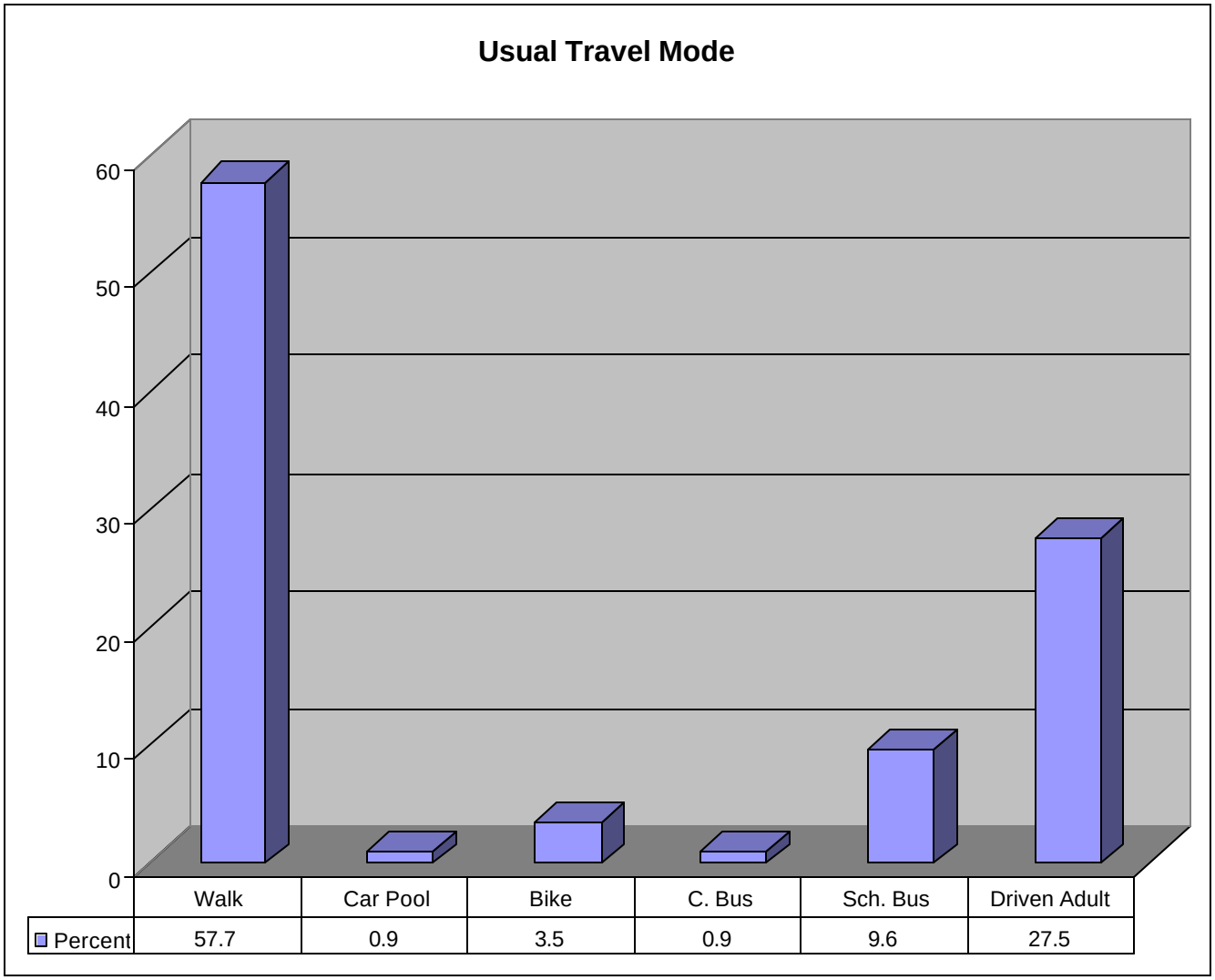
Question #3b Are you a girl or a boy?

53.3 % of the participants were girls and 46.7 % were boys.

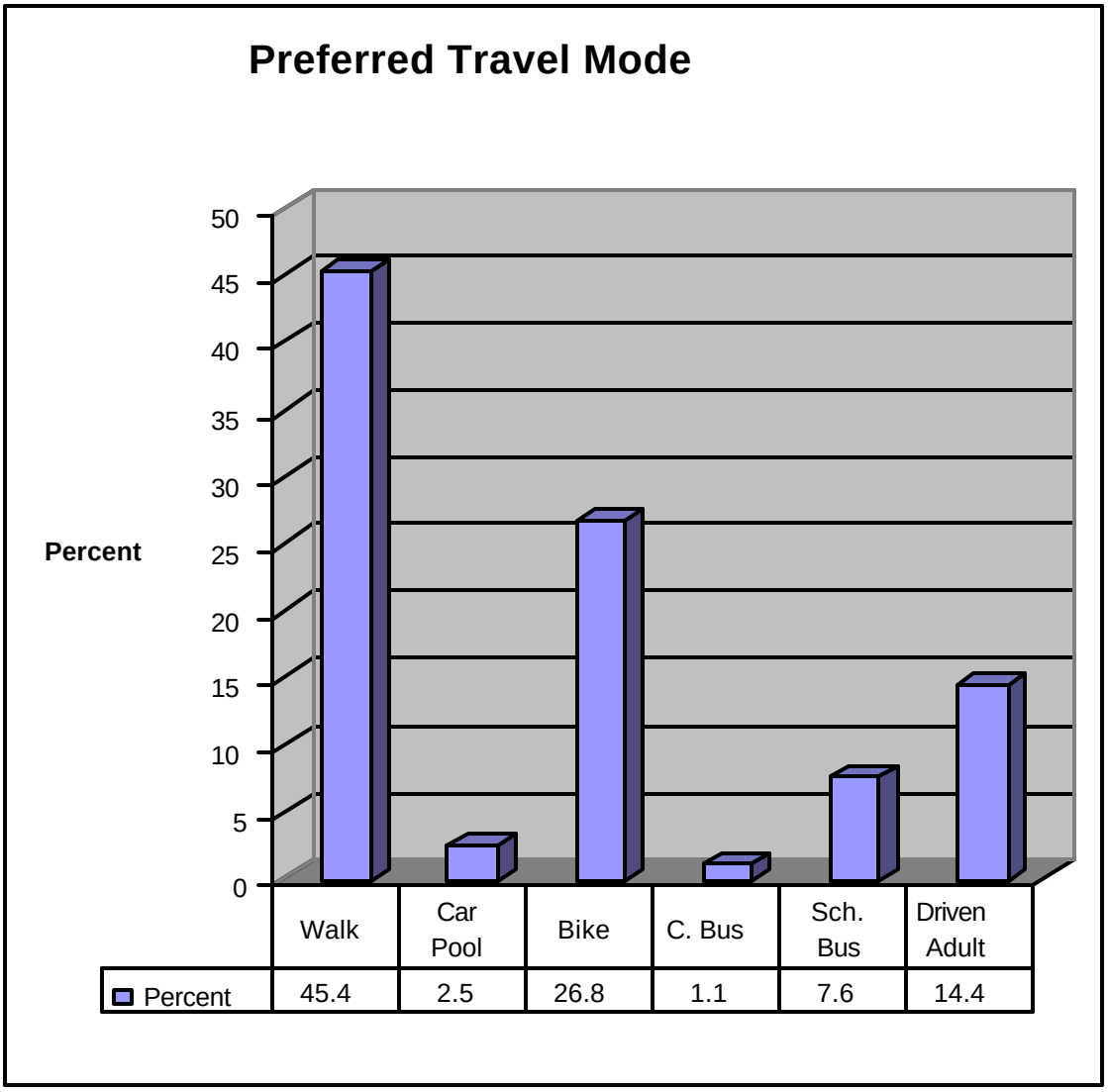


Question #4 How do you usually get to school?

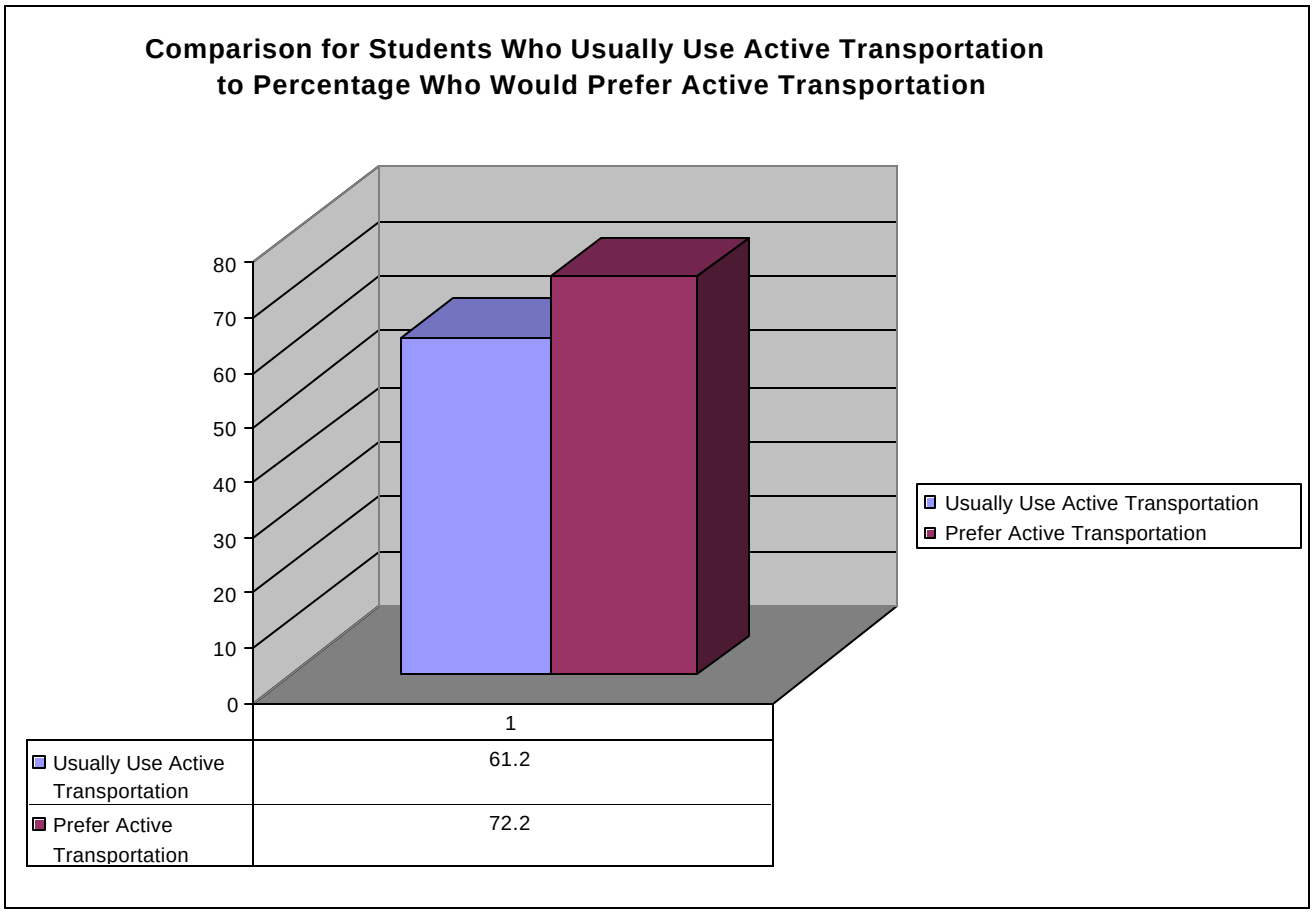
61.2 percent of participating students stated that they usually walk or cycle to school. **57.7%** told us that they walk with friends, a parent/adult or by themselves. **3.5%** ride bicycles regularly. **27.5%** said that they are driven by an adult.

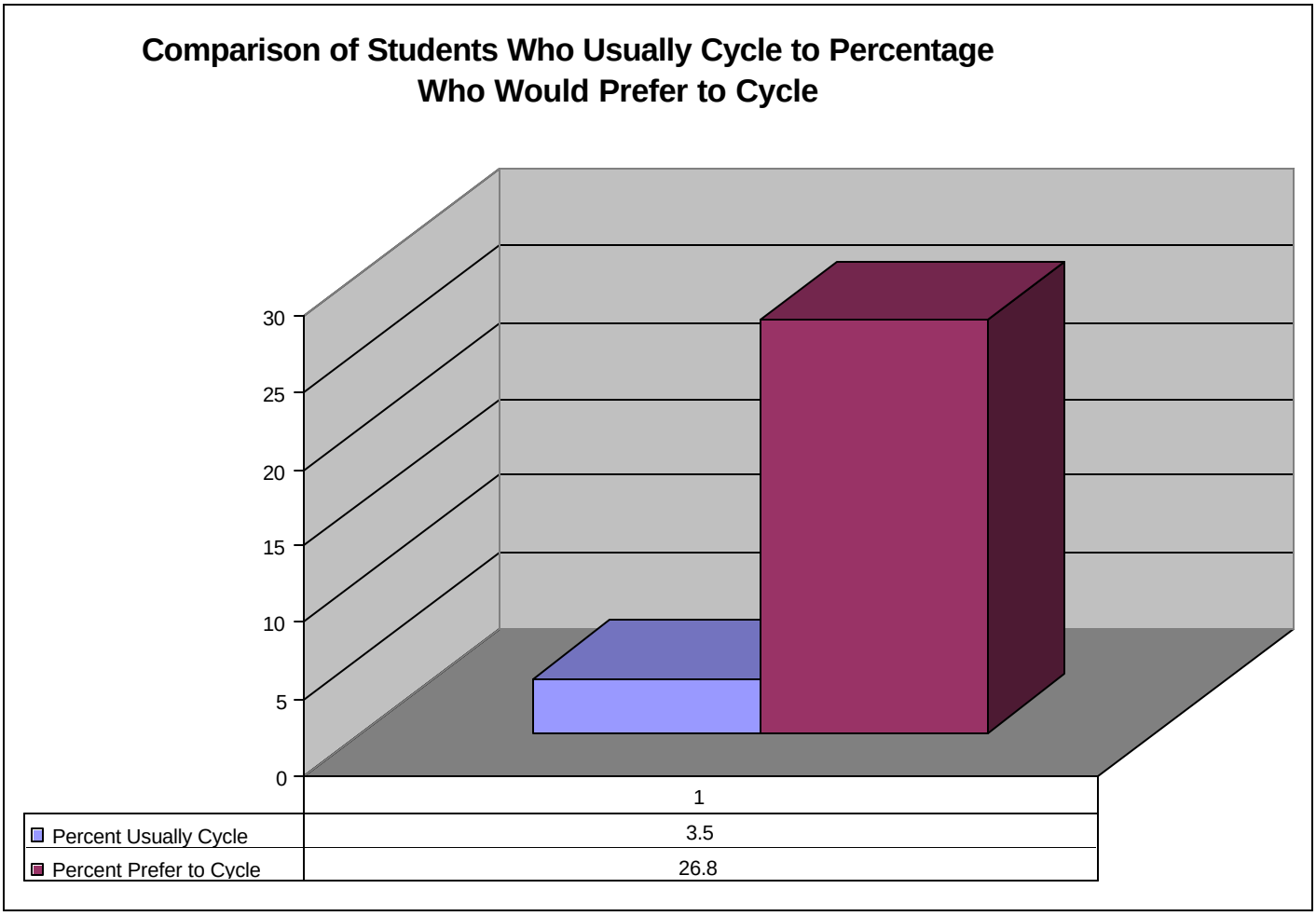


Question #5 If you had any choice, how would you most like to get to school each day?



72.2% of students survey said that they would prefer to walk or cycle to school. This breaks down to **45.4 % who would prefer to walk** and **26.8% who would prefer to ride a bicycle**. For the children who would prefer cycling, 43% are girls and 57% are boys.


Comparison for Students Who Usually Use Active Transportation to Percentage Who Would Prefer Active Transportation
80
70
60
50
40
30
20
10
0
1
Usually Use Active Transportation
61.2
Prefer Active Transportation
72.2
Usually Use Active Transportation
Prefer Active Transportation



Question #6 On your walk today did you see… parks, factories, empty fields, gas stations, houses, construction areas, shops, parking lots, other?

"In Canadian urban and suburban communities, roads and parking cover between 30-50% of the land base".
(Way to go web site www.waytogo.icbc.bc.ca)

Bearing in mind that 80% of the students surveyed reside in the GTA , it is not surprising that the built environment figured strongest in their observations. Almost every child mentioned seeing houses, **34.3%** mentioned parks, **28.3%** saw parking lots, **7.9%** noted shops, **13.9%** noticed empty fields, and **7.9%** mentioned construction areas. Overall, **48.2%** mentioned noticing green space (fields or parks). There were no observations of factories.

Question #7a On your walk today… did you have enough room to walk safely?

79.3% of students responded "Yes" to this question. When students responded "No"**. 4.7%** said that sidewalks were broken or cracked. **3.3%** found that sidewalk were blocked with parked cars. An additional **2.9%** stated that there were no sidewalks, paths or other shoulders, **2.5%** found sidewalks or paths started and stopped**. 1.9%** found the sidewalks were blocked with poles, signs, or dumpsters**. 15.4%** gave more than one reason why there was not enough room to walk safely, though all multiple responses referred to the fact that sidewalks were broken or crack, blocked with parked cars and there were no sidewalks or paths for part of the journey.

In total, **18.2%** of respondents reported that there was not room to walk safely.

Question 7b Was it easy to cross streets?

75.6% stated that it was safe to cross streets. **24.6%** found that it was not easy to cross streets. The predominant reason for saying "No" was that the roads were too wide (**10.1%). 1.6%** named roads too wide and "need striped crosswalks or traffic signals". **1.3%** stated roads too wide and "traffic signals made us wait too long or did not give us enough time to cross". **1.2%** stated that the roads were too wide and "need curb ramps or ramps need repair" **7.3%** stated they encountered other problems.

In total, **24.6%** of the children found that it was not easy to cross streets.

Question #7c Did drivers behave well?

72.8 % of students felt that drivers behaved well. The predominant reason for stating "No" was that drivers "sped up to make it through yellow lights". The second most common driving fault was that drivers "drove too fast". Next came "not yielding to people crossing the street".

In total 23.4% stated that drivers did not behave well.

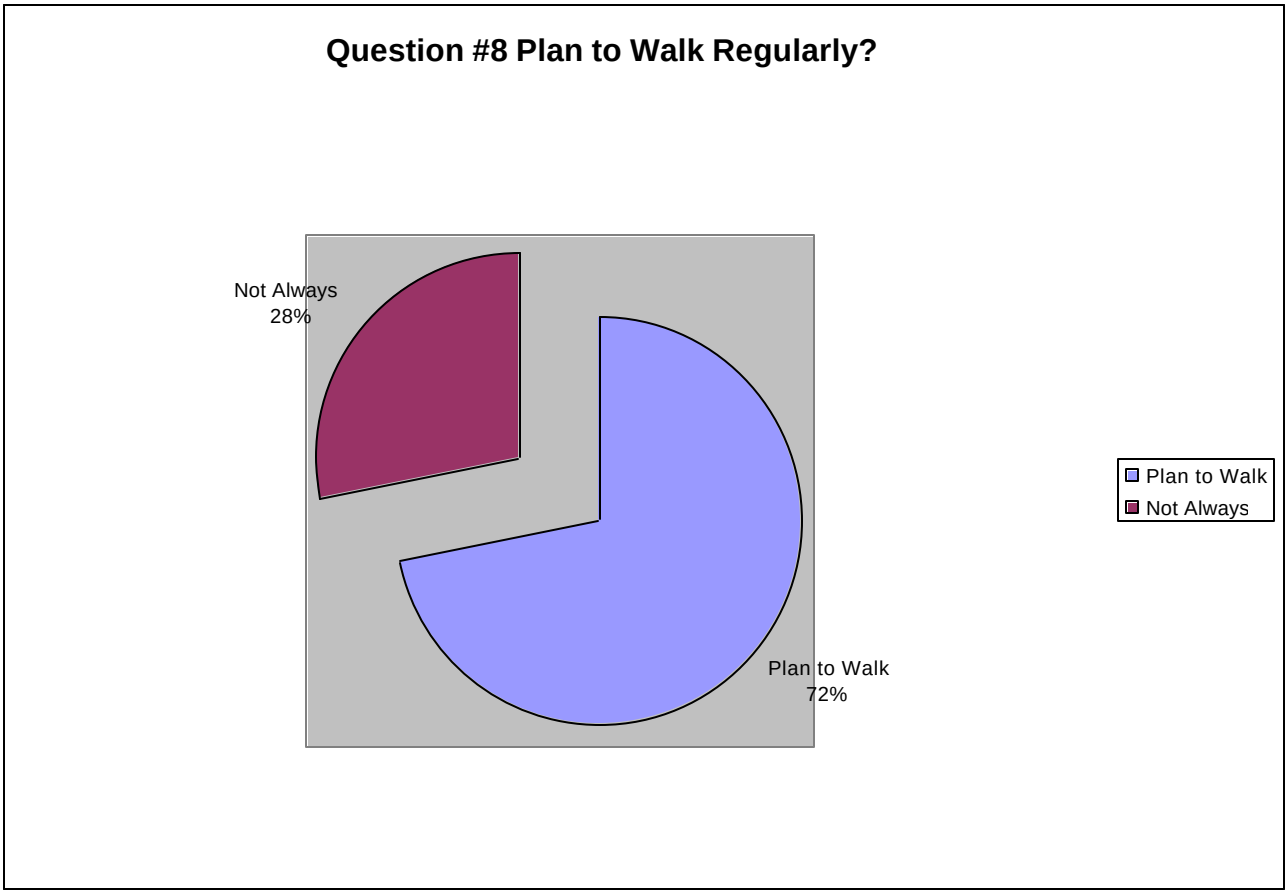
Question #7d Was your walk pleasant?

79.4% of students found their walk pleasant. For those who checked "No", the most common reason **(8.2%)** "was litter and trash on the street". **17.6%** gave a variety of reasons why they found the walk unpleasant, including bad smells in the air.

In total, **21.3%** found that the walk was unpleasant.

Question #8 Do you plan to walk regularly in the future?

69.6% of students stated that they plan to walk regularly in the future.



Results by Municipality

Results were collected for 28 municipalities. This report presents the data for 12 municipalities, representing those where two or more schools participated. Aggregate results for each question are also included in each chart to provide comparison.

North York - 14 schools

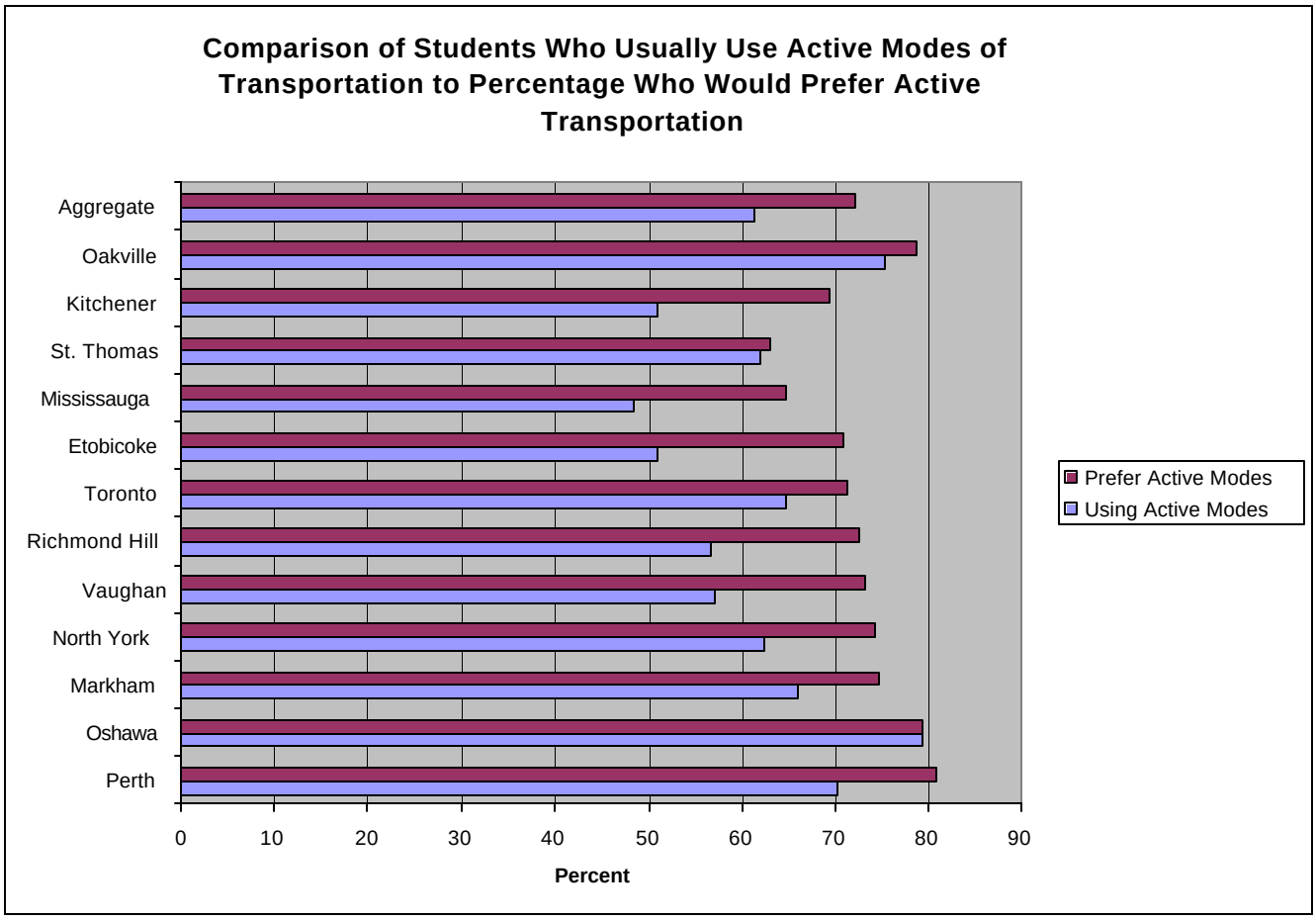
Toronto – 8 schools
Mississauga – 5 schools
Markham – 4 schools
Etobicoke – 4 schools
Kitchener, North Easthope – 3 schools
Perth- 2 schools
Oshawa 2 schools
Vaughan – 3 schools
Richmond Hill - 2 schools
Oakville – 2 schools
St. Thomas – 2 schools

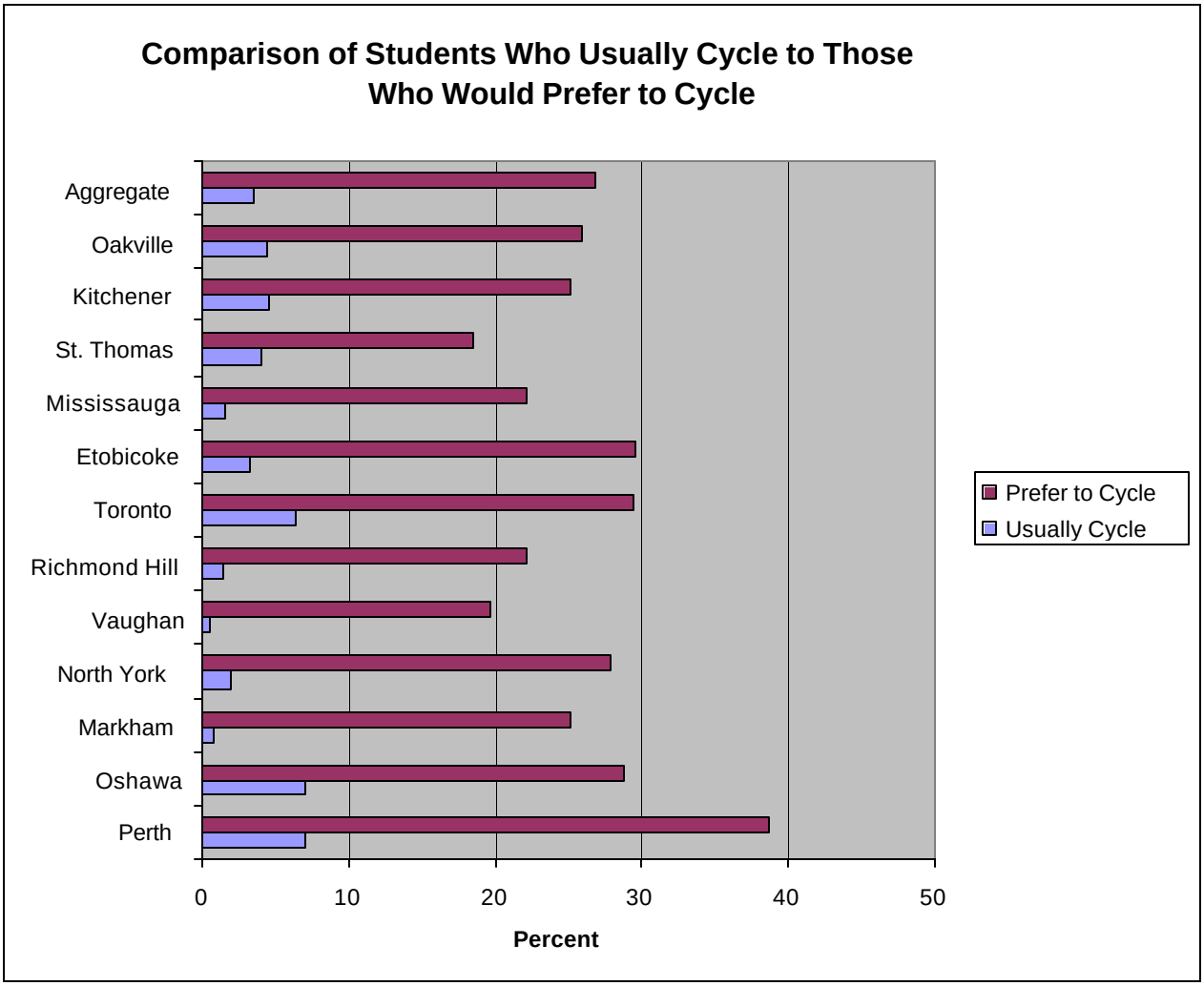
Using Active Modes of Transportation: Perth, Oshawa and Oakville are higher than the aggregate scores. Toronto (8 schools), is quite similar to the aggregate norm. Mississauga and St. Thomas are lower than the aggregate survey average.

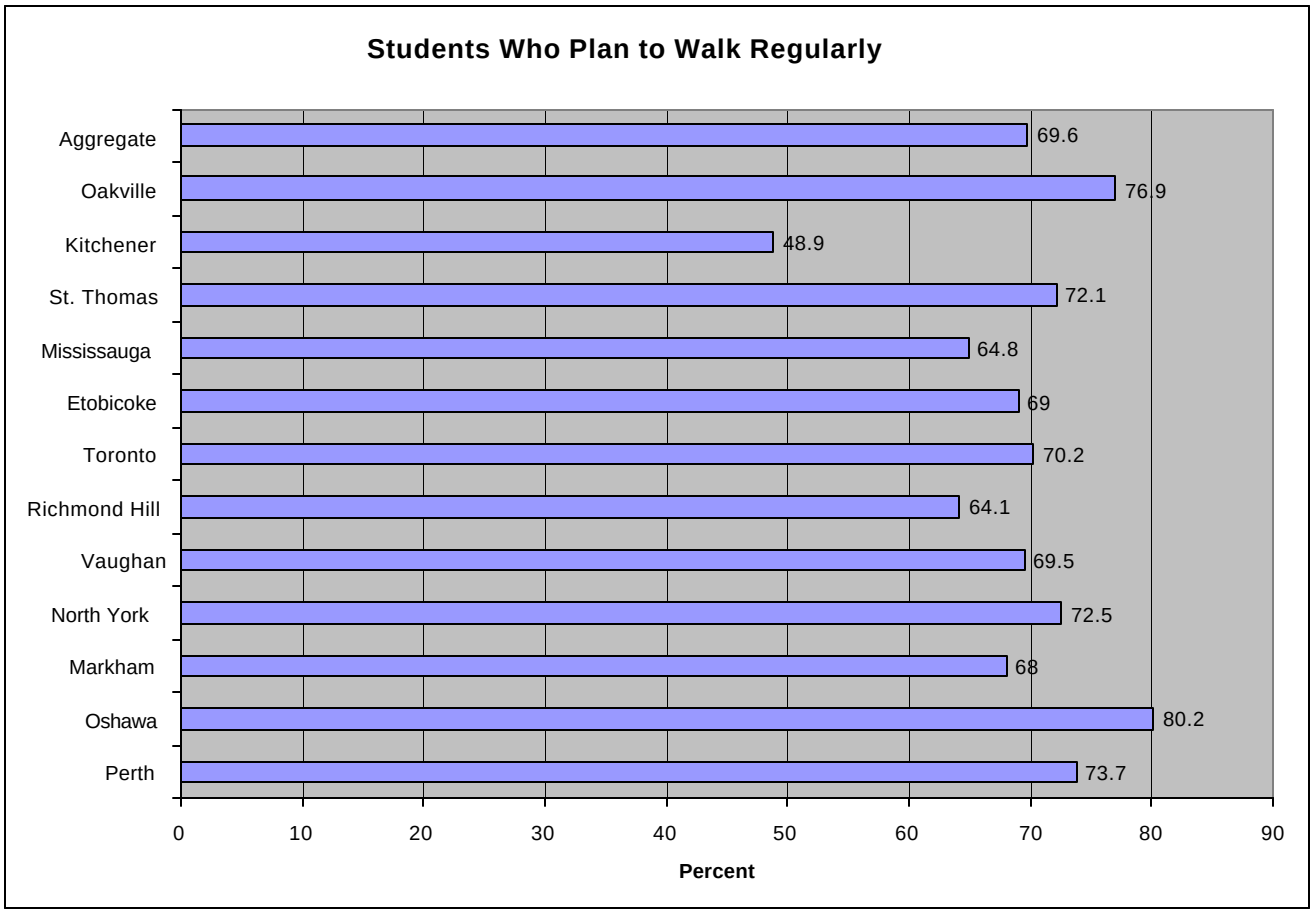
Prefer Active Modes of Transportation: Perth and Oakville are much higher than the aggregate scores, and Oshawa, and Markham are slightly higher. St. Thomas, Etobicoke, and Kitchener are lower than the aggregate average.

Comparison of Students Who Usually Cycle to those who Would Prefer to Cycle

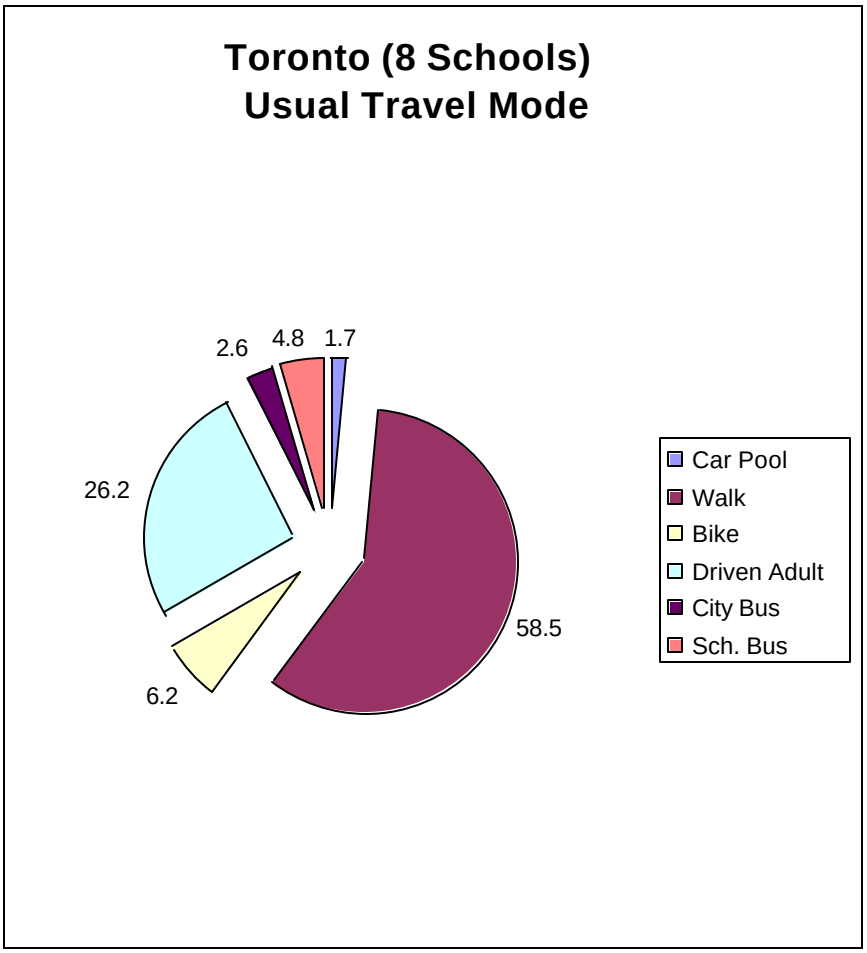
Every municipality indicated large gaps between the number of students who are currently cycling and those who would prefer to cycle. Perth and Oakville, once again are notably higher than the aggregate scores.


Comparison of Students Who Usually Use Active Modes of Transportation to Percentage Who Would Prefer Active Transportation
Aggregate
Oakville
Kitchener
St. Thomas
Mississauga
Etobicoke
Toronto
Richmond Hill
Vaughan
North York
Markham
Oshawa
Perth
0
10
20
30
40
50
60
70
80
90
Percent
Prefer Active Modes
Using Active Modes

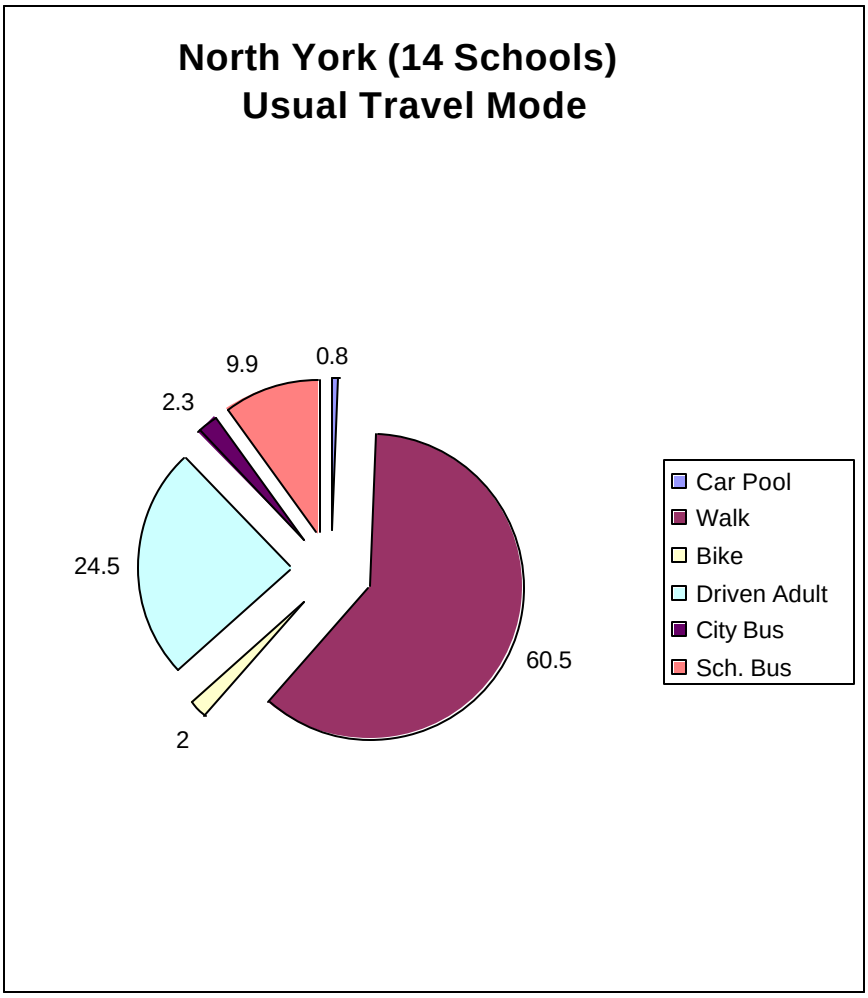

Comparison of Students Who Usually Cycle to Those Who Would Prefer to Cycle
Aggregate
Oakville
Kitchener
St. Thomas
Mississauga
Etobicoke
Toronto
Richmond Hill
Vaughan
North York
Markham
Oshawa
Perth
0
10
20
30
40
50
Percent
Prefer to Cycle
Usually Cycle


Students Who Plan to Walk Regularly
Aggregate
Oakville
Kitchener
St. Thomas
Mississauga
Etobicoke
Toronto
Richmond Hill
Vaughan
North York
Markham
Oshawa
Perth
69.6
76.9
48.9
72.1
64.8
69
70.2
64.1
69.5
72.5
68
80.2
73.7
0
10
20
30
40
50
60
70
80
90
Percent

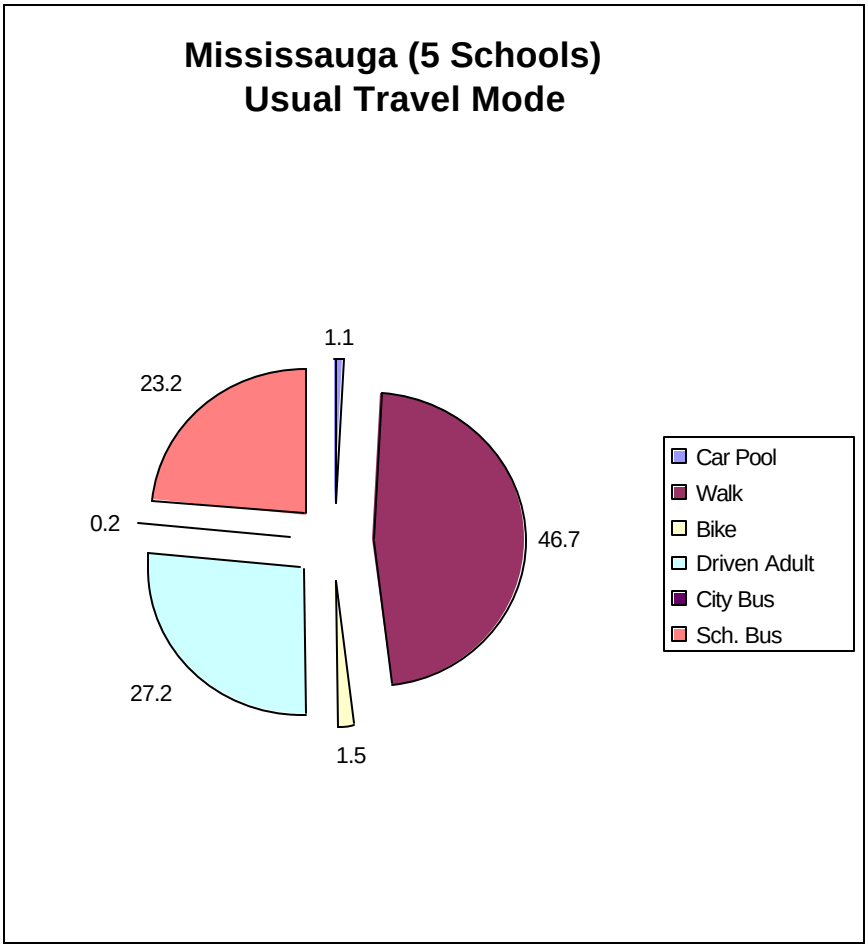
Question #4 How do you usually get to school?



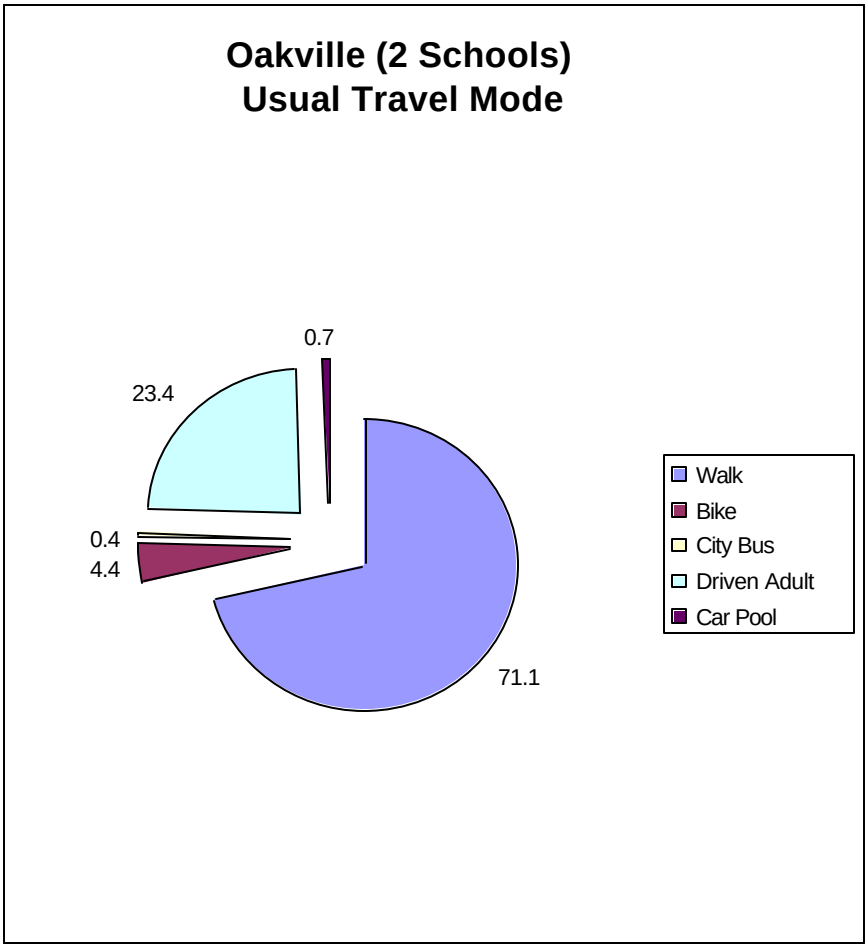
Question #4 How do you usually get to school?


North York (14 Schools)
Usual Travel Mode
0.8
9.9
2.3
24.5
60.5
2
Car Pool
Walk
Bike
Driven Adult
City Bus
Sch. Bus

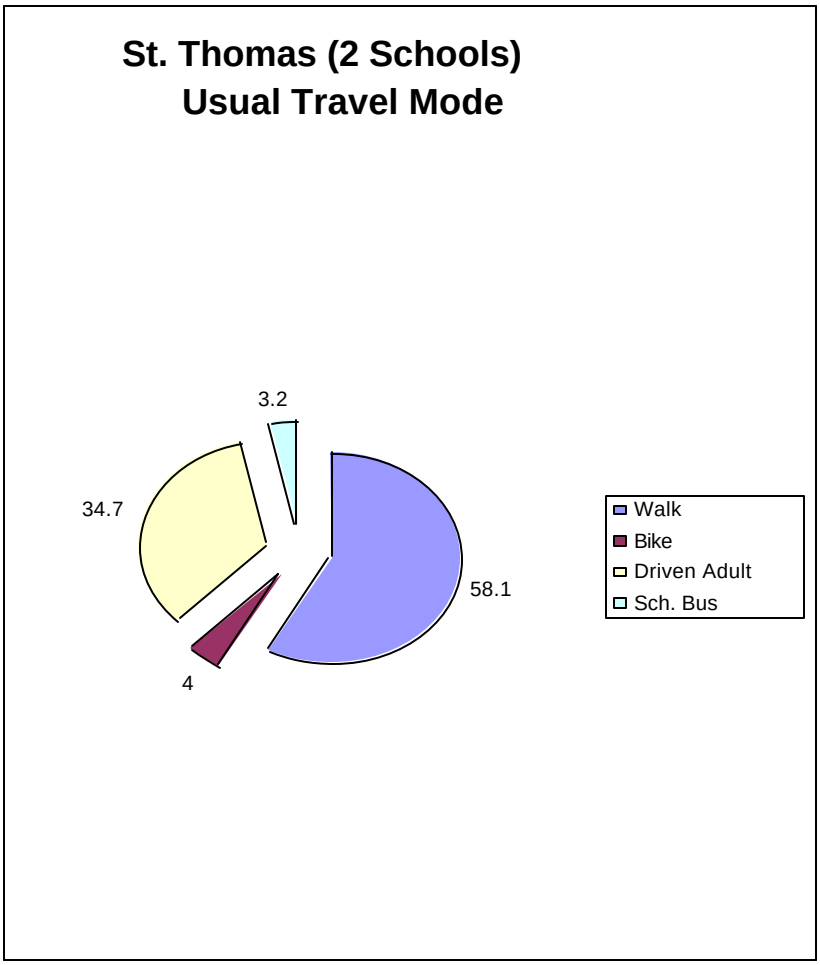
Question #4 How do you usually get to school?



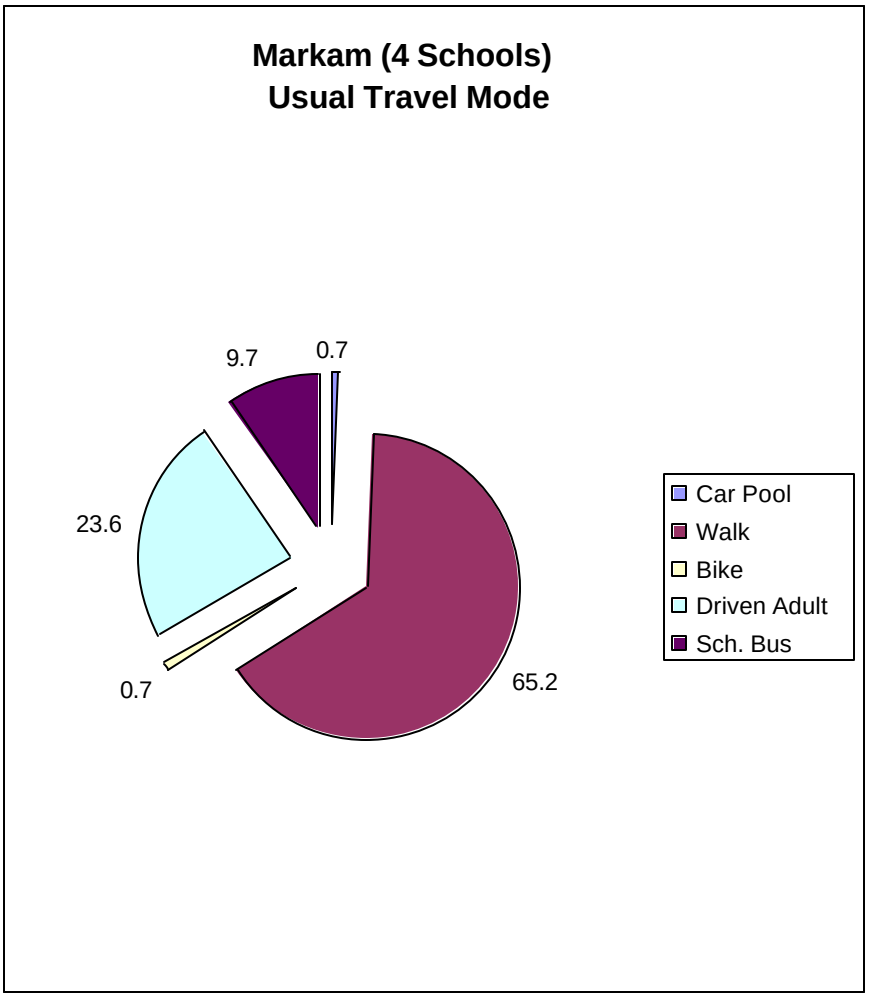
Question #4 How do you usually get to school?



Question #4 How do you usually get to school?



Question #4 How do you usually get to school?



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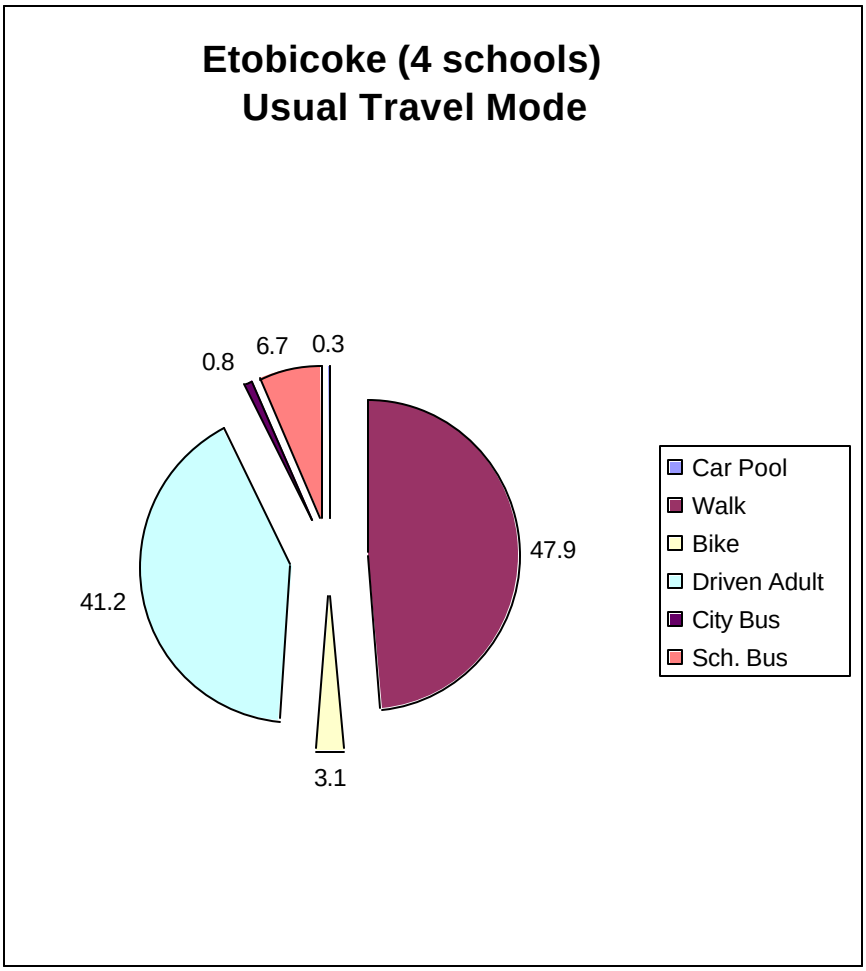

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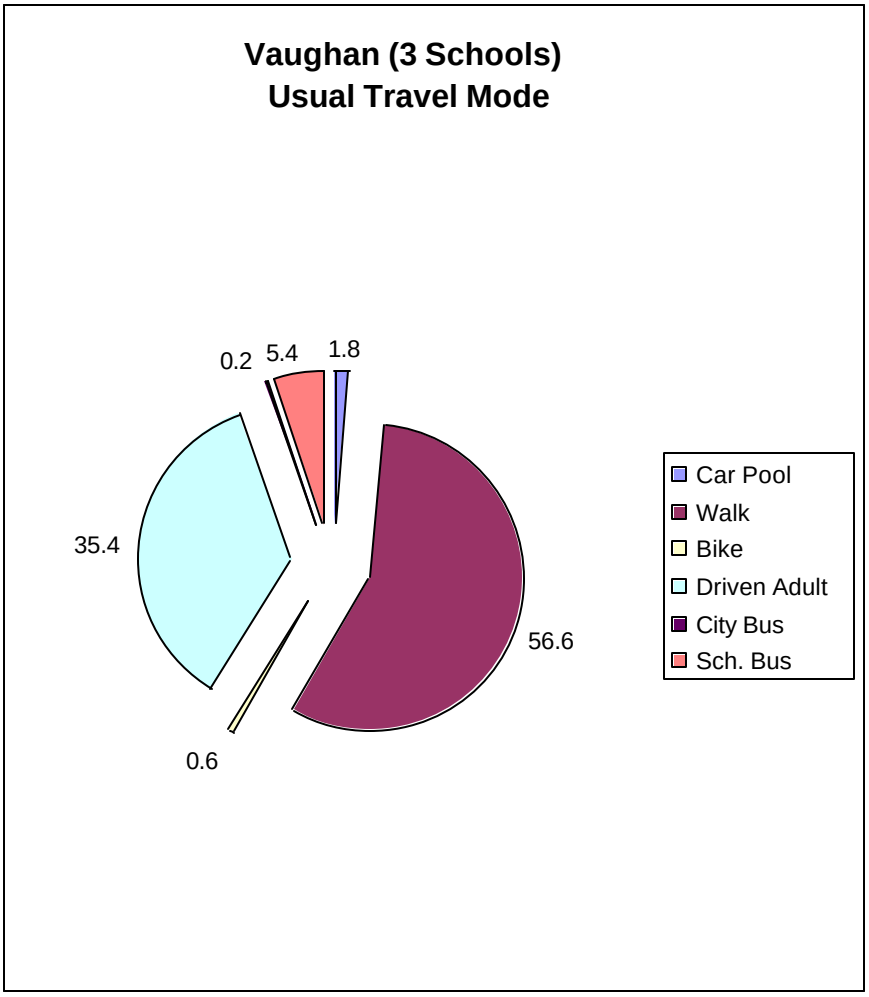

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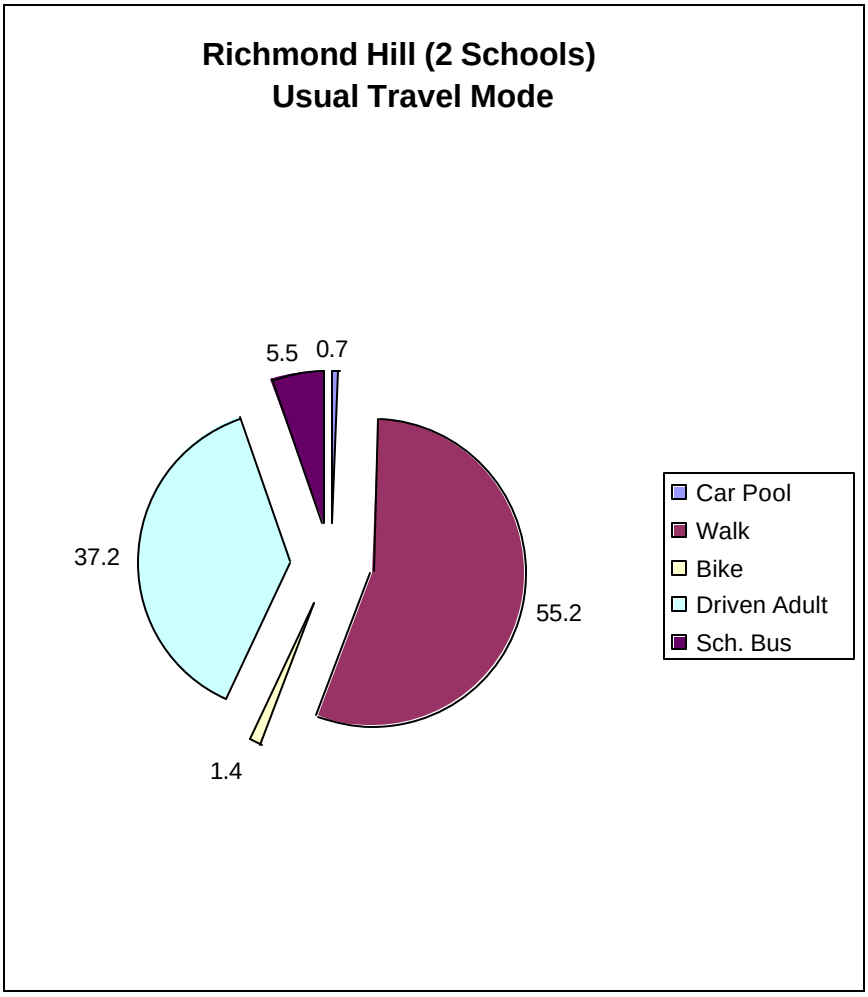

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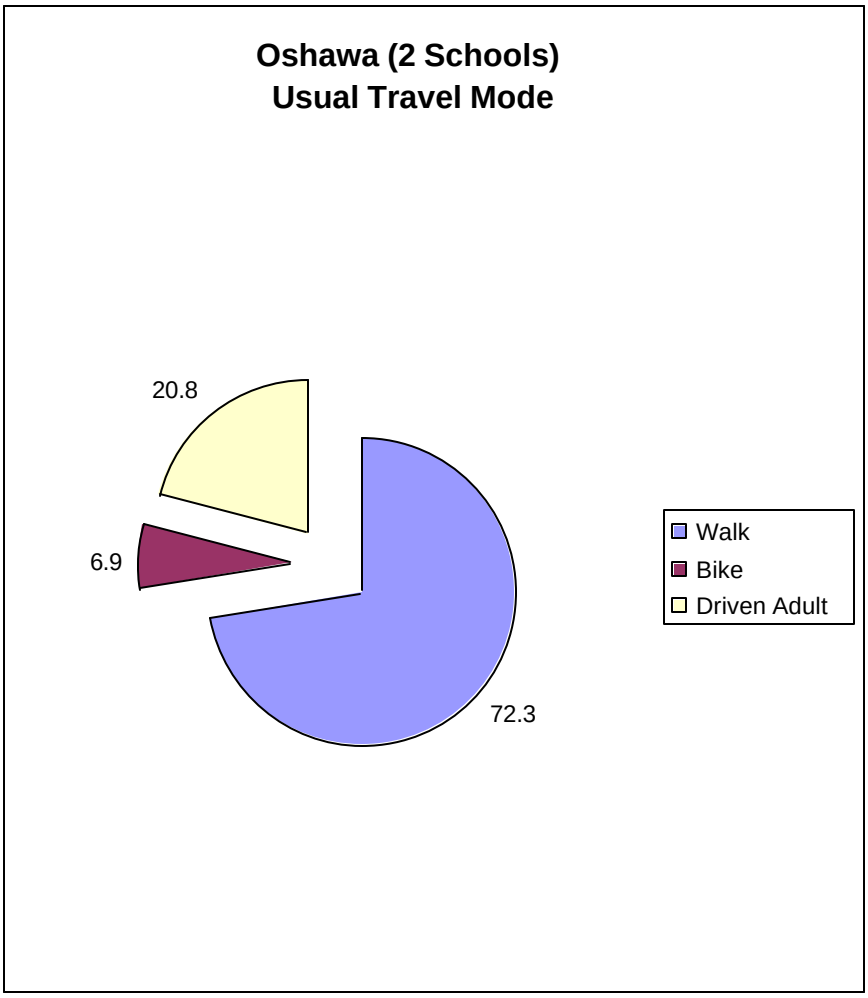

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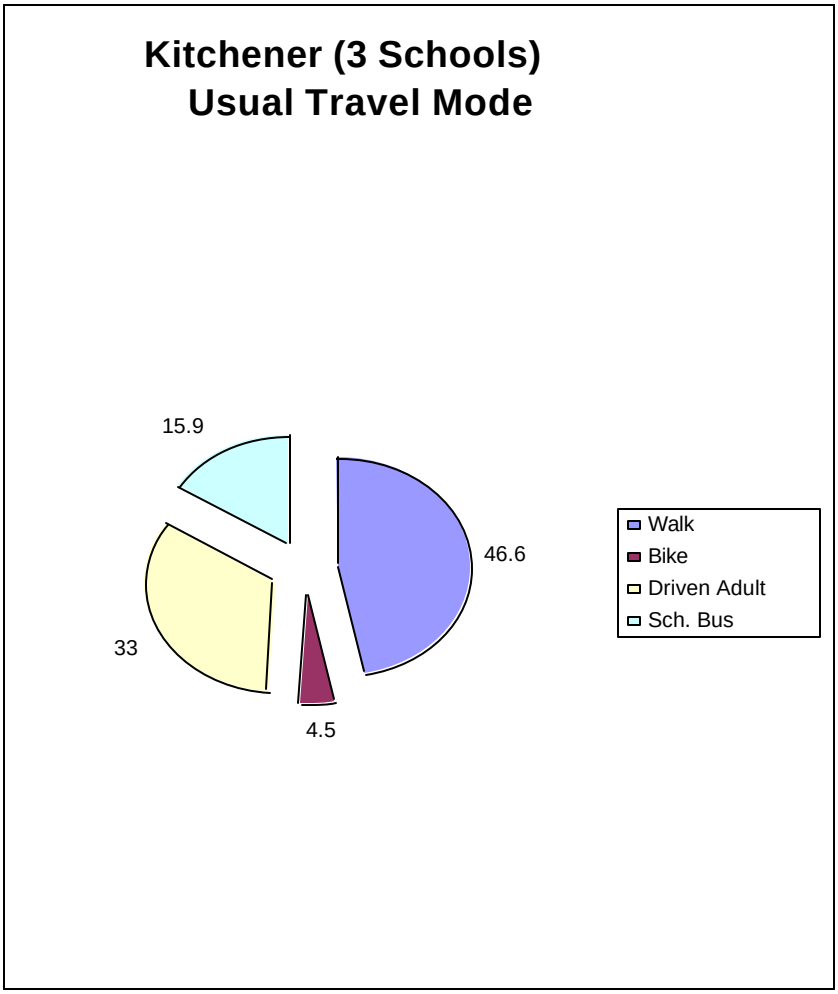

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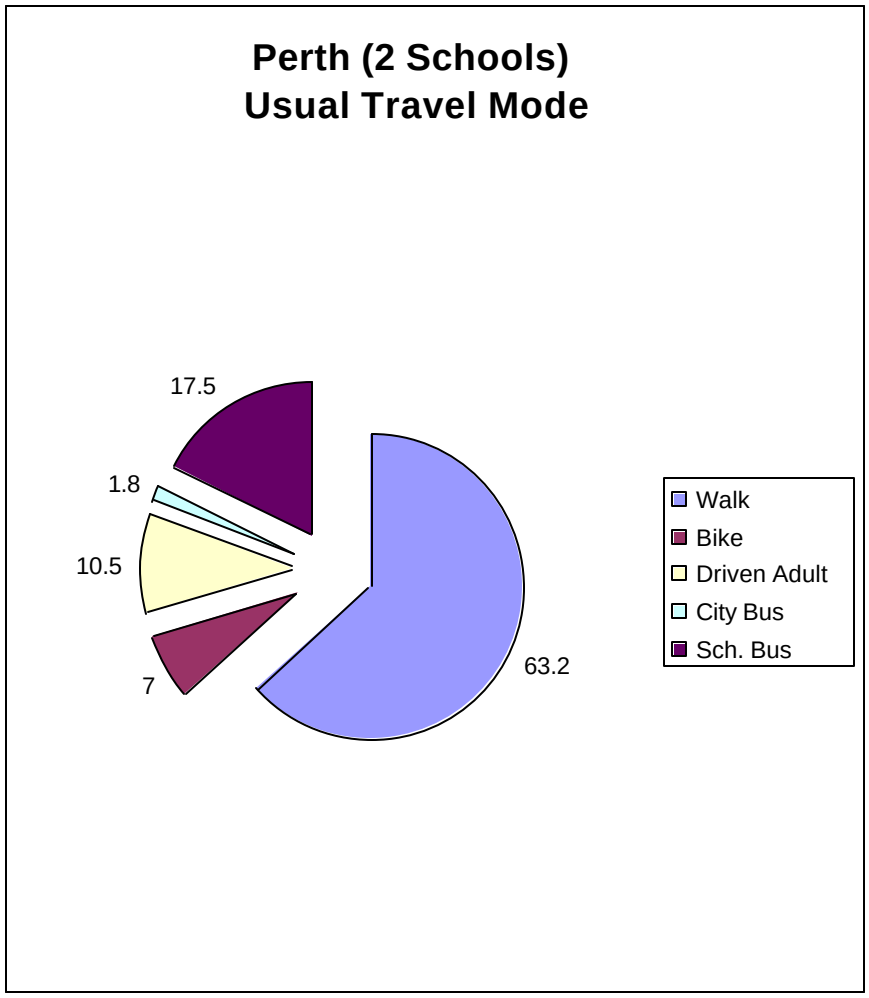

Discussion

A striking result from this survey is the large gap between the number of students who are currently cycling to school and those who would prefer to cycle. From the aggregate results, we see that only 3.5% of Ontario students surveyed ride their bicycle to school regularly. However **26.8% would prefer this mode of transportation.**

There appears to be support from the general population with respect to encouraging cycling. A survey conducted by Environics International for Go for Green found:

> ***A large majority in Canada (82%) support government spending to create dedicated bicycle lanes and paths that would encourage safe cycling and a healthy lifestyle.*** Environics International, 1998

Another significant area of interest relates to the comparison of children who currently use active modes of transportation (walking and cycling), 61.2%, compared to **72.2% who would prefer active transportation.**

These Ontario results may be compared to the 1998 Environics national survey regarding children's travel choices for the trip to school. The Environics study found that:

- While 68% of children have a walk to school of 30 minutes or less, only 36% walk as a rule;
- Almost all respondents with 5 to 13 year olds said their children have bicycles, however only 2% of children in that age group cycle to school;
- Top parental concerns about walking to school: busy traffic/bad drivers (cited 55%); no sidewalks/poor roads (19%); too far (16%); bad area/drugs etc (12%); gangs/other kids (3%). If walking to school was very safe, 20% who presently feel it is unsafe say their child would walk much more often;
- If cycling to school was very safe, two thirds (66%) of those who presently feel it is unsafe say their child would cycle more often

(Environics, 1998).

The Walkability Survey tells us that children would prefer to walk or cycle to school. This presents a challenge to parents, educators, transportation planners and government representatives at all levels. Children represent approximately 20% of our population and it is very encouraging that they still prefer active transportation. John Adams, of the Policy Studies Institute in London England investigated the trip to school trends in Britain during the early 1990s. He warns that we may well soon have a generation in Britain that no longer remembers walking to school. Canadian children have not yet followed that disturbing trend – though failing to remove barriers to walking and cycling could lead us in that direction.

> ***Stand outside almost any elementary school these days at drop off and pick up times and you are likely to witness a scene of complete chaos. Parents and caregivers converge in their vehicles on the streets surrounding the school, sometimes as many as 100.*** *(11)*

Greenest City has identified the following barriers to cycling to school:

Security - many schools are reluctant to allow bicycles at school because of the high incidence of vandalism and theft.

Safety - like walking, parents seem to feel that if students cycle they will cycle alone. Parents don't make the connection that they could cycle (or walk) with their children to teach safety, etc. Because of this, parents feel that the routes are not safe. With a lack of bike lanes/paths in most communities, this is certainly true. Even existing bike lanes/paths are designed for adult cyclists, and don't take into consideration the needs of children.

Plans to encourage walking and cycling will certainly need to include infrastructure modification. Nearly 25% of the students found that it was not easy to cross streets and approximately 18% also stated that there was not enough room to walk safely.

With nearly a quarter of the children claiming that drivers did not behave well, perhaps public education for drivers needs to address the impact of traffic on children and greater respect for pedestrian traffic.

Perhaps removing some of these infrastructure barriers, public education for drivers and expanding Active and Safe Routes to School could see the numbers of children who are walking and cycling increase in the next decade.

Discussion of Municipal Results

> ***One quarter of all morning rush hour trips in the Greater Toronto Area are parents ferrying their children to school (Transportation Tomorrow survey, 1999).***

While it is not possible to draw conclusions about the different results amongst the 12 municipalities, it is interesting to note the cities and towns that differ dramatically from the provincial results. It is important not to assume that results from several schools can be extrapolated to an entire city. However, in towns such as Perth, the school sample is more representative.

Municipalities that indicate a higher participation rate in Active Transportation Modes than the aggregate level, have generally achieved this through the assistance of "champions". These keen individuals have promoted Active and Safe Routes to School, recruited parent volunteers and may also have worked to remove infrastructure barriers. Perth stands out as a particularly effective municipality in the study. This is likely a result of the efforts of EcoPerth and individual champions within the participating schools.

There is also some consistency between the current travel patterns in some municipalities and the students' stated plans to walk in the future. Fore example, municipalities such as Perth and Oakville have higher participation in active transportation modes than the aggregate score. A higher percentage of students from these areas also stated that they plan to walk in the future. Conversely, Kitchener students surveyed appear to be less active than the aggregate level and also demonstrated lower expectations for walking in the future.

The explanation for this may be that once students are accustomed to walking and cycling to school that this fosters both the desire and the expectation to use active transportation modes. Preliminary evidence to support this comes from a pilot study of 49 Grade 6 students at Bayview Hill Elementary School in Richmond Hill. The students were asked to complete a Travel Diary for one week during the month of May. They recorded every trip they made, the travel mode used, and the amount of time required to make the trip. The experience of keeping the Diary caused many students to notice the trips they were taking by car and throughout the week many decided to walk or cycle more (even though they had been asked not to change their regular travel patterns). Sixteen students who were not using active transportation very often at the beginning of the week increased their walking or cycling by the end of the week. The students frequently commented on how much better they felt when they were walking and cycling.

> ***"I think that instead of going to school in a car, I could walk. I think t his because its better for the environment and for me".***
>
> ***"I think I've been definitely using the car too much and I never noticed until now!"***
>
> ***"You feel much happier after you do physical, un-polluting exercises".***
>
> ***"I had fun doing the Travel Diary! It's the last day and I think I'll try to decrease the usage of car in my household!"***
>
> ***"I started to walk my dog from today on!"***
>
> ***"I now love biking because I've gotten used to biki ng from trying to ride every day."***

The School Level analysis of the Walkability Study provides detailed descriptions of problem areas around each school. Individual school reports have been completed by Greenest City. In addition, Greenest City has conducted focus groups for schools participating in their ASRTS program in several municipalities to understand some of the barriers which parents identify to choosing active modes of transportation for the school trip. (refer to www.greenestcity.org for an Executive Overview of the results of this market research).

Recommendations for Further Study

The Walkability Survey has yielded remarkably rich data which could be used for more in depth analysis of children's travel patterns. For example, each student provided their postal code on the survey, and thus the distance they live from school could be calculated. It would therefore be possible to correlate distance from school with usual and preferred travel mode. The data could also be analysed to determine trends according to age and gender.

Students are telling us that generally they would prefer to walk and cycle. Many of the barriers for them could be removed. It would be useful to select several "pilot" communities in Ontario where infrastructure and other barriers are removed and monitor the travel behaviour of children over time. Along with this, family trip diaries would also indicate whether the family travel patterns change to conform with more sustainable transportation choices.

It would be highly useful to have an Environics Survey completed for Ontario school children which addresses the usual travel mode and preferred travel mode for the trip to school. This could be compared with the Walkability Survey so that we could determine how the ASRTS participating schools compare to the general school population and the national results.

Finally, the Walkability Study surveyed children in elementary school. There is very little research that is investigating the mobility needs and aspirations of youth. A literature review of the Academy of Educational

Development stated the following:

> In the transportation research literature we found little material that pertained to youth and air pollution or VMT. We contacted more than fifteen transportation/ environment/engineering departments in universities across the United States, but none of them were doing research specifically in the field of environmental transportation and youth.

Understanding the mobility needs and aspirations of high-school aged youth would add important information to sustainable transportation strategies. This would ideally include exploration into the barriers to youth for using active modes of transportation.

The pilot study using Travel Diaries has yielded some unexpected results. The task of focusing on their travel behaviour appeared to be both a source of education for many students and a motivation to change their behaviour. The students at Bayview Hill Elementary School had already learned about Active and Safe Routes to School and were aware of the environmental and physical benefits of walking and cycling. Documenting their travel behaviour seemed to reinforce this information. A research study with a larger number of students in various municipalities could investigate both the travel behaviour and patterns of many students, as well as determining whether students continue to walk or cycle once the Travel Diary week is finished.

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APPENDIX

Impact of Traffic on Children

- Traffic fatalities are the leading cause of death in Canada for children over the age of one year (Canadian Institute for Child Health, 1994);
- Less than half of Canadian children now walk to school. (Go for Green, 1998). This figure drops to 10% in the United States (Centers for Disease Control and Prevention, 1998);
- 2 out of 3 Canadian children do not meet average physical activity guidelines to achieve optimum growth and development (CFLRI, 1995);
- More than a quarter of Canadian and American children and youth are overweight (CFLRI, 1997; Centers for Disease Control and Prevention, 1998);
- 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 (Pearson, Wachtel & Ebi, 2000);
- There appears to be no threshold for ozone levels that are safe, and children are particularly susceptible (Transportation, Air Quality and Human Health Conference,1996);
- Children may be more vulnerable to airborne pollution because their airways are narrower than those of adults, (Transportation, Air Quality and Human Health Conference,1996);
- Children also have markedly increased needs for oxygen relative to their size. They breathe more rapidly and inhale more pollutant per pound of body weight than do adults. In addition, they may spend more time engaged in vigorous outdoor activities than adults, (Transportation, Air Quality and Human Health Conference,1996);
- Heavy traffic has reduced the independent mobility of children and youth (Tranter, 1996; Hillman, M. and Adams, J., 1992);
- Opportunities and locations for spontaneous play are severely restricted by traffic (Hillman, M. and Adams, J., 1992; Garbarino, 1989; Moore, R., 1986);
- Exposure to traffic noise has been linked to reduced reading levels in children, (possibly due to reduced auditory discrimination), (Bronzaft, A. ,1995);
- Children who survive traffic accidents may suffer from emotional distress for a considerable amount of time, unless treated. This may include depression, recurring nightmares, difficulty attending to school work, fear of cars (Canterbury, R. and Yule, W., 1996);
- In Canada, approximately 30% of greenhouse gas emissions come from transportation. These are contributing to global warming which will have long term impacts on children. (NRTEE, 1997).

Compiled by Dr. Catherine O'Brien, York Centre for Applied Sustainability, York University, Toronto, Canada. E-mail:imurray@renc.igs.net