INJURY PREVENTION CENTRE

POSITION STATEMENT

The Role of Booster Seats in Childhood Injury Prevention

Summary:

The Injury Prevention Centre (IPC) works to reduce catastrophic injuries and death in Alberta. The IPC is a catalyst for action by supporting communities and decision-makers with knowledge and tools. Developing position statements on key injury issues helps to raise the profile of these issues and clarifies best practices and recommendations for injury prevention.

Position

It is the position of the Injury Prevention Centre (IPC) that all child passengers who weigh at least 18 kg (40 lb) and are less than 145 cm tall should be in an approved and properly used belt-positioning booster seat while traveling in a motor vehicle.

Abstract

Safety experts and advocates currently recommend the use of booster seats for children who have outgrown forward-facing car seats but are too small to properly fit into adult seat belt systems. In Alberta, these recommendations have not been accepted into law, contrary to all other provinces in Canada.[1] The development of a position paper would provide the basis for advocacy efforts related to booster seat legislation, as well as education and awareness campaigns aimed at parents / caregivers, healthcare workers and family support providers on the benefits of booster seat use.

Introduction & Background

Motor vehicle collisions (MVCs) were the leading cause of injury, disability, and death in Canadian children in 2023.[2] Between 2010 and 2021 there were 696 fatalities in children and youth (ages 0-14) as a result of motor vehicle collisions (MVCs)[3] with the societal cost of these injuries totaling CAD $83 million in 2018 alone.[4] In Alberta, between 2017 and 2021, motor vehicle collisions were the second leading cause of death for children less than 15 years of age[5] with the societal costs of these injuries estimated to be in excess of CAD $60 million.[6]

Although there have been many efforts made to improve child passenger safety in Alberta, there is still substantial room for improvement. A previous collaboration between Alberta Government departments and non-government groups, known as "Think… Think Again" did contribute to positive changes in levels of awareness of child passenger safety and should be considered as a strong example of positive outcomes that can result from informed, collaborative effort. A five-year evaluation of the "Think…Think Again" program indicated a 57% increase in the awareness of parents and caregivers of the need for the correct and consistent use of child restraints for children between 9 kg and 18 kg.[7] The Final Report for the Think…Think Again program (TTA report) suggests that education and enforcement strategies, targeting parents and caregivers of children 0 to 6 years of age, regarding the need to use child restraints has met with some measure of success. The TTA Report also identified non-use / incorrect use of restraints for children over the age of 6 as a critical emerging issue and recommended that strategies to address this issue be developed.

Over a 5-year period, the rates of restraint non-use for children over 6 years of age consistently exceeded the rates of misuse, with 40% (n=1,404) of all child occupant restraint tickets being issued for non-use of a restraint system.[7] The issue of declining restraint use as a function of increased child age is not unique to Alberta, but it is an issue that has lacked an appropriate response by government. The negative impacts of improper booster seat use, and non-use, are presented in a review of current evidence, outlined below.

Literature Review

Section 1: Injuries related to seat belts, seat positions, and booster seats

There are numerous safety experts and advocates, both in Canada and the United States, who currently recommend the use of booster seats in children who have outgrown their car seats, but are still too small to safely fit into an adult seatbelt.[8–13] These recommendations stem from evidence which shows an increased incidence of life altering injuries and deaths in children involved in MVCs. These injuries and deaths are most often a result of misuse of adult seat belts, misuse / lack of use of booster seats, as well as age-inappropriate seating positions.

The benefits of booster seats have been generally accepted, and proper use has been shown to reduce the risk of injury by 45% or more when compared with the use of just adult seat belts in children aged 4 to 8.[14, 15] In a 2016 study conducted in Alberta, 23% of children were not using a booster seat, and of those who were, 31.8% were misusing the booster seat in at least one way.[16] This study also highlighted the increased risk of injury that older children (up to age 7) face, as they were more likely to be inappropriately transitioned out of their booster seat (47.8%) versus children at 2 years of age (22.2%). A more recent study, published by Pitt, confirmed this finding. They found that children in Alberta who were restrained using adult seat belts were 21% more likely to be injured in a MVC, compared to children who were restrained in a booster seat.[17]
When a child is prematurely transitioned into an adult seat belt, there are often significant problems with seat belt fit, increasing the risk of serious injury. A vehicle seat belt fits correctly "when the lap portion of the belt rides low over the hips and is held in place by the upper pelvis". A well-fit shoulder portion of the belt crosses the sternum and shoulder".[18]

For children, the frequency of head injuries, brain injuries, spinal fractures, and other characteristic injuries labeled "seat belt syndrome" increase if placed in an adult seat belt. The term "seat belt syndrome" encompasses characteristic cervical and lumbar spinal cord injuries and intra-abdominal injuries resulting from ill-fitting or incorrectly positioned lap and shoulder seat belts.[19] It is difficult for a child to sit properly against the back of the seat because the seat is long in relation to the child's thigh. To compensate for this, children will often slouch, moving the correct placement of the seat belt. If restrained in an adult seat belt, slouching causes the lap belt portion to move up, over the abdomen instead of across the pelvis. In the event of a collision, direct force will be transferred to the abdomen and lumbar spine rather than the stronger iliac wings of the pelvis. This type of injury could result in serious fractures of the spine and even paraplegia. When the lap belt is worn high, the child is also at increased risk for sliding out of the lap belt during a collision.[20]

Children have a smaller torso and narrow shoulders compared to an adult. This causes the shoulder portion of the seat belt to ride up and across the child's neck or face. To compensate for this discomfort, children will either put the shoulder portion behind the back or under an arm, eliminating its protective function. Both of these practices increase the risk of injury to the bony cervical spine or to the spinal cord in the event of a collision.[20] Without the proper protection of a shoulder belt in a crash situation, the child's torso remains unrestrained. Upon sudden deceleration, a child's body will jackknife forward, placing full force on the pelvis or abdomen. Impact could be made between the head and knees, or with the vehicle's interior, resulting in a head or brain injury.[20] The increased pressure on the abdomen also puts the child at risk for abdominal injuries and seat belt syndrome. When a child puts the shoulder belt under one arm, the resulting forces are known to result in serious internal injuries as well, a properly fitted booster seat eliminates the need to displace the shoulder portion of the seat belt, decreasing the rate of seat belt misuse by children.

Mature anterior superior iliac spines are strong enough to absorb the forceful velocity of the body in a collision. The bone composition of children is less developed, providing insufficient strength to properly anchor the belt. Virtually no child between 6 and 8 years would be big / strong enough to be adequately protected by an adult seat belt. It is not until children are 37 kg (80 lb) and at least 145 cm tall that an adult seat belt will fit correctly and provide adequate protection.[18-22]

Section 2: Barriers to booster seat use

While the benefits of booster seat use are clear, and appropriate use of booster seats is increasing in Alberta, there are still a significant number of children who are improperly restrained in motor vehicles. It is important to address the barriers that exist as it relates to booster seat use, as removing these barriers can have a significant impact on usage rates.

Socioeconomic Status

A significant concern for many caregivers is the financial barrier of booster seat use, with many studies showing a correlation between socioeconomic status and the likelihood of proper booster seat use. One study, conducted in Michigan in 2006, found that low income households (earning less than $20,000 per year) were 3.5 times less likely to use a booster seat for their child, citing cost as the main factor.[23] The effect is further exacerbated based upon the number of children of booster seat age in the household.

Knowledge and Awareness

While availability of and access to booster seats and other child restraint systems can often be overcome, knowing which product to use and how to use it remains a major barrier to booster seat usage. In some cases, as much as 64% of parents surveyed have low knowledge of child restraint devices.[24]

Many parents remain unaware of the specific age, height, and weight criteria for transitioning children from car seats to booster seats, often moving children out of booster seats prematurely based on perceptions of their child being "too old" or "big enough" for an adult seatbelt alone. Furthermore, a foundational misunderstanding of a booster seat's primary function - to properly position an adult seatbelt for a child's developing body, not merely to elevate them for visibility - contributes to underutilization.

Access to and the affordability of booster seats, coupled with clear and understandable information on how to use them, are critical components to compliance.[25]

Section 3: Legislation

Booster seat legislation has been strongly recommended by child passenger safety advocates as a way to increase booster seat usage and reduce injuries and fatalities in children involved in MVCs.[9, 12, 18, 18, 26] In Canada, booster seat legislation has been enacted in all provinces, with the exception of Alberta. This highlights a significant gap in Alberta's approach, and commitment to child passenger safety, as a lack of provincial booster seat legislation corresponds with a higher rate of childhood fatalities related to MVCs.[27]

An example of the positive impact of implementing booster seat legislation is illustrated in a study conducted in British Columbia. Researchers reported a 10.8% decrease in the rate of injuries in children 4 - 8 years of age after the province's child restraint legislation was updated.[28] A similar trend was seen in the United States in states where booster seat legislation was extended to include children up to 7 years of age.[29]

Booster seat legislation must be consistent with best practices and set a higher standard and vision of safety to which we strive to achieve. This should be considered as one of the first, and most important, steps in reducing childhood injuries and deaths related to MVCs.

Recommendations

The following recommendations are specific to the Alberta context and are based upon the results of the above literature review, as well as consultations with child passenger safety experts.

- Enact legislation in Alberta requiring children use booster seats with the following requirements:
  - Children between the ages of 5 and 12 and weighing at least 18 kg (40 lb), should be securely buckled in a forward-facing car seat with a 5-point harness or a belt-positioning booster seat until they are at least 145 cm (4'9") tall.
  - Exceptions include children who exceed height and / or weight limits of available Canadian booster seats, but do not yet meet the age minimum outlined in legislation.
- Support booster seat legislation through the use of robust enforcement campaigns.
- Implement education and awareness campaigns targeted at both healthcare providers / other frontline workers and parents / caregivers.
- Identify barriers to booster seat usage and implement programs to assist families experiencing these barriers (i.e. financial support for families who may struggle to afford the cost of booster seats).

References

1. Parachute. Policy: Booster Seat Legislation. 2024. Available from: https://parachute.ca/en/professional-resource/policy/booster-seat-legislation/#:~:text=Currently%2C%20Alberta%2C%20Northwest%20Territories%20and,or%2012%20years%20of%20age.
2. Statistics Canada. Deaths, by cause, Chapter XX: External causes of morbidity and mortality (V01 to Y89). 2024. Available from: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310015601
3. Transport Canada. Road Safety, National Collision Database Online (NCDB) - October 19, 2023. 2024. Retrieved 9 July 2025. Available from: https://wwwapps2.tc.gc.ca/Saf-Sec-Sur/7/NCDB-BNDC/p.aspx?l=en
4. Parachute. Cost of Injury in Canada. The highest costs: Falls and transport. 2024. Available from: https://parachute.ca/en/professional-resource/cost-of-injury-in-canada/the-highest-costs-falls-and-transport/
5. Injury Prevention Centre, Edmonton. Database held by the Injury Prevention Centre. Unpublished data, available upon request. 2023.
6. Injury Prevention Centre, Edmonton. Economic Burden of Injury, Alberta 2017 database. Unpublished data, available upon request. 2017.
7. BIM Larsson & Associates. Think... Think Again Five Year Final Report. 2002. Formerly published online. Copy held by IPC.
8. Canadian Paediatric Society. Child and youth injury prevention: A public health approach. 2020. Available from: https://cps.ca/en/documents/position/child-and-youth-injury-prevention#ref21
9. Parachute. Choosing the right car seat. 2025. Available from: https://parachute.ca/en/injury-topic/car-seats/choosing-the-right-car-seat/
10. Child Passenger Safety Association of Canada. Recommendations for revisions to provincial and territorial legislation related to child passenger safety. 2023. Available from: https://cpsac.org/wp-content/files/documents/toolbox/Recommendations-for-revisions-to-provincial-and-territorial-legislation-related-to-child-passenger-safety.pdf
11. Transport Canada. Choosing a child car seat or booster seat. 2019. Available from: https://tc.canada.ca/en/road-transportation/child-car-seat-safety/choosing-child-car-seat-booster-seat
12. National Highway Ssfety Traffic Administration. n.d. Available from: https://www.nhtsa.gov/vehicle-safety/car-seats-and-booster-seats
13. Alberta Health Services Provincial Injury Prevention. Evidence-based Recommendations for Car Seat, Booster Seat and Seat Belt Use for Children. 2023. Available from: https://www.albertahealthservices.ca/assets/healthinfo/ip/hi-ip-pipp-evidence-based-recommendations-carseat-boosterseat-seatbelt.pdf
14. Arbogast KB, Jermakian JS, Kallan MJ, Durbin DR. Effectiveness of belt positioning booster seats: an updated assessment. Pediatrics. 2009;124(5):1281-6. Available from: https://doi.org/10.1542/peds.2009-0908
15. Pai JE. National Highway Traffic Safety Administration (NHTSA). Evaluation of Child Restraint System Effectiveness (Report No. DO HS 813 047). 2020. Available from: https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813047
16. Golonka RP, Dobbs BM, Rowe BH, Voaklander D. Prevalence and predictors of booster seat use in Alberta, Canada. Can J Public Health. 2016;107(2):e155–e160. Available from: https://doi.org/10.17269/cjph.107.5254
17. Pitt T, Howard A, HubkaRao T, Hagel B. The effectiveness of booster seat use in motor vehicle collisions. Inj Prev. 2021;27(Suppl 2):A1–A79. Available from: https://doi.org/10.1016/j.aap.2021.106296
18. Winston FK, Durbin DR, Kallan MJ, Moll EK. The danger of premature graduation to seat belts for young children. Pediatrics. 2000;105(6):1179-83. Available from: https://doi.org/10.1542/peds.105.6.1179
19. Durbin DR, Arbogast KB, Moll EA. Seat belt syndrome in children: A case report and review of the literature. Pediatric Emergency Care. 2001;17(6):474-7. Available from: https://doi.org/10.1097/00006565-200112000-00021
20. Lapner PC, Mckay M, Howard A, Gardner B, German A, Letts M. Children in crashes:Mechanisms of injury and restraint systems. Canadian Journal of Surgery. 2001;44(6):445-9. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC3692680/
21. Alberta Centre for Injury Control and Research. ACT: Traffic safety. Edmonton, AB: Alberta Centre for Injury Control and Research; 1999.
22. Canadian Paediatric Society. Information for parents. Car seat safety. 2025. Available from: https://caringforkids.cps.ca/handouts/safety-and-injury-prevention/car_seat_safety
23. Bingham CR, Eby DW, Hockanson HM, Greenspan AI. Factors influencing the use of booster seats: a state-wide survey of parents. Accid Anal Prev.

2006;38(5):1028–37. Available from: https://doi.org/10.1016/j.aap.2006.04.014

24. Harzand-Jadidi S, Sadeghi-Bazargani H, Ponnet K, et al. Parents' knowledge and socio-demographic determinants toward child's restraint system use. BMC Pediatr. 2023;23(1):315. Available from: doi:10.1186/s12887-023-04136-5
25. Angell GB, McMurphy S, Alberton AM, Grenier S, McCue HA. Factors associated with booster seat use among Indigenous peoples in Canada. Traffic inj prev. 2023;24(8):700–706. Available from: doi:10.1080/15389588.2023.2245514
26. Anderson DM, Carlson LL, Rees DI. Booster Seat Effectiveness Among Older Children: Evidence From Washington State. American journal of preventive medicine. 2017;53(2):210–5. Available from: https://doi.org/10.1016/j.amepre.2017.02.023
27. Fridman L. Interprovincial differences in childhood motor vehicle-related injuries and booster seat legislation across Canada. Paediatrics & Child Health. 2017;22(Suppl 1):e37. Available from: https://doi.org/10.1093/pch/pxx086.093
28. Brubacher JR, Desapriya E, Erdelyi S, Chan H. The impact of child safety restraint legislation on child injuries in police-reported motor vehicle collisions in British Columbia: An interrupted time series analysis. Paediatrics & Child Health. 2016;21(4):e27–e31. Available from: https://doi.org/10.1093/pch/21.4.e27
29. Mannix R, Fleegler E, Meehan WP, Schutzman SA, Hennelly K, Nigrovic L, Lee LK. Booster Seat Laws and Fatalities in Children 4 to 7 Years of Age. Pediatrics. 2012;130(6):996–1002. Available from: https://doi.org/10.1542/peds.2012-1058

INJURY PREVENTION CENTRE

INJURY PREVENTION CENTRE
4-248 ECHA, University of Alberta
11405 87 Ave NW
Edmonton AB T6G 1C0

Phone 780.492.6019
ipc@ualberta.ca

injuryprevention centre.ca

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