Improving Safety of Active School Travel Through Decreasing Traffic Speeds

Literature Review and Policy Scan for the Active and Safe Routes to School (ASRTS) Partnership of
Elgin-St. Thomas, London, Middlesex, and Oxford

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It is only through the joint effort and contributions of the partners that School Travel Planning and the ASRTS mission; to work in partnerships for the improvement of children's health, safety, and our environment through comprehensive health promotion strategies such as engagement, education, research, and policy development, are possible.

Executive Summary

Introduction

Active and Safe Routes to School (ASRTS) in the Thames Valley region, consisting of the cities and counties of Elgin-St. Thomas, London, Middlesex, and Oxford (ELMO), Ontario, is a community partnership working together to encourage children and families to choose active school travel (AST). AST is defined as using any human-powered mode of transportation, such as walking or cycling, to get to and from school, and provides children with up to ten opportunities a week to become more physically active. Through local School Travel Planning (STP) data collection, safety concerns relating to speeding traffic have been identified as a top barrier among parents and youth for using AST. A literature review and policy scan were conducted to determine determine the most successful interventions in other communities to reduce traffic speeds around schools, as well as the interventions currently used by municipalities in the Thames Valley region. This report provides a summary of the results in addition to contextual background information and a discussion of their implications for improving and increasing students' use of AST.

Key Findings

The literature review found physical traffic calming measures, particularly vertical deflections (e.g. speed humps), to be the most effective individual strategy to decrease traffic speeds. Speed enforcement cameras were relatively successful at decreasing speeds, but reduced speed limits had limited success unless combined with other strategies. Awareness raising interventions were the least effective on their own, but often increased success of other interventions when combined. Overall, all studies that evaluated a single strategy identified that incorporating additional strategies would move more towards a wider cultural change. Locally, the three most common types of policies or by-laws identified were physical traffic calming devices (engineering), reduced speed limits (enforcement), and community safety zones (enforcement), which are double fine zones for drivers who exceed the posted speed limit. Based on the literature, communities will be most effective at decreasing vehicle speeds if they combine a variety of interventions. This comprehensive strategy is called the 3E's and includes an element of Engineering, Education, and Enforcement.

Recommendations

Communities should consider the costs, benefits, and unexpected risks of traffic calming options prior to implementation. Municipalities can strengthen traffic calming policies by making them more specific and measureable, and ensuring there is a budget for implementation. It is important to be specific and provide guidelines as environments and scenarios differ across communities, as do the strategies to combat the variety of barriers. The results of the literature review identify that physical traffic calming measures are the most effective and sustainable measure to reduce traffic speeds but that they should be used in combination with other enforcement and education strategies to be most effective. While this approach is often more costly, utilizing a partnership approach can allow for a greater impact on a shared goal by combining organizational resources.

Conclusion

It is clear that change needs to happen to reverse the trend of fewer children using active modes of transport to and from school. For children and communities to experience the many benefits of AST, more work must be done to remove the barriers. Parental concerns around traffic speed and safety have been locally identified as a key barrier to AST. When trying to change the behaviours of parents and children to choose AST, barriers rooted in fact and reality cannot be addressed alone; those based on perceptions must also be targeted. ASRTS aims to decrease perceived barriers of traffic speed by influencing decisions that objectively reduce traffic speeds in school zones. The strength of ELMO ASRTS is the partnership itself and the fact that by working together, the common goal can be achieved sooner and with greater impact on the health and well-being of local children and society.

Introduction

Active and Safe Routes to School (ASRTS) in the Thames Valley region, consisting of Elgin-St. Thomas, London, Middlesex, and Oxford County (ELMO) in Ontario, is a community partnership working together to encourage children and families to choose active school travel (AST). Data is collected as part of ASRTS's overarching program, School Travel Planning (STP), to identify barriers preventing parents and children from using AST in the Thames Valley region. Based on the results from ten STP schools between 2013 and 2015, safety concerns relating to speeding traffic were identified as a top concern among parents. A literature review and policy scan was conducted by members of the ELMO ASRTS committee during the 2015/2016 school year to determine determine the most successful interventions in other communities to reduce traffic speeds around schools, as well as the interventions currently used by municipalities in the Thames Valley region. This report provides a summary of the results in addition to contextual background information and a discussion of implications for improving and increasing students' use of AST.

Background

Current State of Active School Travel (AST)

AST is defined as using any human-powered mode of transportation, such as walking or cycling, to get to and from school. It is important in today's society where physical activity levels of Canadian children have been declining steadily over the years with only 7% of children meeting the Canadian Physical Activity Guidelines (Colley et al., 2011). AST can provide children with up to ten opportunities a week to be more physically active and provides benefits to children's physical and mental health; they arrive at school more alert and ready to learn, feel more connected to their community, and there is reduced traffic around schools, which provides further environmental and economic benefits (Transport Canada, 2011). Unfortunately, the number of children using AST has declined by nearly 50% over the past 20 years (Buliung, Mitra, & Faulkner, 2009).

Parent and youth surveys conducted by ELMO ASRTS at ten STP schools between September 2013 and February 2015 found 42% of children self-reported walking to school (46% from school to home). When asked about modal preference, 57% of parents stated walking, 30% preferred busing, 9% car, and 3% cycling (See Table 1). Children's preferences differed greatly with 38% preferring to walk, 30% cycle, 17% bus, and 15% by car. In response to the question: "It is difficult for my child to walk or bike to school because…" the number one answer among parents was that "it feels unsafe due to traffic on the route". For children living within walking distance of school, "most drivers go too fast" was the greatest concern regarding neighbourhood safety. The concern for traffic speed as a barrier to AST was also identified through two further STP data collection methods: traffic counts and neighbourhood walkabouts.

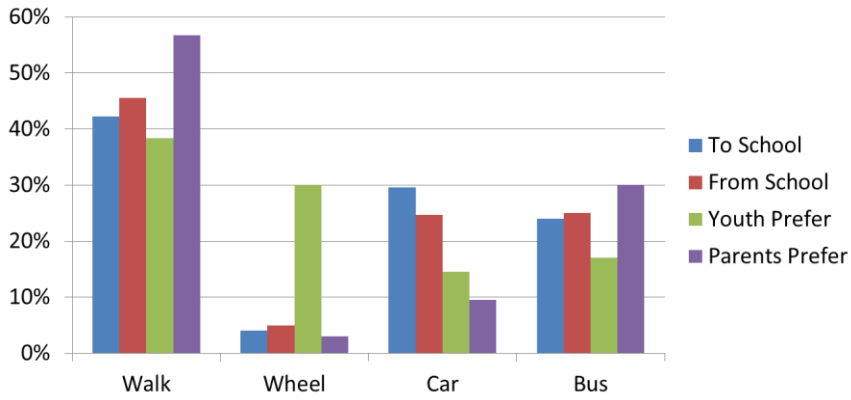

Table 1: Travel Mode Use vs. Parent & Youth Preference *(HEALab)*

Safety Perceptions

Perceptions of safety can either be rooted in reality or influenced by external factors, such as media, and not necessarily reflect reality. An example of a safety perceptions rooted in reality is "fear of a collision", based on motor-vehicle-collision data. On the other hand, "stranger danger", the abduction of a child by a stranger, is fear based on perceptions and exacerbated by the media. The fear of "stranger danger" is often greater than the fear of being injured in a motor-vehicle-collision even though the risk of the latter is much higher (Dalley & Ruscoe, 2003; Transport Canada, 2013).

Locally, the fear of neighbourhood traffic and traffic speeds is primarily based on perceptions, as statistically, there have been no recent incidents of children being hit by a speeding motor vehicle on their journey to school (Office of the Chief Coroner for Ontario, 2010). Objective traffic speeds are easy to measure; however, perceptions of traffic speeds are difficult to quantify because traffic speed is difficult to gauge by the human eye. A vehicle travelling at 50km/h could be perceived as speeding when travelling on a curvy, narrow road, but look like it is moving slowly on a straight and wide road. This skill becomes increasingly difficult with younger children as they can struggle to decipher the speed and distance of an approaching vehicle because their optical sensitivity to looming objects has not yet matured, a scenario that increases in danger the faster a vehicle is moving (Wann, Poulter, & Purcell, 2011; World Health Organization, 2004).

Decreasing vehicle speeds in school zones has the ability to impact both real and perceived safety concerns. ASRTS aims to decrease perceived barriers of traffic speed by influencing decisions that objectively reduce traffic speeds in school zones. Studies identify that the faster a car is travelling during a collision with a pedestrian, the greater the risks of injuries and fatalities (NICE Centre for Public Health Excellence, 2009). Therefore, slower vehicles in school zones provides children with more time to gauge whether there is a safe gap in traffic to cross the road, as well as decreased risk of injury and fatality in the serious event of a collision.

ASRTS wants to increase use of AST among families, but as long as active modes of travel are perceived as being less safe, these fears will direct decisions that often lead parents to drive children to school. More parents choosing to drive further contributes to the dangers inferred on all children in school zones caused by traffic. When trying to change the behaviours of parents and children to choose AST, barriers rooted in fact and reality cannot be addressed alone; those based on perceptions must also be targeted. The purpose of the literature review was to look at the effectiveness of interventions for objectively decreasing speeds in order to affect both real and perceived dangers.

Methodology

Literature Review

Search Question: What interventions have been successful at reducing traffic speeds in school areas or on residential roads?

The literature search was conducted between January and February 2016 through a variety of academic databases. Full articles of potentially relevant studies were obtained based on a scan of abstracts. Reference lists from eligible studies were also scanned for additional studies. Criteria were determined for inclusion / exclusion criteria based on the PICOS acronym (population, intervention, context, outcomes, and study design). The most precise criteria included the population of motorists and an outcome of reduced vehicle speeds. Following application of the inclusion / exclusion criteria and an appraisal of all studies through relevant tools to determine their strength, 14 final articles remained; 13 were primary studies and 1 was an umbrella review of systematic reviews.

Policy Scan

The policy scan was conducted to determine what policies and interventions are currently being utilized to decrease vehicle speeds in local school communities. The region consists of three counties and 25 municipalities; however, only 24 municipalities were explored as one does not have a school. Policies that address traffic speeds for school areas in the Thames Valley region were collected. A manual online search was first conducted to find land use planning documents and by-laws that were available on county and municipal websites. Emails were sent to municipal clerks requesting information that may have been missed through the online search. A variety of documents were scanned, but for the purpose of this report, the term “policy” will be used to encompass all findings throughout county and municipal documents such as Official Plans, contents of master plans, municipal resolutions, manuscripts, and by-laws. Policies were collected and categorized into three emergent themes: physical traffic calming devices, speed limits less than 50km/h, and community safety zones.

Summary of Results

Literature Review

Several communities and organizations target injury prevention, including road safety, through the 3E's: Engineering, Education, and Enforcement. This approach is more comprehensive, and therefore, has a greater chance of creating change. Five themes emerged from the literature based on similar interventions and are presented according to their relation to the 3E's:

Engineering: physical traffic calming devices

Education: awareness raising devices

Enforcement: 30km/hr (20mph) speed limits / zones; speed enforcement cameras

3E's Approach: combination of all three interventions

The interventions, methodologies, and evaluations differed across the studies, making comparison difficult; however, all studies included traffic speed reduction as an outcome. Studies and themes were compared by looking at their reduction in mean speed (the average speed of all recorded vehicle speeds on the road during the study time period), 85th percentile speed (the speed motorists feel most comfortable travelling, and therefore, the most likely speed to be driven on that road), and whether vehicle speeds were successfully reduced to equal or below the posted speed limit. The following results summarize the key findings from each of the studies by theme.

Engineering: Physical Traffic Calming Measures

Physical traffic calming devices are common engineering interventions for reducing speeds. They are used in short segments of road and can be categorized as vertical deflections (change in pavement height such as speed cushion or raised crosswalk), horizontal deflections (prevent travel in a straight line such as a curb extension or roundabout), or obstructions (involve some extent of road closure such as right-in/right-out island or one-way) (City of London, 2015).

Two of the studies specifically evaluated physical traffic calming measures and found good results with lowering both the mean and 85th percentile speeds as well as meeting the posted speed limit (approximately 50km/h in both studies). Mountain, Hirst, and Maher (2005) compared the impact of engineering measures (both vertical and horizontal deflections) and speed enforcement cameras on vehicle speeds and found that all three were generally effective, but that "vertical deflections have the greatest average impact on the mean, 85th percentile speed, and the percentage of drivers speeding" (p. 750). Cameras were the second most effective, followed by horizontal features. Leden, Wikstrom, Garder, and Rosander (2006) assessed the effectiveness of a variety of traffic calming measures (central refuge islands, broad flagstone pedestrian crossing, street lights and railings, roundabout, 2-directional cycle track) and road reconstruction on vehicle speeds and safety. The researchers found a modest decrease in 85th percentile speeds (2.8 - 4.12 km/h) but identified several other positive outcomes including an increase of pedestrians present ($p<0.001$), decline in students being driven to school ($p=0.026$), and increase in students cycling to school ($p=0.008$). These findings could represent an increase in perceived safety.

Enforcement: Speed Limit Changes, Speed Enforcement Cameras

Physical traffic calming devices are one of two types of traffic calming; the other being passive traffic calming measures. Passive measures are the simpler option and are usually implemented over an entire road segment. Examples of passive and mitigating measures include lane reductions, textured pavement, line markings and/or signage, speed display signs, targeted enforcement, and community education (Education and Enforcement). (City of London, 2015)

The primary enforcement measures evaluated through the reviewed literature were decreased posted speed limits and speed enforcement cameras. Retting, Farmer, and McCartt (2008) evaluated the initial effects of camera enforcement on traffic speeds and assessed public attitudes on residential streets with speed limits of 35mph or less and in school zones in Maryland, USA. The study saw a 70% decrease in motorists traveling more than 10mph

over the posted speed limit when warning signs and speed cameras were used in conjunction. The warning signs included a 30 day "Safe Speed" education campaign and warning period prior to the program going live; an added educational element. The researchers found highly visible automated enforcement to be beneficial in promoting community-wide changes in driver behaviour.

Kattan, Tay, and Acharjee (2011) assessed the impact of 30km/h speed limits on reducing vehicle speeds in school zones and playgrounds in Calgary, Alberta. While a statistically significant reduction in mean and 85th percentile speeds were identified, 54.4% of drivers continued to travel over the posted 30km/h speed limit. Speeds were found to be lower in school zones than playground zones, on two lane roads than four lanes, roads with fencing, and sites with speed display devices (educational and engineering devices incorporated). Lazic (2003) studied the effectiveness of reducing speed limits from 50km/h to 30km/h in Saskatoon school zones where the speed reductions were in effect in all elementary and secondary school zones from September 1 to June 30 and between 8:00am and 5:00pm Monday to Friday. The average 85th percentile speed reduction was quite significant at 10km/h (54.4km/h to 44.5km/h); however, there was only a compliance rate of 23% to the newly posted speed limit. No significant change in speed was observed outside the restricted hours and weekends. Lazic identified "the observed low compliance shows that posting a reduced speed limit alone does not guarantee the desired change in driving speeds. It is only one method that can be used as part of a pedestrian safety program around schools" (p.2). These findings are consistent with the umbrella review conducted by Cairns, Warren, Garthwaite, Greig, and Bambra (2014) that included 5 systematic reviews looking at the effects of 20mph speed limits and speed zones, the latter consisting of additional physical traffic calming measures. Overall, the reviewers found convincing evidence that the measures effectively reduce traffic speed as well as improve perceptions of safety. However, in the discussion they identify that more aesthetically pleasing and intensive street designs and accompanying health promotion and educational interventions around physical activity would do more for moving towards a wider cultural change.

Education: Awareness Raising Devices

The majority of studies evaluating educational components looked at awareness raising devices; of which, the elements and results of the five studies were mixed. In their study of the effectiveness of speed monitoring displays in a reduced school speed zone, Lee, Lee, Choi, and Oh (2006) concluded that speed monitoring displays have a positive impact on drivers' behaviour. They found a mean speed reduction of 8.2km/h at the location of a display in the short term, and 5.8km/h reduction 12 months later. Spiegel, Farahmand, Da Silva, Claassen, and Kalla (2012) also found positive results when they studied a device that displayed a child smiling with a green LED display reading "Thank You" beneath the picture or red letters stating "Slowly!" when speeding was detected. An increase in drivers adhering to the speed limit went up from 27.6% in the control condition to 41.1% in the experimental condition. However, this still leaves 58.9% of drivers exceeding the posted speed limit.

Gehlert, Schulze, and Schlag (2012) evaluated 3 different types of dynamic speed display signs (DSDS): 1) a standard DSDS with numeric values corresponding to the driver's speed, 2) a standard DSDS with numerical values highlighted in red or green depending on whether the car driver complied with or exceeded the local speed limit, and 3) a verbal coloured DSDS where the word THANK YOU in green letters or SLOW in red letters appeared based on whether the car driver complied with or exceeded the local speed limit. All 3 devices saw a reduction in speed when the device was installed but all speeds returned to baseline following their removal. Of the three devices, the verbal coloured DSDS saw the greatest reduction in speeds followed by the numeric coloured DSDS and lastly, the numeric DSDS.

Two of the studies examined the impact of visual displays on reminding drivers of a reduced speed limit following a trip interruption. Gregory, Irwin, Faulks, and Chekaluk (2014) found vehicles sped an average of 6.51km/h more after being interrupted by a stop sign or traffic light than uninterrupted vehicles. Adding a flashing "check speed" sign 70m after the traffic light saw the interruptive effect eliminated. Hawkins (2007) assessed the impact of a rear-facing beacon and an "End of School Zone" sign on vehicle speeds and found a slight reduction in speeds and 10% improved compliance. These findings can be used to provide a reminder when changing speed limits or where trip interruptions such as stop signs and traffic lights exist.

3E's Approach

Two studies evaluated a 3E's approach in residential areas and found minimal mean speed reductions; however, one of the studies included education and enforcement as supplements to a single "low cost engineering countermeasure (i.e. painting of a centre line)" (Islam & El-Basyouny, 2013, p. 85). The study by Blomberg and Cleven (2006) evaluated speed reductions on untreated streets with educational materials (yard signs, pamphlets)

and increased police enforcement patrols and ticketing, adjacent to streets that received traffic calming treatments. The study found a modest mean speed reduction, excellent increase in driver's compliance to the speed limit, and increased "knowledge of the program, awareness of enforcement efforts, and acceptance of the need to moderate speeds" (p. i).

Policy Scan

Three primary themes emerged from the policy scan within the realms of engineering and enforcement: physical traffic calming devices, speed limits less than 50km/h, and community safety zones.

Engineering

Physical Traffic Calming Devices

Physical traffic calming devices are designed to encourage motorists to slow down and adhere to the posted speed limit by restoring the road back to its intended function. Policies for physical traffic calming devices were identified in one county and five municipalities, primarily in land use planning documents such as Official Plans. Most of the statements are general in nature, indicating traffic calming measures will be "considered" if applicable. One municipal recommendation is specific for school zones while the others are applicable for any location. One community has a specific traffic calming document to help guide decisions on the best device for different scenarios; encouraging physical traffic calming devices only when passive or mitigating measures have been unsuccessful.

Enforcement

Speed Limits Less than 50km/h

Speed limits less than 50km/h aim to reduce vehicle speeds through posted speed limits below the current default urban limit of 50km/h. Several communities in the Thames Valley region have a reduced speed limit of 40km/h, including many near schools. Some speed limit reductions are paired with community safety zones or "school zone maximum speed when flashing" signs. The flashing signs remind motorists that the speed limit is reduced when the beacons are flashing during specific times of the day. In most cases, this is a reduction from 50km/h to 40km/h, but in one case, the sign is on a King's Highway and the reduction is from 80km/h to 60km/h when flashing. Only one community had a speed limit of 30km/h and documents identify that the traffic flow was already moving slowly in the area, increasing the likelihood of speed limit compliance.

Community Safety Zones

Community safety zones are double fine zones for drivers who exceed the posted speed limit and are primarily found in by-laws. The by-law impacting a school is based on which type of road it is located, as roads are owned and operated by the municipality, county, or province. Supportive by-laws were found at all levels of government within the Thames Valley region including one on a King's Highway, but the majority were found on county roads.

Discussion

Key Findings from the Literature

From the literature review, physical traffic calming measures, particularly vertical deflections, were found to be the most effective independent intervention at reducing traffic speeds. Physical traffic calming measures are also more sustainable at reducing traffic speeds because of the physical change to the road that encourages drivers to slow down and feel less comfortable travelling at higher speeds. The findings also suggest an increase in both objective and perceived safety related to traffic speed, as described by Leden et al. (2006), who found an increase of pedestrians, a decline of students being driven to school, and an increase in students cycling to school.

Two primary enforcement interventions were assessed through the literature: reduced speed limits and enforcement cameras. The studies found success with speed enforcement cameras but limited effectiveness of reduced speed limits, unless combined with additional strategies. Kattan et al. (2011) found 54.4% of drivers continued to travel over the newly posted 30km/h speed limit; however, compliance was higher in school zones compared to playground zones, on two lane roads compared to four, on roads with fencing, and at sites with speed display devices. Cairns et al. (2014) discussed more aesthetically pleasing and intensive street designs with accompanying health promotion and educational interventions around physical activity would do more for moving towards a wider cultural change. The most successful camera enforcement study also combined interventions with a 30 day "Safe Speed" education campaign and warning period prior to the program going live (Retting et al., 2008). It was clear from the literature that enforcement is most effective when combined with other strategies, particularly engineering and education. Awareness raising devices were least effective when used independently but often increased the success of engineering or enforcement interventions when combined. Studies identified devices that were most effective (verbal coloured DSDS); however, vehicle speeds returned to baseline when devices were removed.

Achieving Safety and Compliance

Nearly all the studies that evaluated one of the 3E's individually identified that using all three strategies would yield greater impacts and a move further towards cultural change. Unfortunately, it is difficult to confirm the effectiveness of the 3E's approach because in a study with multiple factors, it is difficult to determine which element led to the change. Using the 3E's approach is also more costly. The more effective interventions (i.e. physical traffic calming measures) are often already more costly, and adding educational and enforcement strategies to increase effectiveness and sustainability only further increases that cost. When choosing between different traffic calming options, it is important to consider those methods that have proven successful in other jurisdictions, as well as the long-term costs, risks, and benefits of each option.

For example, reducing speed limits are a popular approach by municipalities to broadly address speeding concerns; however, they may have unintended risks when used alone. The studies that looked at reduced speed limits found that the number of vehicles speeding remained high after implementation. The Office of the Chief Coroner for Ontario and the systematic review conducted by the NICE Centre for Public Health Excellence (2009) recommend the implementation of 30km/h speed limits on residential roads for the greatest reduction in child injuries. Roads are designed and built to accommodate vehicles at a specific speed, which in Ontario means they are built for the current urban speed limit or 50km/h. Reducing the speed limit from 50km/h to 30km/h is a 40% decrease that, without additional interventions, will lead to more motorists exceeding the speed limit. The greater the discrepancy between actual speed and the speed limit can create a false sense of security among pedestrians as they believe traffic is travelling slower than it actually is; potentially increasing risk of a collision instead of decreasing it. Therefore, the design and land use context of each road should be considered to customize potential solutions that will achieve the goal of speed reduction, balancing safety with compliance.

Additional measures can be implemented to increase compliance in reduced speed limit zones. For example, Gregory et al. (2014) found awareness raising devices such as "check speed" signs could be utilized to remind drivers of the decreased speed limit after trip interruptions such as stop signs or traffic signals. Several local communities combine enforcement and education through "school zone maximum speed when flashing" signs to raise awareness of the decreased speed limit through flashing beacons. Speed limits with corresponding flashing beacons increase compliance but are only in effect during specific times, days, and seasons, which unfortunately do not see the same speed reductions outside the restricted hours and weekends (Lazic, 2003). Community safety zones, consisting of double fine for drivers exceeding the posted speed limit, are another strategy employed locally but were not assessed through the literature resulting from this search. Their use however, could be considered as an enforcement measure when considering a comprehensive 3E's approach to targeting traffic speeds.

Physical traffic calming measures could negate the use of reduced speed limits as they change the design of the road to encourage drivers to slow down and feel less comfortable travelling at higher speeds. Building roads for a desired lower traffic speed is also more sustainable as it targets driver behaviour directly and requires less enforcement. Unfortunately, few local physical traffic calming policies were identified through the policy scan, and those that exist are quite general in nature. Municipalities could strengthen their traffic calming policies by making them more specific and ensure there is a budget for implementation. One specific local document does this by providing guidelines for investigating, selecting, and implementing appropriate traffic calming measures and putting a high priority on the safety of school travel (City of London, 2015). It is important to be specific and provide guidelines as environments and scenarios differ across communities.

Utilizing A Policy Approach

Strategies to combat a variety of barriers also differ greatly and need to be considered. For example, for the barrier of "my child lacks the cycling skills to bike to school", an educational Bike Rodeo or Festival could be implemented. However, barriers that arise consistently across multiple schools could benefit from a systemic approach. This can be accomplished by impacting policies at any of a variety of government levels or at school boards. Policies allow for impacts that are broader, more efficient, more sustainable, and create more upstream changes than approaching barriers on a school-by-school basis.

There are several ways to influence policy. For example, traffic speeds in school zones can be enhanced by advocating for increased funding for education or enforcement strategies. Changes to municipal policy could include land use planning policies within local Official Plans that support AST by influencing sidewalk and road infrastructure. By-laws are a type of legislation that addresses issues and concerns in the municipality that can result in legal action if not followed. Statements regarding speed limits and community safety zones are often found in local by-laws.

The ELMO ASRTS committee has an opportunity to impact local policy through the provision of local data obtained through STP data collection as well as by providing evidence, such as that found within this report. Members have the ability to advocate for local policies that decrease identified barriers and increase use of AST. Results of the initial STP school surveys identified perceived traffic speed as a top barrier from using AST among both parents and students. The results of this literature review identify that physical traffic calming measures are most effective and sustainable at reducing traffic speeds in school zones but that they should be used in combination with other enforcement and education strategies. While this approach is often more costly, utilizing a partnership approach can allow for a greater impact on a shared goal by combining organizational resources.

Conclusion

Fewer children are walking to school and one reason, as identified by ELMO ASRTS, is due to traffic related safety concerns. Both reality and perceptions of lack of safety result in fears that need to be addressed if families are to become more comfortable with AST. The purpose of the literature review was to look at the effectiveness of interventions for objectively decreasing speeds in order to affect both real and perceived dangers. The policy scan was conducted to determine what policies and interventions are currently being utilized to decrease vehicle speeds in local school communities.

From the review, physical traffic calming measures, particularly vertical deflections, were found to be the most effective individual strategy to decrease traffic speeds. Two enforcement interventions were evaluated: reduced speed limits and enforcement cameras. Speed enforcement cameras were relatively successful at decreasing speeds but reduced speed limits had limited success unless combined with other strategies. Awareness raising interventions were the least effective on their own but often increased success of other interventions when combined. Results of this literature review and policy scan can be used to advocate for policies that effectively decrease traffic speed in order to increase the use of AST among local families.

It is clear that change needs to happen to reverse the trend of fewer children using active modes of transport to and from school. For children and communities to experience the many benefits of AST, more work must be done to remove the barriers. Parental concerns around traffic speed and safety have been locally identified as a key barrier and working with local decision makers to develop supportive policies to decrease traffic speeds around schools is one way to help reverse the trend. This is one of many strategies that can be used to remove barriers and increase the use of AST in the Thames Valley region. The greatest action and strength of ELMO ASRTS is the partnership itself and the fact that by working together the common goal can be achieved sooner and with greater impact on the health and well-being of local children and society.

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