

The importance of child car seats and current challenges with their use

Kit-Ngan Young-Hoon MBBS MPH, Christopher Mackie MD MHS

Although child car seats have been shown to save lives (1), the current issue of *Pediatrics & Child Health* includes two publications highlighting rare potential hazards associated with child car seats. Moharir et al (2) (pages 495-497) describe a burn to an infant likely caused by a car seat during a long drive on a hot, sunny day. Singhal et al (3) (pages 498-500) discuss the details leading to two childhood deaths after being left to sleep in car seats.

The potential harm from child car seats described in these articles must be balanced by a consideration of their benefits. Proper car seat use reduces the risk of injury, hospitalization or death by greater than 70% when compared with seat belts or no restraints (1). Legislation mandating the use of child safety seats has covered all jurisdictions in Canada since 1991 (4). Such legislation is believed to have contributed to the substantial declines in motor vehicle deaths and serious injuries over the past two decades.

The death of any child is devastating, and the cases described by Singhal et al (3) speak strongly to the importance of a safe sleep environment. A Canadian joint statement on safe sleep (5) outlines a number of factors that decrease the risk of sudden infant death syndrome or sudden unexpected death in infancy. Such deaths have been attributed to co-sleeping with an adult in a bed or on a couch, or the presence of soft bedding such as pillows, duvets and bumper pads (6). The safe sleep statement also specifically highlights the importance of transferring the child from the car seat to a safe sleep environment when no longer travelling (5).

Physicians and other health professionals can play a part in reducing the likelihood of parents placing children in unsafe sleep environments. As reliable and trusted sources of information, health professionals can encourage new parents to consider how and where they put their infant to sleep. Health professionals can also refer to local public health organizations or other resources that can provide detailed information on safe sleep (5,7). By improving patient awareness and facilitating changes in behaviour, deaths such as those described by Singhal et al (3) may be prevented.

Although car seats may have warnings about the heat generated under specific environmental conditions, burns from car seats are not well documented in the research literature (2). In the case report by Moharir et al (2), it is uncertain whether the car seat manual provided the necessary warning to parents about protecting their infant from an overheated car safety seat. Improper use of car seats is not uncommon and can be dangerous (8). These cases serve as another reminder that manufacturers have a responsibility to ensure that consumers understand how to use car seats correctly, and providing a manual may not adequately fulfill this responsibility.

Perhaps the case described by Moharir et al (2) is just the 'tip of the iceberg' and there are many other cases of burns from car seats that are not documented. Similar to phase IV trials that assess for unknown side effects of pharmaceuticals after they have been

marketed, a system that can detect adverse effects of car seats has the potential to improve our understanding of the magnitude of this issue. Such a system does exist through Transport Canada under the Motor Vehicle Safety Act. Any safety-related complaint about car seats can be submitted to Transport Canada. These complaints are reviewed, shared with the manufacturer of the car seat and may trigger an investigation. Depending on the investigation, Transport Canada may issue a public notice, a consumer information notice or a recall, or take appropriate legal action (9). The safety information is accessible on their website and may be further publicized through public health staff working with parents.

A system is useless if it is not utilized. Did the busy health care professionals who diagnosed the burn case encourage the patient to report it to Transport Canada, or did the parent do so after recovering from the chaos of the emergency room visit? Such data are critical to informing alterations to the design of car seats, changes to relevant regulations or the usage of scarce resources to issue recalls or publicize notices. Health care professionals can play a role in this process by encouraging parents to report safety problems that may have arisen from defective car seats.

Unfortunately, physicians show low rates of reporting to surveillance systems, and such a system of passive surveillance may not detect problems with car seats and incorrect usage (10). Alternatively, the Canadian Paediatric Surveillance Program may be a useful source of data to examine this issue. This program collects data from more than 2500 paediatricians and is designed particularly to enable research into rare conditions (11).

In a discussion of the potential harms from car seats, one must also include the risk to preterm infants or infants with pre-existing respiratory or neurological deficits. Even when used properly, the recommended angle of recline in an infant car seat can lead to oxygen desaturation or apnea in infants who are at high risk for medical reasons. Hospitals may assess the infant in a car seat before discharge to ensure that they are able to maintain normal oxygen levels (12). Further research is required in this area to establish the parameters that should be used in assessing babies and determining the cost effectiveness of car seat assessments before hospital discharge.

Since the advent of car seat legislation in Canada, annual motor vehicle collision deaths in children zero to 14 years of age decreased from 300 in 1990 to 54 in 2009, while injuries decreased from 23,000 to 9000 in the same age group and time period (13,14). Despite this dramatic decline, accidental injury remains the leading cause of death in children one to 14 years of age, with motor vehicle collisions being the number one contributor to this statistic (15). Challenges remain in ensuring road safety for children who should be using car seats.

Observations of car seat use show shockingly high proportions that are not using a car seat, or using the wrong car seat for the child's weight and height. A Canadian study that observed more

McMaster University, Hamilton, Ontario

Correspondence: Dr Kit-Ngan Young-Hoon, Public Health & Preventive Medicine Residency Program, Clinical Epidemiology & Biostatistics, HSC 2C2,

McMaster University, 1280 Main Street West, Hamilton, Ontario L8S 4K1. E-mail kit.youngphoon@medportal.ca

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TABLE 1
Useful websites with information and resources on child safety seats

- Caring for Kids. Information for parents from Canada's Paediatricians
www.caringforkids.cps.ca/handouts/car_seat_safety
- Safe Kids Canada
www.safekidscanada.ca/Parents/Safety-Information/Car-Seats/Index.aspx
- Transport Canada
www.tc.gc.ca/eng/roadsafety/safedrivers-childsafety-car-index-873.htm
- Child Car Seat Clinics in Canada
www.tc.gc.ca/eng/roadsafety/safedrivers-childsafety-seat-clinics-1058.htm

than 13,000 children noted that approximately 90% were using car seats. Of these, only 60% were using the correct type, with only 20% of those four to eight years of age correctly using a booster seat (16). These statistics would probably be worse if we considered recent recommendations that rear-facing car seats should be used up to two years of age or until the child has reached the greatest height and weight for their car seat (17).

The statistics for incorrect use are even worse. A Manitoba study found a rate of 70% and some American studies report rates greater than 80% (8). Incorrect use includes improper positioning of the car seat, poor installation or incorrect harnessing of the infant or child (18). Greater parent education and engagement is required on the importance of using a car seat and how to use one safely and effectively (19).

Legislation of child car seat use is an important tool in improving compliance and has been shown to decrease fatalities and improve the rates of use (20). An important gap, however, is the lack of booster seat legislation in a number of provinces/territories with inconsistencies among the criteria used for booster seat use in the other jurisdictions (21). The poorest compliance in car safety seat use is among children four to eight years of age who are generally graduated from booster seats to seat belts too early, increasing their risk of injury.

The roles of physicians and health professionals lie within a comprehensive framework of community education and outreach (20). This includes education through a variety of avenues with a consistent message and supporting parents through a collaborative network of information providers and programs. Physicians are a trusted source of information and are an important channel through which public health organizations promote their messages to parents and caregivers. There are a variety of targeted health promotion materials available online and in print that provide quick and easy education for parents and caregivers (Table 1). Public health organizations provide a variety of programs, such as car seat clinics, that allow parents to seek more detailed advice on correct car seat installation and usage (Table 1).

Physicians and health professionals are also a strong voice in advocating for important legislative changes and for encouraging the exemption of car seats from sales taxes (18).

Child car seats save lives. Although the articles in the present issue highlight the potential hazards from car seats, they do not negate the car seat's vital role in reducing childhood mortality and injury. While the potential hazards of car seats described in the present issue are tragic, the high rates of incorrect use are of primary public health concern. Clearly, car seats save lives and prevent injuries. Ensuring proper use remains a major challenge.

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