COORDINATED EVALUATION OF ACTIVE AND SUSTAINABLE SCHOOL TRAVEL:
INTERNATIONAL BEST PRACTICES

by

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BA, Trent University, 2016

A Major Research Paper
presented to Ryerson University

in partial fulfillment of the requirements for the degree of

Master of Planning
in
Urban Development

Toronto, Ontario, Canada, 2018

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ABSTRACT

More children across the Greater Toronto and Hamilton Area (GTHA) are driven to school than ever before, which is detrimental to their health and wellbeing, and contributes to traffic congestion and reduced environmental sustainability. Active and sustainable school travel (ASST) describes sustainable modes of school travel. The Big Move envisions that 60% of children will utilize ASST by 2033. However, contemporary data collection efforts are not coordinated across the region making it difficult to measure progress towards this goal. This paper explores international best practices for coordinated data collection and evaluation of school travel-related programming. Five recommendations are made for future school travel data collection efforts in the GTHA related to stakeholder relationship building, incentivizing data collection, utilizing multiple data collection tools, developing holistic performance indicators, and establishing clear leadership from one organization.

Key Words: active transportation, evidence-based planning, data collection, evaluation, children, planning

ACKNOWLEDGEMENTS

This research was generously supported by Metrolinx. I would like to sincerely thank Dr. Raktim Mitra for supervising this research study within the TransForm Research Laboratory at Ryerson University. Dr. Mitra's vast knowledge of active transportation and his commitment to student success were touchstones for this research.

I would also like to thank Kate Berry, Senior Program Manager of Active and Safe Routes to School at Green Communities Canada, who contributed as a second reader to this research. Kate Berry's investment and guidance were invaluable assets to the research.

Lastly, heartfelt thanks go to my family and close colleagues for their support and encouragement during this research project. Thank you, all.

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1. INTRODUCTION

An excessive dependence on automobiles over the past three decades has significantly changed how children and young people travel to and from school. Today, more children in the Greater Toronto and Hamilton Area (GTHA) rely on private automobiles for school transportation than ever before (Metrolinx, 2015). This phenomenon is international—increased automobile dependency for school transportation has occurred across the Global North since the late twentieth century (Boarnet et al., 2005; Grize et al., 2010; Kerr et al., 2006; McDonald, 2007; Pooley et al., 2005). Conversely, the proportion of children travelling to and from school by active modes of transportation, such as walking and cycling, has declined (McDonald et al., 2011; Mitra et al., 2016). The use of automobiles for short trips, including school transportation, is a major and growing contributor to exacerbated traffic congestion on local streets, environmental degradation, and a myriad of negative impacts on health and wellbeing, particularly among children (Dumbaugh and Frank, 2009; Mackett, 2013; Wilson et al., 2007). Within this context, promoting more active and sustainable forms of transportation must be prioritized through comprehensive policies and coordinated programming.

The concept of active and sustainable school travel (ASST) has emerged within planning literature to describe more sustainable modes of school travel such as walking, cycling, and public transit (Metrolinx, 2013). The potential benefits of ASST programming have been widely discussed and may include modal shifts towards sustainable transportation, reduced traffic congestion and increased levels of safety for pedestrians and cyclists. These benefits are often observable at the school or neighbourhood level (Giles-Corti, et al., 2011; Mendoza et al., 2009), however, when implemented on regional or national scales, other benefits may be observed. These larger scale benefits include greater environmental sustainability through reductions in

greenhouse gas emissions and vehicle kilometers travelled (VKT), and improved levels of health and safety across larger jurisdictions (Ewing and Cervero, 2010; Frank et al., 2006; Toronto Centre for Active Transportation, 2015). Connecting these benefits to specific ASST programs, and active transportation projects in general, is a challenging yet essential undertaking within increasingly entrepreneurial regional and municipal government structures where performance-based budgeting and resource allocation are becoming increasingly common.

In Toronto, the proportion of 11- to 13-year olds travelling to school by active modes of transportation has decreased from 62% to only 48% between 1986 and 2011 (Metrolinx, 2015). This trend has occurred despite the average distance travelled to school remaining relatively constant over the same time period at approximately 0.8-kilometers or a ten-minute walk (Mitra et al., 2016). In more suburban areas of the GTHA, the decrease in active modes of school transportation has been even more extreme where only 34% of 11- to 17-year olds travel to school by walking or cycling. Similar trends have been observed across the Global North—in response, increasing rates of ASST has been identified as a key goal, both internationally and within the GTHA, to mitigate the negative externalities associated with automobile dependence.

The Regional Transportation Plan (RTP) for the GTHA, *The Big Move*, envisions that 60% of children will walk or cycle to school by 2033 (Metrolinx, 2008). While this is an important policy goal, data collection efforts related to school travel in the GTHA lack regional coordination and systematic administration. Without a systematic data collection tool and comprehensive evaluation framework, it is challenging to accurately measure program success of ASST initiatives across the GTHA, and thus assess progress towards achieving the target for active school transportation identified in the RTP. This study examines 6 cases of coordinated regional data collection on school travel-related programming, which were assessed through a

qualitative investigation to identify key areas of program success and response to challenges.

This research has two key objectives:

- 1) To conduct a synthesis to improve our understanding of international best practices regarding data collection and evaluation; and
- 2) To identify challenges and responses that can be applied to the GTHA context through a “lessons learned” approach.

An exploration of this topic is critically important in advancing transportation planning and policy in the GTHA region. Metrolinx, the provincial transportation authority for the GTHA, has been actively involved in promoting ASST over the past decade and has overseen the implementation of several related initiatives and programming. From 2009 to 2011, Metrolinx facilitated the Stepping It Up pilot project, one of the first attempts at identifying regional opportunities for promoting ASST in the GTHA. Stepping It Up was funded through Transport Canada’s ecoMOBILITY program and was implemented in partnership with Green Communities Canada and the University of Toronto at elementary schools across the Region of Peel and the City of Hamilton (Metrolinx, 2012). In 2013, Metrolinx released the ASST Strategy Roadmap, a guiding policy document which outlines the strategic directions for Ontario-wide implementation of ASST initiatives including a framework for priority setting and identifying accountability among key stakeholders (Metrolinx, 2013). The ASST Strategy Roadmap emphasizes the need for evidence collected through systematic data-gathering as an essential component for program success and sustainability (Metrolinx, 2013). Additionally, the development of quantifiable performance measures would be necessary for effective ongoing program evaluation (Metrolinx, 2013).

With systematic data collection identified as a key next step for ASST planning in the GTHA, it is important to assess the current state of data collection practices. Efforts related to establishing regional ASST planning in the GTHA have been ongoing since the 1990s and significant work has been undertaken by a broad spectrum of stakeholders, including considerable contributions from grass roots organizations. Green Communities Canada, a national association of community organizations involved in sustainability initiatives, has emerged as a key stakeholder in ASST initiatives across Canada. Green Communities Canada has developed and implemented several Active and Safe Routes to School (ASRTS) and School Travel Planning (STP) programs nationally. However, many of these programs operate on an ad hoc basis and are not coordinated at a municipal or regional level (Flanagan and Mitra, 2016). Most ASST initiatives within the GTHA do not routinely collect data on school transportation mode, and even where data collection does occur, it is often not comparable across the region as a whole (Buliung et al., 2009; Mammen et al., 2014). Additionally, the existing regional transportation survey for the GTHA, the Transportation Tomorrow Survey, one of the largest of its kind in the world, does not collect information on travel behaviour on children under the age of 11-years old. Considering these existing gaps and limitations, the impacts of ASST initiatives in the GTHA are largely unknown, and it is unclear whether these programs are effectively contributing to improving sustainable school travel. ASST practitioners in the GTHA are missing an opportunity to assess what is working and what is not working. These concerns are key rationales behind further research on: (1) regional coordination of ASST programming and (2) the need for coordinated evaluation efforts.

Previous research on international best practices of regional ASST planning identifies routine data collection on school travel as a key component to ensure long-term success of

school travel-related initiatives (Flanagan and Mitra, 2016). In the United States, the National Safe Routes to School (SRTS) program is a federally funded ASST program that provides both infrastructure and non-infrastructure interventions to encourage active school transportation (Safe Routes to School National Partnership, 2015). Since 2007, the National Centre for Safe Routes to School (NC-SRTS) has provided a centralized data collection and reporting system involving two standardized data collection instruments, a parent survey and an in-class student hand tally, which as of 2016 has received data from over 13,000 schools across the country (National Center for Safe Route to School, 2016). Similar national-level data collection efforts are evident in England, which introduced the Home-to-School Travel and Transport Statutory Guidance in July, 2014. The Statutory Guidance emboldens Local Authorities (local levels of government) with a statutory duty to promote sustainable school transportation and monitor school travel behaviour (Department for Education, 2014). While the policy document is general in its definition of “promoting” sustainable transportation, it has nonetheless been decisive in establishing national data collection efforts related to school transportation.

This study contributes to research and policy on the establishment of an regional data collection framework to evaluate the impacts of ASST initiatives on a regional scale. The outcomes of this research can be used by a variety of stakeholders invested in regional ASST planning in the uptake of implementing a regional data collection and evaluation tool to assess the effectiveness of particular programs and initiatives. This paper is divided into four key sections. Chapter 2 provides a literature review of the current state of school transportation and data collection efforts. Chapter 3 discusses the methodology of the study. Chapters 4 and 5 provide a synthesis of international best practices and responses to potential challenges that can inform future ASST planning in the GTHA.

2. LITERATURE REVIEW

Over the past decade, active school transportation has become a widely discussed topic within transportation planning. While some evidence demonstrates the positive impacts of active transportation on children's health and wellbeing (Frank et al., 2006; Ramanathan et al., 2014; Rossenberg et al., 2006), environmental quality (Frank et al., 2010; Saelens et al., 2003), and local transportation networks (Berrigan et al., 2010; Giles-Corti et al., 2011), rates of active school transportation have declined since the late twentieth century. There is a lack of systematic data collection on school travel-related programming which makes evaluating ASST initiatives challenging, especially at regional and national levels (Boarnet et al., 2005; Buliung et al., 2009; 2011; Davidson et al., 2008). The following review explores previous research on evaluating ASST initiatives and the methodologies used to collect and monitor data on school transportation. The research problem addressed in this study is situated amongst a broader knowledge gap in coordinated evaluation and monitoring of initiatives related to active transportation and outlines the need for further research on developing regional evaluative frameworks.

2.1 Context and Trends of School Transportation

The concept of ASST has emerged in planning and public health literature in response to countries across the Global North experiencing significant decreases in the proportion of children walking and cycling to school, including the United States (McDonald 2007; Beck and Nguyen 2012), Canada (Buliung et al., 2009), the United Kingdom (Atkins Limited, 2010), Australia (Merom et al., 2006), and New Zealand (Hinckson and Badland, 2011). In the United States, for example, the proportion of children age 5-18 travelling to school by active transportation declined from 40.7% to 12.9% between 1969-2001 (McDonald, 2007). Several factors related to

this decline have been discussed, including safety concerns, increase of school choice (particularly in the United States), distance to school, societal changes, increase in car ownership and shift towards organized play (Everett-Jones and Sliwa, 2014; Rothman et al., 2017). Physical infrastructure and residential densities around schools have also been suggested as influential factors that determine children's mode choice. For example, areas with few crosswalks and busy roadways lacking pedestrian and cycling infrastructure were associated with lower levels of active school transportation (Carlson et al., 2014). The decline in active school transportation has occurred even when few perceived barriers exist. While the distance travelled to school has remained relatively unchanged over the past five decades in the GTHA, the mode share of automobile trips continues to increase (Mitra and Buliung, 2012). This has occurred in many urban contexts, though the decline is more pronounced in suburban areas, perhaps due to the dominance of automobiles for everyday travel (Mitra and Buliung, 2012).

The decline of active school transportation is concerning due to a myriad of negative impacts associated with automobile dependency, particularly among children as they are still developing physically and mentally and have less autonomy to make choices over their transportation habits (Mackett, 2002; Mackett, 2013). Several studies demonstrate that children who walk or cycle to school are less prone to physical inactivity-related diseases (Center for Disease Control, 2016; Merom et al., 2006; Zapata-Diomedes et al., 2017). In a systematic review of active school transportation, Buliung et al. (2009) found that the majority of children who walk or cycle to school engage in more physical activity than children who travel by motorized vehicles. Automobile dependency for school transportation is also a major and growing cause of traffic congestion and has significantly impacted neighbourhood transportation networks (Berrigan et al., 2010; Giles-Corti et al., 2011). Beyond traffic congestion, automobile

dependence also impacts the future travel behaviour as children who are driven to school are less likely to engage in active transportation as adults (McMillan, 2005).

2.2 Characteristics of ASST Planning and Interventions

In response to the current context of school transportation, promoting and increasing ASST has become a near universal recommendation and policy goal among governments and community organizations. The concept of school travel planning (STP), first introduced as a national program in the United Kingdom, has emerged as a common strategy that encompasses several specific ASST initiatives and programming ranging from national programs to school- and neighbourhood-level interventions. In general, STP is a community-based and iterative process focused on increasing active school transportation, reducing automobile dependency and increasing road safety among children (Buliung et al., 2011; Mammen et al., 2014). The process is typically undertaken by addressing local barriers to ASST through the creation of a school transportation plan containing locally derived goals and targets related to school transportation. The school travel plan is meant to “document a school’s transportation characteristics and provides an action plan to address school and neighbourhood barriers to ASST” (Buliung et al., 2011).

Previous research has identified a variety of best practices for ASST planning in general. Flanagan and Mitra (2016) conduct case study research on ASST planning practices in the United States, the United Kingdom, New Zealand, and Canada which demonstrate systematic and coordinated data collection efforts integrated into broader ASST planning practices and processes. The study found that a commitment from a regional or national government through policy and a top-down responsibility for promoting ASST is essential to bolstering the uptake of

systematic data collection efforts across regional and national jurisdictions (Flanagan and Mitra, 2016). The role of the national government in the United Kingdom is highlighted as a key best practice for managing ASST planning on a regional scale due to the national prioritization of promoting ASST through policy-led practice (Flanagan and Mitra, 2016).

Another key practice identified by Flanagan and Mitra (2016) is a strong commitment from one organization, such as regional transportation authorities, which act as coordinating bodies during the implementation and evaluation of ASST programs. For example, Metropolitan Transportation Commission (MTC), the regional transportation authority for the Bay Area, California, demonstrates a responsibility and sense of “ownership” over ASST planning facilitates, resulting in stronger relationships between other involved stakeholders including school administrators, police, and public health officials (Flanagan and Mitra, 2016). This practice is also evidenced in Canada, where Metro Vancouver’s HASTe (Hub for Active School Travel) program has emerged as the region’s primary ASST organization. Having one primary ASST organization streamlines the formulation of strategic policy and planning directions through a centralized body (Flanagan and Mitra, 2016).

ASST planning is meant to be a holistic process which addresses numerous barriers to active school travel, as demonstrated by Auckland Transport’s “whole school” approach (Flanagan and Mitra, 2016). A holistic approach to ASST allows organizers to adequately addresses specific barriers including infrastructure and programming gaps. In Metro Vancouver, HASTe facilitates interactive mapping exercises where parents and students can indicate on neighbourhood maps their existing and preferred routes to school while highlighting safety and infrastructure concerns (Flanagan and Mitra, 2016).

There are several common characteristics that describe ASST-related interventions. In the United States, the NC-SRTS has introduced a “Five E” approach involving five distinct program characteristics and intervention types that encompass successful implementation of federal SRTS programs. (National Center for Safe Routes to School, 2015). First, “Engineering” involves to physical interventions to the built environment surrounding schools that are designed to promote ASST and increase road safety; this may include design interventions involving streets, sidewalks and intersections, or improved lighting and pedestrian/cycling infrastructure. “Education” involves outreach on the benefits of ASST and may include pedestrian and cycling safety training to increase awareness and capacity for children to engage in active school transportation. “Encouragement” refers to promoting ASST through specific events such as Walk/Bike to School Day events. “Enforcement” involves partnering with local law enforcement teams to monitor traffic speed, parking regulations and safety conditions within school zones. Lastly, “evaluation” encourages ongoing monitoring of school travel trends in order to assess specific programs successes and challenges and is a focal point of this research study.

In the GTHA, and across Canada more broadly, STP remains a largely community-driven and voluntary process led through the non-governmental organization, Green Communities Canada (Mammen et al., 2014). The most common ASST-related interventions that are implemented in the Canadian context include: education strategies, activities and events, capital improvement projects and enforcement initiatives (Mammen et al., 2014). In 2007, Green Communities Canada received funding from the Public Health Agency of Canada to implement a national STP pilot project. Results from the project have established a common STP process for implementation among Canadian school. Key components of the STP process involve data collection and problem identification, largely conducted through hands-up and family surveys

along with an assessment of localized barriers to ASST (Buliung et al., 2011). Another important component of the STP process is follow-up data collection and ongoing monitoring in order to evaluate progress towards school-level goals (Buliung et al., 2011).

2.3 Impacts of ASST Planning

While still limited, there is a growing body of research on the impacts of ASST initiatives. The first peer-reviewed study evaluating a specific ASST-related program was published in 2003 and assessed the effectiveness of the SRTS program in Marin County, California (Staunton et al., 2003). In their study, Staunton et al. (2003) found that schools participating in the SRTS program increased school trips made by walking and cycling by 64% and 114%, respectively, while decreasing trips made by private automobile by 39%. Marin County was one of the first jurisdictions in the United States to implement a county-wide SRTS program and, along with other counties in the Bay Area, has been particularly successful in promoting rates of ASST (Boarnet et al., 2005).

In their evaluation of 37 walking school bus (WSB) programs across New Zealand, Hinckson and Badland (2011) recorded an average increase of 5.9% in active school transportation when comparing the baseline school transportation modes in the pre-implementation phase of programs. The main successes of WSB programs were attributed to collaboration from schools, community organizations and local councils, along with a flexible STP process which was tailored to each school's specific needs and targets (Hinckson and Badland, 2011). Kingham and Ussher (2005) assess WSB programs in Christchurch, New Zealand and found that several schools had difficulty in maintaining program longevity past one-year of operation with only 54% of programs surviving. Keys to program success and longevity

were identified as increased interaction between schools with operating WSB programs, incentives for children to participate and strong support from local levels of government.

Mendoza et al. (2009) undertake a pilot evaluation of WSB programs in three schools from low-income communities in Seattle, Washington. After a one-year program implementation, the researchers observed a greater mode share of active transportation (25%) in schools receiving WSB interventions compared to control schools (7%) (Mendoza et al., 2009). The WSB program demonstrates promising results for increasing rates of active school transportation in low-income communities, which tend to have higher rates of active school transportation (McDonald, 2008; Mendoza et al., 2009).

Existing research on the impacts of ASST initiatives tend to focus on one or a few projects, and often the findings related to these interventions that are not comparable to control groups. Most studies are based on individual case studies and are not necessarily comparable regionally or nationally (Buliung et al., 2011; Mendoza et al., 2010). As a result, findings from existing evaluative studies on ASST initiatives are less generalizable and largely lacks systematic before-after comparison. While previous studies have compared before and after rates of active school transportation, systematic before-after comparisons about the variations in active transportation rate change across age, gender, and different built environments are less known.

While extensive research has been conducted on the impacts of local and school-level ASST-related interventions (Buliung et al., 2011; Crawford and Garrard, 2013; Mendoza et al., 2009), there is a lack of systematic evaluation criteria of such initiatives, particularly at regional and national scales (Mackett et al., 2003). Coupling ASST initiatives with formalized evaluation criteria is an important step for collecting data on school transportation and monitoring the effectiveness of specific programs as well as broader policies related to improving the conditions

for active transportation (Litman, 2017). In summary, while the “concept of evaluation is straightforward, its implementation is very complex” (Mackett et al., 2003 p. 3).

2.4 Common Methodologies and Data Collection Tools

A variety of methodologies have been implemented to monitor and evaluate school travel behaviour, including surveys, GPS and GIS-based applications, collision and injury counts, and mechanical counts of pedestrians and cyclists. However, much of the existing research on these methodologies is more quantitative in nature and focuses on validating individual data collection tools in individual research contexts. There is a lack of qualitative research that addresses the nuances of data collection and evaluation that emerge as part of on-going ASST programming and planning such as stakeholder relationship dynamics, coordination and ownership of data collection, ethical challenges, and resource allocation.

While various methodologies have been employed to collect data on school travel behaviour, specific data collection tools have seldom been validated and assessed for their reliability for assessing the impact of school travel-related programs (de Wit et al., 2012; Mendoza et al., 2010). This research gap has been identified by numerous researchers, though there is limited literature on the reliability and validity of specific travel survey instruments. TravelSmart, an Australian transportation demand initiative, did not require a specific travel survey methodology but suggested using either a paper-based diary containing travel information for 1-2 days or Global Positioning System (GPS) technology for longer periods of analysis (Australian Government, 2006). Meanwhile, the Travelling Green program in Scotland, a school travel programme aimed at encouraging active school transportation among elementary school children, used a computerized mapping program to record school travel behaviour at baseline

and follow up periods (McKee et al., 2007). This approach required children to map their route to school which collected information on the distance travelled and transportation mode used on the journey to school, which was useful at identifying multimodal school transportation behaviours (McKee et al., 2007).

Mendoza et al. (2010) and deWitt et al. (2012) both evaluate the reliability and validity of school travel surveys through a test-retest method which asked elementary school children how they travelled to school on a specific day. Mendoza et al. (2010) evaluate test-retest reliability and validity of the paper-based NC-SRTS student survey in Portland, Oregon. de Wit et al. (2012) evaluate test-retest reliability and validity of a hands-up survey to assess active school transportation from random sample of children in Auckland Region, New Zealand. Mendoza et al. (2010) rationalized the use of a written response rather than a hands-up approach due to the possible influences of social and peer pressure on modifying how children respond to survey questions. In both cases, parents of children who participated in the survey were contacted approximately 3-4 hours after child survey responses were collected and asked the same question (de Wit et al., 2012; Mendoza et al., 2010). Both studies found high agreement between child and parental responses collected from paper-based school travel surveys and validated surveys that collect student responses (de Wit et al., 2012; Mendoza et al. 2010). Other research has shown that in-class travel tallies, in some cases, are as reliable as parental surveys (McDonald et al., 2011).

The challenges related to data collection and evaluation on ASST initiatives are common among other initiatives aimed at promoting active transportation. The difficulty associated with relating impacts (outcomes) to specific programming (inputs) is a common theme among researchers in the field of policy evaluation (Chillón et al., 2014). Researchers have called for a

multi-level framework to guide the development of active transportation-related policies and programs, but few models have been developed for this purpose (Chillón et al., 2014; Insall, 2009). Several evaluations of active transportation-related initiatives have been undertaken on an input-output-outcome model. “Inputs” describe the specific programming and interventions that are incorporated within an active transportation initiative and may include project aspects such as funding and educational training. “Outputs” are key measurable enhancements that get built or implemented through a particular input (Clean Air Partnership, 2014). Outputs are typically quantifiable and may include the kilometres of sidewalk or bike lanes that are built or (Clean Air Partnership, 2015). Lastly, “outcomes” are broader effects and impacts that are observable at the street or neighborhood level. These may include indicators such as levels of safety, air quality and transportation mode choice (Clean Air Partnership, 2015).

This research study presents an exciting opportunity to contribute to the growing field of qualitative research on data collection tools used to evaluate ASST programming and planning approaches. While most contemporary research on data collection tools and methodologies focus on point-in-time evaluations, this research seeks to better understand the data collection tools that comprise successful and on-going ASST programming. In response to existing research gaps, this study seeks to better understand the data collection tools that comprise contemporary school travel programming at regional and national scales, with a hope to better inform ASST practitioners in the GTHA as they develop regional data collection tools.

3. METHODOLOGY

3.1 Overview

Qualitative methods form the basis of this research paper. Qualitative methods are as “rigorous and extensive”, and currently used by all major groups within the critical social sciences approaches utilized in human geography and planning (Winchester and Rofo, 2010). Specifically, a case study research approach is used to identify examples of coordinated data collection and evaluation of ASST initiatives. This research approach mirrors that used by Flanagan and Mitra (2016) in their exploration of international best practices of ASST planning. Informant interviews with stakeholders involved in data collection for ASST initiatives, both international and within the GTHA, were conducted between December 2017 and February 2018. Thematic analysis was conducted on interview transcripts and publicly available documents related to specific school travel programming to identify overarching themes and patterns. Ultimately, the findings gleaned from this research paper are synthesized into key best practices and learnings to inform future directions undertaken by ASST practitioners in the GTHA.

3.2 Research Approach

Six case studies, including five international and one Canadian jurisdictions, demonstrating coordinated data collection efforts that evaluate school travel-related programming were analyzed in this research. The selected cases were identified through a systematic online search using multiple internet search engines (Google, Yahoo! and Bing) and academic databases (Elsevier, Google Scholar, PubMed and Web of Science). Combinations of key phrases (e.g. “coordinated data collection”, “data evaluation”, “active school travel”, “active

routes to school”, “safe routes to school”) were used to identify potential cases. When necessary, regional variations in spelling and syntax were used to identify potential cases from a broader geographic range. Various search operators, such as Boolean and Wildcard, were used to direct the online search. The systematic online search identified 120 cases of data collection related to the evaluation of ASST initiatives. To narrow down the selection, cases were assessed using the following criteria:

1. Direct policy statements and programming related to ASST at a regional level or covering multiple municipalities.
2. Direct involvement and leadership of a government organization(s).
3. Coordination and collaboration between multiple organizations and stakeholders.
4. Systematic collection and analysis of school travel-related data for purposes of monitoring and evaluation.
5. Currently in operation or was in operation for three years or longer.

Using the above criteria, total of 6 case studies were selected for further research, as shown in Table 1.

Country	Selected Regions and/or Jurisdictions
United States of America	Bay Area Region, California Portland, Oregon
United Kingdom	England Scotland
Australia	Brisbane, Queensland
Canada	Metro Vancouver, British Columbia

Table 1: Selected Case Studies of Coordinated ASST Data Collection and Evaluation

A purposeful sample of informants were recruited for participation in this research based on their experience with data collection and evaluation of the selected case studies. Semi-structured interviews were conducted with 10 informants in which their ideas and experiences regarding data collection and evaluation of ASST were discussed (Minichiello et al., 1995). In

addition to stakeholders from the selected case studies, interviews were also held with stakeholders involved in ASST planning across the GTHA in order to contextualize the findings from other jurisdictions to local conditions. A total of four ASST practitioners from three upper- and single-tier municipalities in the GTHA (Hamilton, York, and Halton) participated in the research.

Informants were selected based on a purposeful online search of publically available contact information related to organizations and individual stakeholders involved in ASST planning and evaluation. After an initial list of potential contacts were assembled for each case study, the snowball sampling method was used to recruit additional interviewees. The snowball sampling method is described by Katz (1994) as a non-probability method for developing a research sample where existing research participants recruit or suggest acquaintances for future participation. The interviewees that participated in this research included a range of stakeholders involved in data collection and evaluation processes, including transportation planners, school administrators, community program managers, and sustainable transportation advocates.

The topics and questions covered through the semi-structured interviews were standardized across all cases. An interview guide, attached in Appendix A was created to direct the interviews which consists of 15 questions, grouped into four general themes: (1) Roles and Responsibilities; (2) ASST Context and Practice; (3) Data Collection and Evaluation; and (4) Challenges and Responses. While the interview guide provides a similar structure of discussion, interviews were undertaken in a flexible manner that allowed the researcher to explore areas of interest not covered by the guide. Prior to participating in an interview, informants were provided with a copy of the interview guide at least 48 hours prior to the interview. Interviews were held by telephone and typically lasted between 30-60 minutes. Audio recordings of interviews were

transcribed and coded for key themes related to regional context of ASST policies and programming, key performance indicators (KPIs), key challenges and opportunities, collaboration and partnership among stakeholders. Qualitative content analysis was undertaken to identify key themes and experiences across the selected case studies.

Formal ethics review and approval was not required by the Ryerson Research Ethics Board. Serious efforts were undertaken to ensure that the data collected was carefully stored and treated in a way to protect the interviewees. Interviewee's participation in this research was on a voluntary basis. Interviewees were informed that they did not have to answer any question that made them uncomfortable and that they could end the interview at any time with no negative repercussions to their relationship with the researchers or Ryerson University. Informants were asked for consent to have their names listed as key contacts that participated in the research. Audio recordings were stored on a password encrypted computer which was only accessible by the researcher and research supervisor. All audio recordings and interview transcriptions were destroyed after the culmination of the research.

3.3 Analytical Approach

Thematic analysis formed the basis of data processing for this research in order to organize and categorize key findings. Archival documents and interview transcriptions were reviewed multiple times to identify key themes and statements that informed how particular data collection and evaluation efforts were undertaken. Four key themes, identified by Strauss and Corbin (1990), were used to guide thematic analysis of content analysis of archival documents and interview transcripts, including conditions, interactions among actors, strategies and tactics,

and consequences. Transcripts underwent triangulation to identify commonalities and differences within key findings among other experiences reported by informants.

It is important to note that the findings from the semi-structured interviews represent ideas and experiences that are conditional to unique local and national contexts. The approaches that other jurisdictions have taken as part of their ASST planning is oftentimes dependent on the impacts of broader structures including national-level policies and the allocation of resources. Knowing this, the results are only generalizable to the scope of this work and are not meant to act as direct lessons learned that can be applied to the GTHA context. Interviews held with ASST practitioners in the GTHA are useful in identifying some of the challenges and opportunities that international practices pose, and what changes need to be made for their implementation across the region.

While the purposeful sample of case studies explored as part of this research represent a broad international scan of current data collection and evaluation practices of ASST, they represent only a small fraction of efforts being undertaken in this field of planning. Hence, the sample size of case studies and interviewees that are examined in this research paper does not reflect the diverse approaches to all ASST planning occurring internationally and is too small to make sweeping conclusions that are normative and prescriptive. However, the methodology used in this research highlights some key examples of coordinated data collection and evaluation efforts related to ASST. The outcomes highlighted in this research paper are a synthesis of qualitative information that represent a medley of “best practices” that can be used by ASST practitioners to influence the future direction of regional evaluation efforts in the GTHA.

4. BEST PRACTICES FOR COORDINATED DATA COLLECTION

4.1 Overview

This chapter provides a synthesis of international best practices for data collection and evaluation of ASST programming and discusses opportunities for establishing similar practices in the GTHA. These findings provide important insights into the type of data that is collected, how this data is collected, and the relationship dynamics between involved organizations that engender positive results when coordinating evaluation efforts. While several practices discussed below are not currently implemented across the GTHA on a regional scale, they are discussed in a flexible manner and provide opportunities for further exploration on their possible introduction in the future. In this chapter, best practices for coordinated data collection and evaluation from the selected case studies are discussed with a focus on data collection tools and methodology, key performance indicators and stakeholder coordination.

The six case studies selected for this research are examined for commonalities and differences between existing practices and processes. Collectively, these cases provide an international overview of the current state of data collection and evaluation of ASST-related programming and initiatives at regional and national scales. Each case study demonstrates coordinated and systematic data collection practices which monitors how children travel to and from school over time. Multiple stakeholders are invested in data collection and evaluation efforts including transportation authorities, not-for-profit organizations, school administrators and boards, local and regional governments, and in the case of the United Kingdom, the national government. Despite the variation of invested stakeholders, each case demonstrates a single department or organization that has assumed ownership and responsibility over data collection and evaluation efforts. While key differences exist in the political organization and specific

program implementation, several commonalities are present throughout the cases. Summaries of key features from each case study is attached in Appendix B.

4.2 Data Collection Tools and Methodologies

Similar approaches to data collection and evaluation have been adopted and implemented in all selected case studies. Baseline and follow up surveys are regularly administered and act as the primary data collection tools used to monitor school transportation mode and assess specific ASST interventions. In the United States, the National Centre for Safe Routes to School (NCSRTS) enforces strict data collection requirements on schools as a condition to receive federal funding (Flanagan and Mitra, 2016; NCSRTS, 2016). In England, local levels of government known as Local Authorities are required by national statute to promote and collect data on school transportation (Department of Education, 2014). All case studies utilize at least one or a combination of data collection tools including in-class student hand tallies (both hands up and paper-based), weekly travel journals, and parent surveys as part of their coordinated data collection efforts. While the type of data collected varies between survey type and jurisdiction where they are implemented, several commonalities exist that are useful to discuss as part of this research.

All data collection tools utilized in the selected case studies track progress towards reaching local or regional ASST goals over time. Some of the common logistical considerations include selecting a specific and consistent timeframe to conduct data collection each year (e.g. one day annually or semi-annually, one week annually) based on local context and conditions. Having a standardized and coordinated time period to conduct data mitigates the impact of seasonal variations that time of year has on school travel behaviour. This is an important

consideration for ASST practitioners in the GTHA to remain cognizant. While previous research suggests that seasonality and short-term weather conditions do not appear to impact active school travel in the GTHA (Mitra and Faulkner, 2012), it is important to incorporate rigorous data collection practices to ensure that year-after-year data collection is comparable. In terms of data collection, all cases demonstrate systematic procedures of collecting baseline and follow up data. In general, baseline data is collected over the course of 1-year with follow up data being collected at least 1-year later with systematic program evaluation occurring at intervals of 1-3 years. ASST practitioners in Metro Vancouver and the Bay Area suggested collecting follow up data a minimum of 1.5-years after baseline data collection in order to ensure that time impacts from specific ASST interventions are fully realized during subsequent data collection efforts.

4.2.1 Data Collection Tool: In-Class Student Surveys

In-class student surveys are the most common data collection tool used to collect school transportation data among the selected case studies. While there are variations in definition and implementation, in-class student surveys generally ask students how they normally travel to school, and their responses are indicated by paper-based responses or show of hands that is recorded by a teacher or school administrator. Additional questions may be asked during an in-class tally based on the specific data collection objectives of an ASST program. For example, through the ModeShift STARS program, a national school travel awards scheme in England, additional questions are asked such as what a student's *preferred* way of travelling to school. Responses are generally collected through a simple tally, either on paper or electronically, that is later processed and analyzed.

A near universal observation from stakeholders is that in-class student surveys are one of the most cost-effective data collection tools, particularly when compared to parent surveys. Teachers or other school-level staff are often tasked with undertaking the tallies which represents a significant cost-savings in terms of staffing and time resources for schools and ASST organizations. One stakeholder involved in ASST planning in the Bay Area noted that “sending our own representatives to schools to conduct the survey is more disruptive to the class and requires a lot more coordination on our end. It was much easier, and less distributive to the individual classrooms, to have the teacher conduct the survey themselves”. This observation was repeated several times by other stakeholders who noted that data collection was streamlined by having student responses recorded in-class: “it’s an efficient use of the time we need to undertake the survey year after year... if we were sending our staff to conduct the survey it might take us upwards of two weeks to get to all the schools. This way, the data is collected in one day.” In all, interviewees expressed the view that in-class student surveys are an easily implemented data collection tool capable of collecting necessary information to inform ASST program evaluation. This is an important observation considering the increasing scarcity of resources, both time and money, available to schools and not-for-profit organizations that may be coordinating data collection efforts.

However, several interviewees noted the limitations on how much information ASST practitioners are able to obtain through student surveys. Several stakeholders noted that while in-class tallies are an easier way to quickly capture how children travel to school, the scope of data collected remains limited. Interviewees noted that in-class hand tallies should be able to be undertaken in under five-minutes to increase classroom participation. When in-class surveys are undertaken using paper-based surveys, one participant noted the need to streamline in-class

surveys, stating “we had issues where other stakeholders were adding on more question to the in-class surveys, so at a certain point it just became too long, and we had to streamline the questions we were asking.” While they represent a cost-effective way of collecting data on ASST, it is important to remain cognizant of the limitations associated with in-class hand tallies when using them to evaluate specific ASST programming and perhaps explore complimenting their use with other data collection tools.

4.2.2 Data Collection Tool: Weekly Travel Journals

During discussions around other data collection tools, several stakeholders from the Bay Area and Portland noted their use of weekly travel journals as a data collection tool to record school travel behaviour. Weekly travel journals are completed by either students or parents and are weekly charts that document how students travelled to and from school for one week. The use of weekly travel journals was noted as an important data collection tool that is able to obtain finer-grain data at school travel behaviour, by monitoring how travel mode changes throughout the week and by morning and afternoon travel times. Weekly travel journals were used in the Bay Area during the most recent evaluation of regional SRTS programs, which stakeholders found particularly useful: “we found that traditional data collection methods, like the hand tally, weren’t as effective at capturing contemporary school travel behaviour—we have students who use multi-modal transportation or who walk on certain days but get driven on others. The weekly chart allows us to see these more intricate travel behaviours.” Another stakeholder noted: “we learn that kids are really multi-modal during the week. They might get dropped off in their parents’ car for 3 or 4 days a week and then one day they might be walking or biking... this helps us figure that out.”

Using a weekly travel journal may represent a best practice for future efforts in data collection and evaluation of ASST programming. The ability to track and record more diverse travel behaviours is an asset to organizations involved in program delivery as it provides a more holistic understanding of how students are travelling at the school and regional level. One particular strength of implementing a weekly travel journals is the ability to assess ASST programming that is aimed at reducing traffic congestion on school sites during peak travel times. Are more children using active transportation during the last portion of their school commute in the morning? Are there less vehicles arriving at school sites in the morning and afternoon? Utilizing weekly travel journals allows school administrators and ASST practitioners to assess these “park and ride” initiatives and collects information that can be used to assess a wider range of ASST-related programming. Weekly travel journals also allow ASST practitioners to identify the effectiveness of specific events such as “walk to school” days. When data is collected over the course of a week, changes in modal splits between advertised walk to school days and regular school days can help practitioners understand how the program is performing in terms of participation and longevity.

In all, interviewees shared positive experiences associated with utilizing weekly journals due to the finer-levels of analysis that could be undertaken on school travel behaviour: “Are external conditions influencing how kids travel to school? How much of an impact does parent work schedule have? Our weekly log helps us understand these factors, so we can develop solutions.” Weekly travel journals may represent a key opportunity for regional evaluation efforts across the GTHA to assess school travel behaviour due to their ability to collect information on multi-modal travel behaviour that changes over time. While filling out the journals regularly may be daunting for some, it provides a wider scope of information that is not

obtained from more straightforward in-class hands up and paper-based surveys. ASST practitioners may wish to encourage respondents to add detailed notes, if possible, in order to obtain valuable qualitative information related to travel choice and the factors that influence travel behaviour that compliments the quantitative information collected on overall mode choice.

4.2.3 Data Collection Tool: Parent Surveys

While in-class student surveys and weekly travel journals are useful data collection tools in monitoring and assessing how children are travelling to and from school, parent surveys represent opportunities to collect additional information on school travel behaviour. Parent surveys are a key data collection tool used by the NCSRTS in the United States. Localized parent surveys been employed in Bay Area, Portland, and Metro Vancouver to evaluate school travel behaviour and collect information beyond transportation mode. In general, parent surveys are either sent home with students or mailed directly to households for parents to complete within a 1-week timeframe. Parent surveys represent significant opportunities for ASST practitioners to collect information on levels of safety, both real and perceived, associated with active routes to school and the external factors that influence how children travel to school.

In Portland, the primary ASST-related initiative is implemented through the SRTS program. Through the Portland SRTS program, a semi-annual parent survey is mailed out to all households with a student enrolled in an elementary or middle school, representing approximately 31,000 surveys. The survey is coordinated by and mailed out on behalf of Portland Bureau of Transportation (PBOT), the municipal transportation authority. Stakeholders involved in distributing the survey and analyzing the collected information noted that a particular strength of the parent survey is the ability to identify real and perceived barriers to ASST.

Commonly reported barriers to ASST that stakeholders in Portland have observed include distance, inclement weather, safety concerns and parent work schedules.

In Metro Vancouver, the Hub for Active School Travel (HASTe), a leading ASST organization in the region, uses parent surveys to undertake interactive mapping exercises. As part of the HASTe parent survey, parents are asked to indicate the route their child uses or *would* use to walk or cycle to school. Parents are asked to annotate the map with safety and concerns and infrastructure gaps. This example is an interactive example of data collection that is able to obtain information on localized barriers to ASST by identifying specific areas for interventions. This tool is particularly useful for regional transportation authorities and municipalities which may be able to respond to these concerns by implementing physical or non-physical infrastructure interventions. Another key strength of interactive mapping as a data collection tool is the ability for ASST practitioners to see which streets are utilized by children travelling to school by active modes which can be used to prioritize pedestrian realm improvements.

Stakeholders shared their experiences on the issues associated with using parent surveys to assess ASST programming and initiatives. Most of the limitations associated with parent surveys revolved around implementation costs and resources. One participant noted: “Portland has a great mail-out parent survey but it’s hard to implement that type of program in another area. We had already achieved dedicated funding to support the survey, so when you try to replicate it... it is very cost-prohibitive”. However, it is important to note that the cost-to-value ratio of implementing a similar city-wide parent survey may be increased when conducted on a 5-year basis rather than annually. When considering the financial cost associated with other jurisdictions’ data collection tools, there are opportunities to adopt them within the GTHA that are reflective of local financial contexts.

While there are additional costs associated with parent surveys, the value that this additional data adds should not be discounted. Instead, establishing a parent survey should be seen as an up-front investment that provides ASST practitioners with critically important additional data that is not necessarily captured when using more cost-effective tools such as hands up surveys. Collecting high quality data on the real and perceived barriers to ASST is essential for transportation planners and other ASST practitioners to adequately respond to these concerns. In the case of the GTHA, the existing family survey developed by Green Communities Canada provided some opportunities to collect this information on a regional scale. In the future, the possibility to collect data using a similar survey that is more systematically implemented within the overall program evaluation scheme may provide stakeholders with the information needed to support many future interventions through evidence-based planning.

4.3 Key Performance Indicators

Stakeholders involved in ASST programming from the selected case studies discussed a myriad of KPIs that are used to evaluate program success in their jurisdictions. Modal shift towards more active forms of transportation, such as walking and biking, is a primary KPI that is used to assess program success in all cases. However, a variety of other indicators are also utilized that provide opportunities for more holistic program evaluations. While the KPIs discussed below are not meant to provide a comprehensive list of indicators, they set provide key insights for areas of exploration in emerging efforts across the GTHA to establish a regional data collection tool. How can data collection tools be coordinated with regional ASST goals and objectives? What information should be prioritized? These are important questions for ASST practitioners to ask and ones that interviewees in this research provide key insights on. An

assembly of KPIs indicative of successful ASST programming are discussed below in relation to the types of information that stakeholders are able to obtain from their use.

4.3.1 Transportation mode

All case studies collect information on what modes children use to travel to school, either by parent or student response survey, and this has become a regular practice among all selected jurisdictions. Perhaps the most important indicator of program success is an observable increase in rates of active school transportation. Conversely, reductions in children being driven to school are another related indicator of program success. However, there are other indicators that are useful for ASST practitioners to remain cognizant of. The interviewees highlighted three questions important to collect data on: are there increases in multi-modal trips that contain a component of active travel? Is there a difference between morning and afternoon travel behaviour? Is there a variation between travel behaviour throughout the week? Together, collecting information that provide insight on these questions is a key consideration towards obtaining a more holistic overview of program success and challenges.

4.3.2 Levels of Safety

Another set of commonly used measures to evaluate ASST programming is the level of safety among children travelling to school. This is measured through data on the frequency, and severity of reported collisions occurring at a particular school site or within the area surrounding a school. Local conditions and infrastructure audits on traffic speeds and pedestrian and cycling infrastructure in school zones are evaluated in several cases including Brisbane and Metro Vancouver. In many cases, working in collaboration with police organizations and transportation authorities represent opportunities for obtaining the information necessary to a holistic

understanding of safety issues children travelling to school may experience. Key informants from the Bay Area noted that in many cases, data on injury involving children travelling to school is rare, but information related to the perceptions of safety are an important element to evaluate program success. When ASST initiatives are implemented at schools, these initiatives may focus on education about the risks of driving to school compared to more active modes. In several cases, students and parents were reported to have increased levels of safety, both real and perceived, as a result of various ASST programs.

4.3.3 Awareness of Programming

Awareness of the benefits of active transportation and the presence of ASST programming at the school level was identified as another set of key performance indicators. Several interviewees noticed that while a school may offer ASST programming, parental and student awareness of the program may remain low. One participant noted: “We saw that in some schools only about half of parents knew that their school was receiving SRTS funding. We wanted to explore this by collecting this data we are able to see our gaps in terms of program advertisement and branding.” Parent surveys represent a key opportunity to obtain information on this topic: in Portland, the SRTS parent survey asks parents whether they are aware of the specific programs and events offered at their child’s school. Increasing program awareness among parents and students often means will oftentimes result in greater uptake of specific ASST programs such as walking school buses or designated walk to school days.

Connecting program success to a “theory of change” is another important component of increasing ASST and program awareness. While some ASST programs may not result in a significant increase in students using active transportation, if more people are aware of the

benefits of ASST or *want* to use active transportation, this can be considered one aspect of program success. Summarized by one participant: “it can really come down to equipping families with a better sense of the benefits of active school travel... which can be a great performance indicator especially in areas where there are really low rates of walking [to school].” This data is an important component of information that should be collected by ASST practitioners because it allows organizations involved in program delivery to assess the quality of program marketing and advertisement to the school community.

4.4 Coordination of Stakeholders

An important consideration when planning for systematic data collection and evaluation of school transportation-related programming is the necessary coordination between multiple stakeholders. Informants involved in the research shared details on the relationship dynamics between key stakeholders involved in data collection and evaluation that streamlined and facilitated coordination. While it is important to remain cognizant of different regional contexts, political organization, and roles among involved stakeholders, when assessing the case studies collectively there are several key practices related to stakeholder coordination and the organization of ASST planning which provide interesting key lessons for ASST practitioners in the GTHA. Four key aspects of stakeholder coordination are synthesized and highlighted below that directly benefit and streamline data collection and evaluation processes at regional and national scales.

4.4.1 Clear Ownership by One Department or Organization

While a variety of different types of departments and organizations are involved in facilitating data collection and evaluation in the selected case studies, each of the selected

jurisdictions demonstrated clear ownership of data collection within one stakeholder group. This observation was described by participants as an important factor in having the ability to coordinate data collection efforts across a regional scale. In the United Kingdom, Local Authorities are local levels of government that play a much more direct role in the administration of public schools compared to the Canadian context. Local Authorities (i.e., municipal governments) have a duty to collect information related to school transportation through the home-to-school travel and transport Statutory Guidance, which clearly identifies where the responsibility of data collection lies (Department for Education, 2014). Working in partnership with Local Authorities, several not-for-profit organizations involved in increasing active transportation have assumed the responsibility to work in partnership with local authorities to collect school transportation data related to ASST programming. Two key stakeholder groups in the United Kingdom include ModeShift and Sustrans, which are involved with facilitating and evaluating ASST programming nation-wide.

In the United States and the United Kingdom, municipalities and regional transportation authorities have partnered with private planning firms and not-for-profit organizations in order to undertake regional ASST planning. In cases where these partnerships exist, the level of involvement and work undertaken by third party organizations are led by government mandates and responsibilities. In the Bay Area, the regional transportation authority has a responsibility to undertake systematic evaluation of transportation-related initiatives including the SRTS program. During the regional evaluation of the SRTS program, MTC retained Alta Planning + Design to undertake data collection and evaluation efforts. Alta received clear instruction from MTC on the type of data to be collected as part of the evaluation and worked in partnership to guide the evaluation process. The presence of clear responsibilities and objectives among involved

stakeholder groups are a key finding that should be explored by ASST practitioners in the GTHA during the establishment of regional data collection efforts.

Several participants noted that having a clear sense of ownership over particular ASST programs was important for facilitating data collection and evaluation: “it makes it much easier because you have everything collected under one roof... we are in control of how the data is collected and what it is used for.” This is an important consideration to note, especially regarding the comparability of data. Having one organization involved in data collection means that data collected across an entire region or country is less likely to have issues where data are not comparable or different metrics have been collected. As demonstrated in Scotland with the Hands Up Survey, having Sustrans implement a standardized survey across the entire country on an annual basis has greatly streamlined the creation of a consistent national database on how children travel to school that now spans over 10 years, which has been used to inform the effectiveness of several national-level policies aimed at increasing active school travel and reducing transportation-related greenhouse gas emissions. Similar adoptions of program ownership would be necessary in the GTHA where there are currently many different ASST programs that are collecting data but doing so in ways that are not comparable across the region as a whole.

Having a clear sense of ownership over data collection also increases the validity of involved stakeholders, and many participants noted that this factor was useful when requesting data from other organizations: “we became known as the program facilitators, so when we came to schools asking to collect data there were fewer issues regarding consent from school councils... we were known to them and they were familiar with our process.” Increasing the visibility and validity of organizations involved in data collection related to school transportation

is an important aspect to be aware of when establishing a regional evaluation framework; this may have significant benefits during follow-up data collection when essential relationships between program delivery organizations and schools have become well established.

4.4.2 Government Involvement at Local and Regional Level

All international case studies have some level of government involvement, both local/regional and national, in promoting and evaluating ASST which is typically demonstrated through in policies promoting ASST and funding to related program providers. A clear example of government involvement is the United Kingdom, where the national government has demonstrated a clear commitment to increasing rates of active school transportation by outlining the requirement for a sustainable school travel strategy in all schools and mandating that local authorities monitor and evaluate how children travel to school: “senior, high-level support for this program is really, really important. When we first initiated the program, it was quite slow to get going but the second we had really good national government backing, which wasn’t substantial financial investment... we went from very small to very big”. The involvement of the national government has been instrumental in the establishment of the Hands Up Scotland Survey (HUSS), an annual census-like data collection tool that collects school travel data from the majority of Scottish school children. Since the mid-200s, Sustrans, a registered charity and not-for-profit sustainable transportation organization has been recognized as an official statistics provider to the national government which has increased the national profile of the HUSS and assisted in nation-wide coordination of the survey on specific days every year.

Similarly, in the United States, the federally funded SRTS program was established in 2005 after the passing of federal legislation SAFETEA-LU, which appropriated US\$821 million

to state Departments of Transportation (DoTs). While each state DoT is responsible for administering a state-wide SRTS, the federal funding source is a key aspect of ASST planning in the United States which provides a consistent level of funding across multiple jurisdictions to ensure that all regions are able to implement a variety of different ASST-related interventions, whether through infrastructure or non-infrastructure responses.

All jurisdictions considered within the selected case studies have policies at a regional level identifying active school transportation as a priority for regional traffic demand management initiatives. In the Bay Area, school travel was identified by the regional transportation authority as key focus as part of the region's travel demand strategy and regional transportation plan. Several interviewees noted that having school travel prioritized through government policies provided stakeholder groups involved in promoting ASST a mandate to secure sustainable forms of funding to implement different types of programming and data collection related to school travel. Additionally, the prioritization of school travel in government policies are often associated with specific targets related to rates of active school transportation. As a result, baseline data and consistent follow up data is needed in order to ensure that progress is being made towards these goals.

Having clear government involvement also enables the ability for ASST programming to progress towards a common goal. In England, for example, a common target related to school travel is to double rates of active transportation, however specific goals and objectives are meant to be flexible and reflective of local priorities established by local authorities. In Scotland, one participant noted: "Scottish local governments have more ambitious targets than elsewhere in the UK... having a stronger presence in government policies that say 'yes, this is something we are going to devote resources to' has meant we've seen more students walking to school than other

areas”. The ability to set regional- and national-level goals is a key finding that directs ASST programming in a meaningful way in order to tie data collection and evaluation efforts to desired outcomes and objectives.

4.4.3 Relationship Building with School Communities

One of the most important aspects of stakeholder coordination raised among study participants was the relationship between school communities at the administration and individual school level. In all, uptake by individual schools is essential to ensuring long-term program success, and many participants highlighted maintaining close relationships between involved schools as a crucial consideration during program implementation. At the school board and council level, several participants highlighted the importance of obtaining approval from school boards in order to undertake data collection efforts. Several strategies have been developed by ASST practitioners to increase the participation of school administrators during data collection and evaluation phases that revolve around increasing engagement early on during program set-up.

Government leadership and engagement with school administrators is one strategy implemented to facilitate relationship building with school communities. In the Bay Area, MTC played an active role in reaching out to schools during their most recent evaluation of the regional SRTS program. In order to build relationships between the schools and ASST program provider (Alta Planning + Design) for coordinating data collection, all schools received a letter from MTC outlining the importance of the data collection project and the importance of the project as it related to larger climate change efforts in the Bay Area and California. One participant noted: “having that connection with the schools was necessary to keeping

participation numbers up”. The relationship between ASST practitioners and school administrators is especially important when working across multiple school districts, as is the case in the GTHA. The ability to maintain a coordinated relationship with all involved school district is a challenging yet essential consideration that must be prioritized as part of regional evaluation efforts.

Other strategies related to relationship-building were evident in Portland. Under the Portland SRTS program, a total of three SRTS coordinators are responsible for conducting outreach to schools across the Portland Region. Two of the SRTS coordinators are the primary school contact for approximately 40 schools each, while the third coordinator has a much smaller catchment area of around 12 schools. One participant observed: “at the [school] district level, we have different levels of participation. One of our coordinator’s position focuses on just one school district, which is 12 schools... That district has been much more receptive... they’ll put things on district wide website that announce upcoming events, they have school transportation section on their website.” Being able to maintain closer relationships between school administration and ASST stakeholder organizations is a clear indicator of being able to increase school buy-in to particular ASST programming, which is useful for stakeholders involved in data collection as the response rates are expected to be higher at schools with a closer relationship to the organization tasked with data collection. Additionally, Portland SRTS negotiates inter-governmental agreements (IGAs) between individual school districts in order to be granted access databases containing the addresses of households with children enrolled in appropriate school district.

4.4.4 Dissemination of Results

An important consideration when discussing stakeholder coordination is the dissemination of data that is collected through a particular ASST program or initiative. Several participants noted that this is one of the most important considerations when planning for regional data collection and evaluation of school transportation. After data on school transportation has been collected from a school, or across an entire region, the next steps related to the dissemination of the results is an important area of conversation related to stakeholder relationships. Several participants noted that schools want to be involved in the dissemination of school transportation data and that by participating in the data collection process many schools feel a sense of ownership over the data that is published in reports and vital signs documents. Hence, it is important that schools receive notice of published data and, where possible, be informed of how their particular school measured up in terms of active transportation rates.

By maintaining close relationships at the school level and sharing results with school communities, a sense of ownership over ASST programs can be built into schools with increased participation in future data collection efforts. Several participants raised these observations: “in our case, the regional government did not spend as much time distributing data with schools after the analysis was done, which was disappointing because I’ve heard that schools were really interested to see how much progress they’ve made.” Under the Brisbane AST program, a series of annual and semi-annual reports are published after city-wide data is collected. These reports contain school travel trends at the city, neighbourhood and school level, which one participant saw as a great asset to the program: “schools are invested in seeing how much their efforts have paid off, so we’ve prioritized creating individual school reports to help them track their progress.” A cost-effective alternative can be achieved through online publications.

5. CHALLENGES AND RESPONSES

5.1 Overview

This chapter discusses the challenges experienced by stakeholders involved in data collection and evaluation processes and the corresponding responses that were adopted. The challenges and responses from the case studies are used to inform possible strategic directions that stakeholders involved in ASST in the GTHA could adopt in the future. Despite the variety of aforementioned best practices, a number of barriers and challenges were experienced by informants from the selected case study regions related to data collection and evaluation at regional and national scales. These challenges are categorized into two key challenges: (1) ethical considerations; and (2) lack of incentive to collect data.

Many of the challenges experienced by international stakeholders also occur within the GTHA (Buliung et al., 2009; Mammen et al., 2014). The international responses to these challenges represent several key lessons for municipalities across the GTHA which face difficulty in quantifying progress towards the goal of having 60% of children walking or cycling to school by 2033, as identified in the RTP (Metrolinx, 2008). Are we changing the number of children walking and cycling school? Is progress evenly distributed across the entire region? These questions remain unanswered amid a lack of resources to devote to coordinated data collection and evaluation at a regional scale. Understanding the innovative directions undertaken within the selected case studies is an exciting opportunity in exploring possible directions for future data collection initiatives across the GTHA.

5.2 Ethical Considerations

Ethical considerations surrounding data collection and dissemination are a key challenge experienced by the informants who participated in this research study. Obtaining consent from school boards and higher-level school administration was identified as a challenging experience yet was essential to the data collection efforts. A variety of approaches have been adopted to address these ethical considerations related to data collection on school transportation initiatives, with many of them involving improving relationships between stakeholders. This is particularly important to consider when addressing ethical issues of confidentiality at the school board level: one interviewee observed that “If you’re delivering a program or the data is staying internal to the school they are much more lenient, but once you’re reporting on this data in public documents it might change their response.” In order to be granted ethical clearance to collect data from students in-class, ASST organizations must be able to demonstrate how data will be anonymized to protect children’s identity and how the data will be presented and used in the future.

In response to this challenge, ASST organizations should consult with school administrators as early as possible in the pre-data collection phase of programming. Informants from Scotland noted the necessity to communicate with school administrators early on in the evaluation process, prior to data collection, to increase the likelihood of being granted ethical clearance. By undertaking informative conversations with higher-level school administrators about how the data will be used (e.g. municipal reports) and the benefits of collecting this data, school administrators are more receptive to allowing such data collection initiatives take place. During the establishment of Brisbane’s Active School Travel program, a roundtable was held with a variety of stakeholders, including school council representatives, that outlined the purpose

of the program and made clear connections to the regional environmental and transportation policies that the data collected as part of the program would support. Informants also noted the importance of demonstrating the ability to maintain oversight on how and where the data collected is published, which reiterates aforementioned practices discussed earlier that suggest having one organization have clear ownership and responsibility over data collection efforts.

The challenges observed in the international case studies closely reflect challenges faced in the GTHA. ASST practitioners in the GTHA expressed challenges related to obtaining ethical clearance at the school board level, and the various measures that can be undertaken in response. One participant noted that ethical clearance at the school board level is needed if any data collected from schools is being published or shown in public-facing reports. In Hamilton, higher-level school administrators have become more directly involved in the ASST planning process over the past four years which has streamlined the data collection process: “having the superintendents involved has made our work much easier... we’re able to demonstrate that we aren’t doing anything new, just continuing our old work.” In response, ethics applications made for data collection purposes do not have to go through the entire committee review process and approval may be granted in 1-2 weeks as opposed to several months due to the heightened awareness of the purpose of data collection at the school administration level.

In York Region in the GTHA, the SRTS program is administered through a joint partnership between the two District School Boards operating in the region. Since the program is administered at the school board level, the ethical challenges faced in other GTHA municipalities are largely mitigated: “everything is done in-house, so we have a much more efficient system... I already have internal clearance to implement our project deliverables [related to ASST].” Increasing the involvement of school boards may present a key lesson for the GTHA as efforts

continue to emerge around creating a regional data collection tool. Expanding beyond the school board level, several participants, both international and within the GTHA, expressed views that having clearance to collect data on school transportation must come from higher levels within the education system such as at the Ministry level: “the long term solution would be that this is data that needs to be collected from within the education system on a systematic level.” Participants noted that this approach would be much more resource efficient than liaising one-on-one with individual school boards whenever data was being collected. Another participant noted that school boards already collect a variety of data on students who are bussed to school and that there is an equal, if not more, need to collect data for non-bussed students.

5.3 Lack of Incentive for Data Collection

Among the most commonly cited challenges faced by informants is a lack of incentive at the school level to undertake systematic data collection efforts. The lack of incentive towards data collection stems from a variety of factors including a lack of resources and an unclear understanding of the potential benefits derived. This challenge is reflected in issues regarding program sustainability and ensuring that schools remained engaged in ASST programs over long periods of time—in cases across the GTHA where baseline data may be collected, it is challenging to encourage schools to continue follow up data collection in a consistent manner in order to obtain high-quality regional databases on school travel behaviour and trends.

In several cases, the lack of incentive to routinely collect and monitor data on school travel is associated with broader socioeconomic factors. In the Brisbane and Portland cases, ASST stakeholders were concerned that program longevity was more limited in schools located in more economically disadvantaged areas and schools were less likely to conduct regular data

follow-up data collection. Informants explained several factors related to this observation—many schools oftentimes have limited resources and must prioritize their resources to address larger issues of systematic underinvestment and discrimination. In Brisbane, there was a push at the municipal level to direct funding and resources to schools in such neighbourhoods in order to ensure an equitable distribution of resources across the city region and to ensure a consistent level of safety and program delivery. This response is also mirrored in Portland where Portland SRTS dedicated more SRTS coordinators to work with schools facing systematic barriers. Across the United States, the NC-SRTS has recently added equity as the “sixth E” to its mandate for providing SRTS interventions in more diverse neighbourhoods and those with historic infrastructure gaps in order to ensure appropriate resources are distributed in an equitable manner (NC-SRTS, 2015).

Staffing shortages and limited budgets often result in limited capacity to collect comprehensive data on regional and national scales. While many municipalities within the GTHA document their own school transportation rates through a variety of methods, the data collected is often done in a haphazard manner that is not comparable across the region as a whole. When considering that many ASST-related initiatives in the GTHA, and across Canada more generally, are undertaken by not-for-profit and grassroots organizations who may lack the resources to collect data at a regional scale, it is important to consider the infrastructure cost associated with specific data collection tools. The limited capacity of schools and program providers to conduct data collection efforts can be addressed by utilizing in-class hand tallies and surveys as primary data collection tools—together, the commonly used tools are also the most cost effective and least resource intensive methodologies to assess school transportation mode and ASST programming.

However, resource limitations are not a universal experience. Even where school resources are not a limiting factor for undertaking data collection, some schools and school boards do not recognize the value of collecting this data and how doing so contributes to larger policy goals and objectives. Additionally, informants noted that school communities are often interested in seeing how their individual school is performing in terms of progressing towards more sustainable travel modes over time yet feel unengaged in post-data collection efforts. In order to address this dissonance, informants involved in the Portland SRTS program have updated their reporting procedures by publishing neighbourhood- and school-specific reports in addition to their annual report on region-wide school travel behaviour trends. Similarly, in Scotland, ASST practitioners are in the process of establishing report templates that can be easily populated with school-specific data. In response, school communities feel much more engaged in data collection efforts, and ASST planning more generally, due to the visibility of tangible progress towards regional and school-specific goals related to school travel.

Another response to a lack of incentive to collect school travel data is the introduction of incentives and school recognition. In this case, ASST-related initiatives across the United Kingdom have adopted incentives and travel awards schemes in order to increase school buy-in and promote long-term program success, such as the STARS program, facilitated by ModeShift, a non-for-profit sustainable organization. As part of the STARS program, schools are eligible for a variety of rewards such as infrastructure improvements (e.g. cycling parking) and recognition at an annual awards ceremony for completing key phases of ASST planning. Schools earn “points” by undertaking routine data collection efforts—over time, schools that are able to demonstrate greater mode shifts towards more sustainable school travel are eligible for more rewards. Incorporating travel rewards and accreditation is a key lesson for ASST practitioners to

increase data collection at the school-level: “it really comes down to using the accreditation to build a culture of active travel in schools, to have a lasting legacy that schools feel proud of.” In the GTHA, adopting a similar travel awards and accreditation scheme may be a useful lesson in order to ensure more school uptake and longer program success.

6. CONCLUSION

This research study has explored best practices for evaluating ASST programming at a regional and national level from six international and Canadian jurisdictions. The selected case studies represent a diverse range of countries and local contexts that provide key lessons for ASST practitioners within the GTHA. While this research study is complementary to previous research on international best practices for ASST planning (Flanagan and Mitra, 2016), it is among the first to focus solely on data collection and evaluation practices at regional scales and discuss the use of different data collection tools and the involvement of different stakeholders from national and regional governments to not-for-profit organizations. Complementing the RTP's vision of having 60% of children walking or cycling to school by 2033 with a systematic data collection tool will allow ASST practitioners across the GTHA to create and implement appropriate initiatives and programming that better respond to contemporary school travel trends. Using information collected from the case studies examined as part of this research, a total of five recommendations, discussed below, are proposed to direct future data collection efforts as part of holistic ASST planning.

First, coordinated efforts should be undertaken to engage with all involved stakeholders as early as possible during the creation of ASST programming. Roundtables and discussions involving the purpose and objective of data collection efforts should be undertaken with a diverse range of stakeholders including school communities, school administrators, police, public health officials, municipal staff, and other involved stakeholders. Establishing close relationships with individual schools and higher-level school administrations are essential to ensure that ethical obligations do not obstruct data collection efforts. This recommendation echoes the responses of ASST practitioners from the GTHA which suggest increased

responsibility for data collection on behalf of school administrators—that this is data that should be coordinated and collected within the school system itself. York Region’s SRTS program should be examined in future research to better understand the role that specific school boards play during data collection and evaluation efforts.

Second, school communities should be provided with incentives to regularly collect data. Incentives can be implemented through a travel awards scheme similar to that used in England whereby schools can earn rewards by completing key steps related to ASST planning and data collection efforts. School communities are more likely to prioritize routine follow-up data collection efforts when there are clear benefits related to doing so. To this end, ASST practitioners should share with school communities the benefits of collecting school travel data with, both at the school level and at regional levels (e.g. response to climate change, reduction of local traffic congestion, improved environmental sustainability). These benefits of collecting data on school travel can be further emphasized by reporting on school-level travel trends: sharing annual reports demonstrating how a particular school is progressing under ASST programming increases school communities’ sense of ownership over ASST planning and ongoing data collection efforts.

Third, data collection tools should be tailored to the desired evaluation outcomes and broader policy objectives. Three main data collection tools are utilized among the selected international cases that collect high-quality data: in-class student surveys, weekly travel journals, and parent surveys. All of these data collection tools are suggested for regional implementation in the GTHA—each tool is adequate at obtaining baseline and follow up data on how children travel to and from school over time, however it is important to discuss their appropriate implementation. In-class student surveys are the most cost-effective tool discussed in this

research and recommended to be administered at the school-level by teachers. Hands up surveys collect anonymous data that is less likely to be denied ethical clearance by school boards. However, additional data collection tools are necessary to foster holistic data collection. Parent surveys are instrumental at obtaining information on the perceptions of safety and barriers to ASST and represent opportunities for schools and ASST organizations to assess the popularity and sustainability of specific ASST programming and events. Weekly travel journals are encouraged to be incorporated into in-class or parent surveys as they represent opportunities to collect detailed information on school travel behaviour not necessarily captured by surveys that only ask participants to record their “normal” school travel mode: variations in morning and afternoon school travel, school travel throughout the week, and multi-modal trips can be identified by weekly travel journals, which provides a more comprehensive understanding of school travel trends. By implementing a variety of different data collection tools, a wide breadth of information will be available to transportation planners across the GTHA which is essential for planning for more sustainable communities.

Next, a key recommendation related to the aforementioned data collection tools is establishing a holistic evaluation framework comprised of several key performance indicators. All cases examined in this research study use a variety of performance indicators to assess ASST success, which are categorized into three main themes: transportation mode; levels of safety; and program awareness among community members. When used together, these performance indicators provide ASST practitioners with a more comprehensive understanding of what aspects of ASST programming are most effective and what changes need to be made to increase effectiveness. By focusing solely on broad measures of transportation mode share (such as what can be obtained by conducting an in-class hands up survey, or tally), key opportunities are

missed to evaluate how programming influences the decision to use these more active transportation modes across various demographic groups living in diverse neighbourhoods and regions, and how a programming is perceived and received by students and parents.

Lastly, coordination among stakeholders is an essential consideration when implementing regional data collection methodologies. In all jurisdictions examined as part of this research, having one organization or stakeholder group responsible for data collection streamlines the process and contributes to better coordination between individual schools. In the Bay Area, Metro Vancouver, England, and Scotland, regional evaluation efforts are regularly undertaken by a single private or not-for-profit organization. In Brisbane and Portland, these efforts are undertaken directly by municipal departments or transportation authorities. To ensure consistent evaluation efforts, involvement from one organization, specifically a single government department or transportation authority, is essential to ensure that data collected in a consistent manner across different jurisdictions. Leadership from a single organization, particularly a government department, facilitates streamlined data clearance procedures with school boards and represents a significant cost savings in terms of time and staffing resources for ASST practitioners. Contemporary involvement from organizations such as Metrolinx and Green Communities Canada represent opportunities for undertaking regional data collection efforts. These organizations are encouraged to engage in future conversations around strategic next steps for establishing regional leadership organization of data collection efforts.

The key recommendations synthesized as part of this research study, accompanied by key case studies to be used as precedents, are summarized below in Table 2.

Table 2: Key lessons for ASST practitioners

Recommendation	Rationale	Case Study Example
1. <i>Engage with involved stakeholders and other organizations early on during program set-up</i>	Engaging with stakeholders in pre-implementation phases of ASST planning establishes clear purposes and goals of data collection efforts. In particular, early engagement and involvement of school administrators may streamline ethical clearance at school board level during future data collection initiatives.	Portland, Oregon Brisbane, Australia
2. <i>Introduce an incentive or school travel awards scheme to promote routine data collection</i>	School communities prioritize data collection efforts when the benefits of doing so, and a sense of ownership are established. Ongoing monitoring at the school-level results in high quality databases on regional school travel trends. Increased involvement in the monitoring phases can be achieved by creating individual school reports reflecting school progress.	England, United Kingdom Portland, Oregon
3. <i>Align data collection and evaluation processes through multiple tools</i>	Using a variety of data collection tools equips ASST practitioners with the information necessary to effectively respond to program performance. Hands up surveys are recommended for in-class data collection and should be complimented by systematically collected parent surveys and where possible weekly travel diaries that collect detailed information on safety perceptions, infrastructure gaps, multi-modal trips, barriers to ASST.	Bay Area, California Metro Vancouver, Canada
4. <i>Establish holistic set of key performance indicators</i>	A holistic set of performance indicators should be used to evaluate program success and regional school travel trends. Performance indicators should reflect performance in three main areas: transportation mode choice, levels of safety, and program awareness. Information related to these performance indicators can be obtained through external sources such as crash and injury data from local police organizations and health statistics from public health authorities.	Portland, Oregon Brisbane, Australia Scotland, United Kingdom
5. <i>Encourage ownership and responsibility for data collection by one organization or department.</i>	Leadership from one organization, particularly a government department, streamlines data collection by having a centralized body to coordinate regional data collection efforts. Across entire regions, data collection tools can be easily standardized and implemented in a systematic and routine manner across time.	Bay Area, California England, United Kingdom

The findings from this research reveal potential next steps for ASST practitioners in the GTHA to undertake. However, it is important to understand the limitations associated with the results garnered from this research. The international and Canadian cases examined here represent a small fraction of current ASST planning efforts and the small size used in this research is too small to make sweeping generalizations and recommendations. Adopting and implementing these best practices in the GTHA is not necessarily a straightforward process and will require involvement from a variety of stakeholders including municipalities, school boards, school transportation consortia, and not-for-profit organizations. That being said, it is important to note that municipalities across the GTHA already have a high capacity to adopt many of these best practices. Currently, four out of six regional municipalities have an ASST committee and a designated ASST charter, and Metrolinx has identified a regional goal for municipalities to progress towards. Recent investments from the Provincial government in January 2018 through the Ontario Active School Travel Fund represent key opportunities to expand and coordinate evaluation efforts through a regional data collection tool.

Other limitations of this research are typical of the broader implications of utilizing qualitative research methods. These limitations include the lack of observational methods, the inability to easily replicate data, and the purposeful sample of interviewees that may not be representative of broader international ASST planning and evaluation efforts. Semi-structured interviews were held between December and February 2018 with a limited sample size of ASST practitioners. As a result, the results and discussion garnered from this qualitative research method may offer limited opportunities for the experiences and responses from other jurisdictions to be easily applied to the GTHA context. Additionally, the research study only provides analysis on three of the six regional municipalities within the GTHA and provides

limited recommendations on the next steps that can be undertaken across the region regarding data collection methodologies and coordination of stakeholders.

Despite these limitations, the recommendations synthesize as part of this research represent possible directions for future ASST planning across the GTHA. Several key recommendations related to program leadership and stakeholder engagement are already occurring: Green Communities Canada, as a leading provincial ASST organization in Ontario, represent opportunities for coordinating data collection efforts on a provincial scale, and direct school board involvement is already occurring within the one of the six regional municipalities (York Region). All informants from the GTHA, and across Canada more generally, noted the importance of emphasizing future involvement of school boards regarding data collection initiatives due to the streamlining of ethical clearances and access to geographical information that may otherwise be unavailable to ASST practitioners. These examples demonstrate exciting opportunities that should be explored to better understand how such a future processes of data collection could be ramped up across the region as a whole. When considering the existing context of ASST planning and the capacity of existing stakeholders, the GTHA is well equipped to adopt several best practices explored in this research study and undertake evidence-based monitoring of progress towards achieving regional school travel-related objectives.

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Appendix A – Interview Guide

ROLES AND RESPONSIBILITIES

1. Can you describe your role as it relates to active school travel (AST) planning and evaluation?

CURRENT ASST PLANNING PRACTICE & PROCESS

2. What are your region's key goals and objectives as they relate to AST?
3. Tell be about current AST programming and initiatives in your region that are specifically meant to encourage students to walk/cycle to and from school.
4. Which, if any, of the abovementioned programming and initiatives are coordinated at a regional level?
5. Who are the main stakeholders involved in these regional AST programming and initiatives?

DATA COLLECTION AND EVALUATION

6. How is AST success measured in your region?
7. Who is responsible for/ involved in collecting and processing data related to AST?
8. Which key performance indicators (KPI) are used to evaluate the success of programming and initiatives?
9. Tell be about the data processing and evaluation related to AST programming and initiatives.
10. Does your region have baseline data related to AST? Can you describe how and when this data was collected?

CHALLENGES AND RESPONSES

11. What are some of the challenges you experienced related to data collection and evaluation?
12. Did you experience any challenges related to ethics of data collection? If so, how were these challenges overcome?

CONCLUSIONS

13. In your professional opinion, what are the most important considerations to make when evaluating AST programming and initiatives on a regional scale?
14. Is there anything you would like to add or expand on?

Appendix B – Case Study Summaries

Table 3: Case Study Summaries

Region	Key Stakeholders	Data collection tools	Key Learnings
England, United Kingdom	National Government Local Authorities ModeShift Sustrans	In-class hands up survey (paper-based and electronic-based)	<p>National government mandates data collection The Home to School Travel and Transport Guidance is a statutory policy that requires all local authorities to promote ASST and collect data on school transportation. The policy has positioned local authorities, local levels of government, as the primary stakeholders involved in delivering and evaluating ASST programming. As a result, adoption of ASST programming has occurred at a national level.</p> <p>Incentives to encourage school participation Nationally-implemented award schemes such as ModeShift STARS recognize and reward schools for implementing ASST programs and interventions. This has increased school buy-in in promoting ASST and developing a culture of active school transportation.</p> <p>Comprehensive Indicators of Success As part of their awards scheme, ModeShift has introduced a comprehensive set of performance indicators to assess schools' promotion of ASST. A multiplicity of indicators ranging from education events to physical infrastructure projects are used to assess program implementation.</p>
Scotland, United Kingdom	National Government Local Authorities Sustrans	In-class hands up survey (paper-based)	<p>Census-style data collection Sustrans, a not-for-profit organization involved in sustainable transportation initiatives, has been recognized as an official statistics provider by the Scottish government. Sustrans implements Hands Up Scotland, an annual survey of how children travel school transportation that is implemented at the majority of public schools across the country.</p>

			<p>Systematic reporting and evaluation efforts</p> <p>Through the Hands Up Scotland survey, Scotland has been able to compile a national database of school transportation spanning over 10 years. A coordinated and systematic data collection process has been adopted to ensure that the survey is conducted in the same way and at the same time each year.</p>
<p>Bay Area, California</p>	<p>Metropolitan Transportation Commission (MTC)</p> <p>NC-SRTS</p> <p>Alta Planning + Design</p>	<p>In-class hands up and student survey (paper-based)</p> <p>Weekly travel diary (incorporated within parent survey)</p> <p>Parent survey (paper-based)</p>	<p>High commitment from regional transportation authority</p> <p>Metropolitan Transportation Commission (MTC), the regional transportation authority for the Bay Area, has been progressive in its commitment to promoting and evaluating ASST programming, mostly implemented through the federally-funded Safe Routes to School (SRTS) program. In 2011, MTC funded an evaluation of the SRTS program across the region to evaluate the impacts on vehicle miles travelled (VMT) and greenhouse gas (GHG) emissions.</p> <p>Coordinated data collection/evaluation/follow up</p> <p>Alta Planning + Design, a private planning firm, was retained by MTC to lead the regional evaluation of SRTS programs. Alta assumed ownership and responsibility of data collection efforts and coordinated data collection from over 2,000 schools across the Bay Area.</p>
<p>Portland, Oregon</p>	<p>Portland Bureau of Transportation (PBOT)</p> <p>Portland SRTS</p>	<p>Parent survey (paper-based)</p> <p>Weekly travel diary (incorporated</p>	<p>Municipally-implemented parent survey</p> <p>The Portland Bureau of Transportation (PBOT) implements a semi-annual parent survey of the SRTS program. The mail-out survey is distributed to all households with a child attending a K-8 school and receives approximately 3,000 responses each year.</p>

	School district administrators	within parent survey)	<p>Neighbourhood-level evaluation (Clusters)</p> <p>PBOT has introduced “clusters”, or groups of nearby schools as a sub-level of analysis when assessing how children travel to school. The clusters allow planners and other stakeholders to more easily identify localized conditions such as infrastructure gaps and safety concerns that limit ASST.</p> <p>Intergovernmental relationship with school board</p> <p>PBOT has entered into intergovernmental agreements (IGAs) with local school boards in order to obtain information such as addresses of households with children attending a K-8 school. This relationship has been critical in PBOT’s efforts to expand the survey to all schools across the city region and to add deeper levels of analysis on the relationship between travel behaviour and the distance travelled between home and school.</p>
Metro Vancouver, Canada	HASSTe (Hub for Active School Travel)	<p>Parent survey (paper-based)</p> <p>Interactive mapping survey (incorporated within parent survey)</p>	<p>Interactive Data Collection tools</p> <p>HASSTe has developed interactive parent surveys that include mapping exercises where parents indicate the exact route(s) that their children regularly take to get to school. Using this data collection tool, school administrators and ASST practitioners are able to identify physical and non-physical infrastructure gaps and adequately communicate these gaps to the appropriate municipal department (s).</p> <p>Inclusive Data Collection Tools</p> <p>ASST practitioners in Metro Vancouver recognize social diversity within the jurisdictions they operate in and have created surveys that are available in both English and Chinese in order to encourage data collection from as many students and parents as possible. In multi-cultural areas such as the GTHA, establishing multi-lingual data collection tools is a key recommendation.</p>

Brisbane, Australia	<p>Brisbane City Council</p> <p>Active School Travel (AST) coordinators</p> <p>School district administrators</p> <p>Parent and school volunteer council</p>		<p>Involvement of municipal government</p> <p>The Brisbane Active School Travel (AST) program was established in 2004 by Brisbane City Council. The municipally-implemented program is available to all schools across the city region and is coordinated by the municipal transportation department. Having clear leadership from a single government department has assisted the program in coordinated between schools and school councils. Centralized municipal involvement was useful in the establishment of the AST program where Brisbane City Council facilitated roundtables that engaged many stakeholders (e.g. school councils, police, public health etc.) early on during program set-up.</p> <p>Connect data collection to other resources</p> <p>Brisbane AST is supported by a comprehensive website that contains a diverse range of resources related to school travel. Parents are able to access up-to-date information on specific programming such as walking school buses (e.g. if a route is cancelled or modified on a particular day). The Brisbane AST also advertises and connects community members to other initiatives related to active transportation such as upcoming walk to school events and cycling education classes offered at schools.</p>
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