INSPQ INSTITUT NATIONAL DE SANTÉ PUBLIQUE DU QUÉBEC

Safety of Elementary School Students Walking or Bicycling Between Home and School in Québec: Summary

SUMMARY

September 2013

Summary of a scientific advisory entitled Sécurité des élèves du primaire lors des déplacements à pied et à vélo entre la maison et l'école au Québec, published by the Institut national de santé publique du Québec in 2011.

The advisory was prepared by Burigusa, Lavoie et al.[1] at the request of the Ministère de la Santé et des Services sociaux.

KEY TOPICS IN BRIEF:

Safe active transportation: an important issue

Promoting active transportation between home and school among elementary school students is a good way to combat sedentary lifestyles among young people. In Québec, active transportation is promoted primarily by "On the Move to School" [2], a program intended for young people who live within walking or biking distance of school.

Since the early 1990s, active transportation to and from school has declined considerably among elementary school students, while automobile use has grown. It is now estimated that roughly 30% of Québec elementary-level students travel to and from school on foot, while nearly 2% do so by bicycle.

To encourage parents and their children to walk and bicycle more, road safety needs to be a priority. Indeed, young pedestrians and cyclists are among the most vulnerable users of the road network.[a] Moreover, road-related hazards are one of the main reasons why parents prefer to drive their children between home and school.[b]

This summary presents recommendations made by the INSPQ to foster safe active transportation between home and school among elementary school students. It is based on a review of the scientific literature.

Key message

Ensuring that children can walk or bike safely to and from school is not only an issue in itself, but also a means to promote active transportation among this population group.

Québec

Scope of injuries

Between 2003 and 2007, an average of 370 children aged 5 to 12 were injured per year in Québec while travelling to and from school. This represents nearly two injuries per school day. Of that number, 112 students were injured while walking, 61 while cycling and 197 while riding in a car. In over 90% of cases, the injuries did not require hospitalization.

- Most of the children injured while walking or bicycling were boys between 9 and 12 years of age.
- In half of the cases, the children were injured in a residential area, while in a quarter of the cases, they were injured in the vicinity of their school.
- Approximately half of the child pedestrians and cyclists were injured at an intersection, while the other half were injured as they crossed the road between two intersections.

Risk of injury according to means of transportation

The number of injuries is not an adequate measure of whether one means of transportation is more dangerous than another. The distance travelled must also be taken into account because trips made by car are longer than those made on foot or by bicycle. Therefore, in this study the likelihood of injury while travelling on foot, by bicycle or by car was always assessed for the same distance travelled.[3] The study covered the 2003-2007 period and was conducted by calculating the injury rate per 100 million kilometres travelled for each mode of transportation.

The findings suggest that children who walk or cycle run a greater risk of being injured than those who travel by car. They also revealed that children who cycle are at greater risk of being injured than those who walk.

For example, the average annual injury rate for children in the Montréal area during the 2003-2007 period was 65 injuries per 100 million kilometres travelled by car, compared with 307 injuries and 1 181 injuries for the same distance travelled on foot and by bicycle, respectively.

Impact of an increase in active transportation on number of injuries

Would an increase in active transportation affect the number of children injured? This question is relevant given the efforts being made to promote active transportation and the greater risk of injury associated with this type of transportation.

Other analyses[4] were conducted to examine different scenarios for the Montréal area. For example, if 20% of trips by car were made on foot instead,[5] the number of children injured while travelling between home and school would increase by a relatively meagre 2.8%. The increase would be 13.0% if 20% of trips by car were made by bicycle instead.[7] However, this latter scenario is less likely since walking is more popular than biking among elementary school students.

Injury risk factors among child pedestrians and cyclists

According to the scientific literature, there are a range of injury risk factors for child pedestrians and cyclists:

AGE AND GENDER

Children begin to experiment with independent mobility on the road network between the ages of 5 and 14. Children aged 5 to 9 are particularly at risk of injury when walking, while those aged 10 to 14 are at greater risk of injury when cycling.

Several studies have shown that boys are more likely to be injured when walking and biking in traffic than girls are.[c]

CHILD DEVELOPMENT

Walking in traffic involves a number of complex tasks, especially at intersections, including:

- choosing an appropriate place to cross the street;
- determining the directions from which traffic might come;
- identifying visual obstacles;
- estimating the speed and distance of vehicles;
- deciding when to cross the street.

Cyclists have to perform more complex tasks than pedestrians do from both a psychomotor standpoint (pedalling, keeping their balance, breaking, etc.) as well as a cognitive standpoint (paying attention, concentrating, exercising judgment and making decisions).[d]

Research on the link between child development (cognitive, physical, perceptual) and child behavior has shown that children acquire the cognitive and psychomotor skills needed to get around safely at different rates between the ages of 7 and 11.

ROAD ENVIRONMENT

Major risk factors for injury among child pedestrians and cyclists are motor vehicle speed, traffic volume, number of lanes and visual obstacles, particularly those related to roadside parking.

The road environment in underprivileged neighbourhoods is not as safe as that in more privileged neighbourhoods, putting child pedestrians and cyclists at greater risk of injury.[6] This situation is due to, among other things, the poorer design and layout of roads and intersections as well as the higher speed and volume of traffic.

Prevention measures

A literature review has made it possible to gauge the effectiveness of several measures to prevent injuries among child pedestrians and cyclists:

- Layout and design of the road environment (e.g. speed tables, narrower streets, curb extensions, pedestrian islands, passenger drop-off/pick-up zones)
- Road safety education
- Adult accompaniment
- Presence of adult crossing guards
- Police enforcement
- Helmet use by cyclists

Several studies have shown that road layout and design measures are effective for reducing injuries among child pedestrians. Such measures are aimed, in particular, at reducing the speed and/or volume of automobile traffic. Helmet use among cyclists and policing have also proven to be effective for reducing injuries among children.

Knowledge and skills of child pedestrians for crossing intersections, but only if they include practical training
(No such information is available for cyclists).

There have been very few studies on the effectiveness of crossing guards or adult accompaniment of child pedestrians and cyclists. Nonetheless, such measures are deemed good practices for preventing injuries among children. Moreover, they are used worldwide.

+ Main organizations involved

Several organizations in Québec help to improve the safety of children during active transportation between home and school, including municipalities, the Ministère des Transports du Québec, the Société de l'assurance automobile du Québec, the school community (schools and school boards), the public health network and certain private organizations (e.g. Vélo Québec, Accès Transports Viables).

These organizations have developed a number of tools, two of which are particularly useful for improving the safety of the road environment: a guide prepared by the Ministère des Transports on how to improve school route safety, and the "On the Move to School" program, developed by Vélo Québec.

Recommendations

Over 150 Québec children are injured every year while walking or biking between home and school. This is a serious concern considering that most of the injuries are avoidable.

The following recommendations take into account currently available prevention measures and specify the conditions needed to implement these measures as effectively as possible. They also highlight the main actors involved (municipalities, school community, road safety education experts, parents, etc.).

Road environment layout and design

Priority must be given to recommendations on the layout and design of the road environment since they have been shown to be effective for protecting children regardless of their age or gender. In applying these recommendations, special attention should be paid to underprivileged neighbourhoods, where child pedestrians and cyclists run a greater risk of being injured.

MAKING NEIGHBOURHOODS SAFER

RECOMMENDATION 1

Encourage and support municipalities in their efforts to implement measures deemed to be effective for reducing the speed and volume of traffic (e.g. speed tables, narrower streets, curb extensions, etc.), particularly in areas with a large number of children who walk or bike to school.

MAKING SCHOOL ROUTES SAFER

RECOMMENDATION 2

Encourage and help municipalities to work with the school community in order to set up safe school routes for children who walk or bicycle between home and school, based on the approach and criteria proposed in the Ministère des Transports du Québec guide.[7]

RECOMMENDATION 3

Encourage the creation of school routes that are accessible throughout the school year for children who walk to school, which supposes, among other things, an appropriate snow removal policy.

RECOMMENDATION 4

Encourage parents to choose one route for their children to use throughout the school year, so that the children can become familiar with the route they have to follow.

MAKING THE AREA AROUND SCHOOLS SAFER

RECOMMENDATION 5

Encourage the creation of drop-off/pick-up zones for school buses and for parents who drive their children to school, located at a distance from arrival and departure points for children who walk or bicycle to school.

RECOMMENDATION 6

Control motor vehicle speed in the vicinity of schools through the following measures:

- Set the maximum speed limit in school zones at 30 km/h during school hours.
- Ensure that road facilities are compatible with speed limits around schools when new neighbourhoods are designed or major repair work is carried out.
- In existing neighbourhoods, give priority to the installation of physical devices (e.g. speed tables) that foster compliance with maximum speed limits.
- In areas where such physical devices do not exist, increase measures (particularly greater police presence) to bolster adherence to speed limits.
- Implement and assess, through pilot projects, technological measures such as photoradar in school zones, especially in areas where speed is serious problem and there are no physical devices to slow vehicles down.

Accompaniment of child pedestrians

RECOMMENDATION 7

Encourage adult accompaniment for children who cannot walk safely on their own between home and school.[8]

- The decision of whether or not to accompany a child should be made by the parents, taking into consideration the child's cognitive and psychomotor skills, his or her experience as a pedestrian and the characteristics of the road environment.
- Parents should be informed that the cognitive skills needed to walk safely are rarely acquired before 8 years of age.

Accompaniment of child cyclists

RECOMMENDATION 8

Encourage adult accompaniment with children aged 5 to 12 when they bike to and from school.

- The decision not to accompany a child should be left to the parents, taking into account the child's ability to bicycle safely on his or her own.
- This decision should be made on the basis of the child's cognitive and psychomotor skills, his or her experience as a cyclist and the characteristics of the road environment.

Adult crossing guards

RECOMMENDATION 9

Encourage and help municipalities to identify, using clear criteria, intersections where an adult crossing guard is needed.

Educational measures

RECOMMENDATION 10

Ensure that road safety education activities for pedestrians complement measures targeting the design and layout of the road environment and include practical training (real-life or simulated situations).

Protection equipment

RECOMMENDATION 11

Encourage the school community to urge and even oblige children who bicycle between home and school to wear a helmet.

Conclusion

Efforts must still be made to make it safer for elementary-level students to use active transportation to travel to and from school. The measures proposed here can help to achieve this goal by reducing the number of injuries among child pedestrians and cyclists of today and tomorrow. Therefore, it is important to support all the players involved in implementing these measures so that children can reap the full benefits of active transportation.

Bibliographic references are available in the complete version of the scientific advisory at

http://www.inspq.qc.ca/pdf/publications/1243_SecuriteElevesDeplacementsMaisonEcole.pdf.

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Notes

[1] The scientific advisory is available in its entirety in electronic format (PDF) on the Institut national de santé publique du Québec Web site. http://www.inspq.qc.ca/pdf/publications/1243_SecuriteElevesDeplacementsMaisonEcole.pdf.
[2] The "On the Move to School" program was developed by Vélo Québec in 2008 to encourage young people who travel to school by car to walk or bicycle instead.
[3] This study was conducted using available data for the Montréal, Québec, Sherbrooke and Trois-Rivières areas.
[4] The impact on number of injuries of a shift from trips by car to trips on foot or by bicycle was assessed for children living 1.6 kilometres or less from school.
[5] This scenario corresponds to the average impact of active transportation promotion programs.
[6] In Québec, during the 2000-2005 period, child pedestrians and cyclists aged 5 to 12 living in underprivileged neighbourhoods were four times more likely to be hospitalized because of an injury than children of the same age living in privileged neighbourhoods.
[7] This guide, entitled Redécouvrir le chemin de l'école. Guide d'implantation de trajets scolaires favorisant les déplacements actifs et sécuritaires vers l'école primaire, is available on the Web site of the Ministère des Transports du Québec (MTQ, 2009)
[8] This approach includes walking school buses, where an adult escorts several children travelling on foot.

References

[a] Peden et al., 2008
[b] Cloutier, 2008, Lewis et al. 2008, CDC, 2005, Dellinger and Staunton, 2001
[c] Colwell et al., 2002; Cushman et al., 1990; Hu et al., 1995; Kopjar, 1995; Rivara et al., 1987, Rivara et al., 1982, in Granié, 2007
[d] According to Briem et al., (2004)

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