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**Transporting Infants and Children with
Special Needs in Personal Vehicles:**
A Best Practices Guide for Healthcare
Practitioners

Road Safety
Transport Canada

January 2008

Canada 

Note

The recommendations contained in this manual are for information and referral purposes only. Healthcare practitioners should provide recommendations for safe transportation of infants and children with special needs on a client-by-client basis. Always refer to the manufacturer's instructions for any child restraint to ensure that it is being used correctly.

The guide was prepared in 2007.

Aussi disponible en français :

Le transport de bébés et d'enfants qui ont des besoins spéciaux dans des véhicules particuliers :
Guide de pratiques exemplaires pour les professionnels de la santé
TP 14772 F

For more information on road safety issues, please contact Road Safety, Transport Canada, at 1-800-333-0371, roadsafetywebmail@tc.gc.ca.

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Introduction

In a crash, the proper use of infant or child car seats can reduce the risk of death by 71% and the risk of injury by 67% (Weber, 2000; Wegner & Girasek, 2003). Like any child, infants and children with special healthcare needs must be provided with appropriate protection in vehicles.

The purpose of this guide is to provide healthcare professionals with information on issues relating to transporting infants and children with special needs in personal vehicles.¹ This resource should be used in consultation with families and health professionals who are very familiar with the child's condition and their physical or behavioural challenges. The guide provides information on the legislative and regulatory requirements for the safe transportation of children. It also includes a description of the types of children's restraint systems (i.e., car seats)² currently available in Canada, including conventional car seats, production restraint systems for persons with special needs, and custom restraint systems for persons with special needs.

Children with special needs include infants and children with short-term and long-term physical, developmental, or severe behavioural health conditions (e.g., autism). In some cases, a conventional car seat may remain the appropriate choice of product; while in other cases, a conventional car seat could aggravate a pre-existing health condition or would not offer the best protection in a crash.

Legislation and Regulations

Infant and Child Car Seat Legislation

Laws requiring car seat use are in effect in all Canadian provinces and territories. Infant and child passenger legislation usually stipulates weight and/or height requirements and sometimes stipulates a minimum age requirement before graduating to the next stage of restraint.³ Weight and height always takes precedence over age, particularly since some children with special needs have developmental delays or are smaller in size for their age.

Some provincial and territorial child restraint legislation is not up to date with current best practices based on research and expert recommendations. For instance, some

¹ This guide does not discuss transportation options for the travel in ambulances, school buses or airplanes.

² The terms child restraint systems and car seats are used interchangeably.

³ The stages of restraint use are outlined in the section "Conventional car seats for infants and children".

provinces and territories do not yet have booster seat legislation, even though injury prevention experts agree that once a child has outgrown a forward-facing car seat, they should be secured in a booster seat until they have reached the correct proportions to fit a seatbelt. Booster seats will keep the seat belt in the correct place over the child's body. While it is important to follow provincial and territorial car seat legislation as a minimum requirement (legislation often reflects the minimum safety requirements), it is also important to be aware of the current best practices and follow these recommendations in addition to the law.

Infant and Child Restraint System Regulations

The regulations that govern the manufacture and importation of children's restraint systems in Canada are the Motor Vehicle Restraint Systems and Booster Cushions Safety Regulations (RSSR). The requirements found within the RSSR are regrouped by classes of car seats or booster seats and a Canada Motor Vehicle Safety Standards (CMVSS) number is assigned to each class. Manufacturers or importers of car seats must certify that their products comply with the number(s) of the CMVSS to which the system conforms. To help ensure that manufacturers and importers are following regulations, Transport Canada randomly assesses the performance of car seats during simulated collisions, as well as tests for qualities such as webbing strength and flammability.

Every car seat offered for sale in Canada and made after March 15, 1998 must bear a national safety mark (NSM), which shows the number(s) of the CMVSS to which the system conforms, as well as the manufacturer or importer's own authorization number. The NSM indicates that the manufacturer or importer has certified that the car seat meets all required safety standards. Children's car seats must also be labelled with the date of manufacture, model name and number, manufacturer information, weight and height requirements as well as instructions for use and warnings.

National Safety Mark (NSM)



Canada's Motor Vehicle Safety Act does not specify the length of time a restraint system should last, nor do the RSSR. However, manufacturers often affix recommended useful life dates to their products. A child restraint system should, in general, never be used if the history of the restraint is unknown, if it has been in a collision, or if parts or installation instructions are missing.

Transportation Options for Infants and Children with Special Needs

CMVSS also regulates the safe transportation of children with special needs. This eliminates potentially hazardous restraint systems from the market. Schedule 7 to the RSSR, "CMVSS 213.5 - Restraint Systems for Infants with Special Needs" regulates restraint systems for infants with special needs who are less than 37 weeks gestation, have a birth weight of less than 2.2 kg (4.9 lbs) or have special breathing problems.

<http://www.tc.gc.ca/acts-regulations/GENERAL/M/mvsa/regulations/rssr/rssr.htm#SCHEDULE%207>

Schedule 6 to the RSSR, "CMVSS 213.3 - Restraint Systems for Disabled Persons" regulates restraint systems for older children with special needs and disabled persons.

<http://www.tc.gc.ca/acts-regulations/GENERAL/M/mvsa/regulations/rssr/rssr.htm#SCHEDULE%206>

Seatbelt Exemptions

It is sometimes possible for individuals to receive medical exemption from the provincial/territorial requirement to wear a seatbelt. Although criteria for exemption varies, generally individuals must produce a certificate signed by a legally qualified medical practitioner certifying that due to physical characteristics or medical reasons, they are unable to wear a seatbelt assembly for a stated period of time.

Although there is legislation in many provinces and territories that may allow for some children with special needs to be exempt from being secured while travelling in a motor vehicle, injury prevention experts and health experts discourage this practice as this presents very high levels of risk of serious injury or death. The Canadian Medical Association has strongly stated, "there are no medical conditions that justify exemption from wearing a seatbelt" (2006, p. 90).

There is the possibility that physicians who issue exemption certificates may be liable in the event of injury or death arising from the non-use of a seatbelt assembly (College of Physicians and Surgeons of Manitoba & Manitoba Medical Association, 1998). Specifically, the Canadian Medical Protective Association advises:

A physician's best protection against any potential litigation is to give careful consideration to the matter, ensuring that his/her decision and reasons for granting the certificate are documented and of a nature that he/she can expect agreement about them from among the majority of his/her confreres. As can happen when a physician grants a certificate of any kind, that physician may be called upon later to justify that decision.

Medical exemptions should be avoided. It is likely that there is a suitable car seat for the infant or child. If a conventional car seat is not suitable for a child, every effort must be made to encourage parents to purchase a production or custom restraint, especially if the restraint will be needed for a period longer than six months.

* See Appendix A for further information on medical exemptions for seatbelts in Canada.

Conventional Car Seats

For many infants and children with special needs, conventional car seats are an appropriate choice. It is necessary that a child be able to bend and flex at the hip while seated, maintain respiration in an upright or semi-upright position, and for children over 10 kg (22 lbs), maintain head and neck control.

Guidelines for use of conventional car seats

Stage	Weight	Approximate age*
Stage 1 Rear-facing seat	2.3 kg (5 lbs) to 14 kg (30 lbs)	Until approximately 1 year old
Stage 2 Forward-facing car seat	10 kg (22 lbs) to 30 kg (65 lbs)	1 - 4.5 years
Stage 3 Booster seat	18 kg (40 lbs) to 45 kg (100 lbs)	4.5 - 9 years
Stage 4 Seatbelt	At least 36 kg (80 lbs)	9 years and over

* Note: To determine the appropriate and proper occupant restraint for the child, always use the child's weight and height. Age should only be used as a guideline, given that at any age, there are substantial variations in the weight and height distribution of children.

When using a conventional car seat, parents should be encouraged to keep their children in the lower stages as long as possible (within the weight and height ranges), since it offers higher levels of protection.

Car seats with five-point harnesses can sometimes be adjusted to provide good upper body support for children with special needs (Committee on Injury and Poison Prevention, 1999).

For older children with special needs weighing between 18 and 45 kg (40 to 100 lbs), a conventional lap-shoulder belt may provide upper body support when used with a booster seat, or the seatbelt alone for children who are at least over 36 kg (80 lbs) and who fit properly in the adult seatbelt. The shoulder belt should never be tucked under the child's arm or back. The child should be able to sit up straight in the seatbelt to prevent the lap belt from riding up over the stomach. The inability to sit upright creates a risk for injuries to internal organs in the case of a crash.



While adapting a commercial product may be carried out routinely in clinical practices, it is not recommended as it nullifies the responsibility of manufacturers and/or importers and puts the clinician and their employer at risk.

Adding blankets, towels, crotch rolls or foam rolls are not considered modifications to a child restraint system. However, these items should not be placed between the harness and the child or the shell and the child, as this affects the fit of the harness, nor should they be placed behind the child.

Encourage parents to register their conventional car seats with the original manufacturer. The manufacturer will then be able to contact them if there are any recalls or problems with the car seat. Transport Canada keeps a list of notices about safety problems with children's restraint systems at <http://www.tc.gc.ca/roadsafety/childsafety/notices/menu.htm>.

Restraint Options for Children with Special Needs

For infants and children with special needs who are unable to use conventional car seats, there are two options: the use of production restraints or custom restraints. These two types of restraints are manufactured for children with special needs. It is vital that parents are informed about production and custom restraint options in order to avoid the use of substandard products, makeshift restraint systems, or unsafe methods of securing children in motor vehicles (Ibid).

The following section outlines the benefits and limitations of the following production restraints: infant production restraints (i.e., car beds) and production car seats for older children, as well as the benefits and limitations of custom restraints, such as the E-Z-On Vest and the modified E-Z-On Vest.

** See Appendix B for a listing of production and custom made restraint systems*

** See Appendix C for a listing of manufacturers*

** See Appendix D for a listing of suppliers*

1) Production Restraints for Persons with Disabilities

Production restraints are generally intended for children who are either under or over the recommended weight or height requirements of conventional car seats and/or who have medical conditions that preclude the use of conventional systems. Production restraints can be grouped into two categories: infant production restraints (currently, car beds are the only production restraint for infants) and production restraints for children.

Production Restraints for Infants (Car Beds)

A car bed may be used for very small or premature infants who have compromised respiration when seated in a conventional car seat, or for infants with other conditions who must travel lying down.

Section 11 of the RSSR states that a car bed "...is to be used in a flat position along the vehicle's rear bench seat with the head of the infant towards the centre of the vehicle". In the event of a side impact, an infant in a car bed is, in theory, more vulnerable to injury than an infant in a rear-facing infant seat, especially if the impact is on the side nearest the infant's head (SafetyBeltSafe, 2004). A car bed should only be used as a restraint option if a rear-facing infant seat is not suitable for the infant.



Diagram of Cosco Dream Ride Car Bed: Courtesy of Committee on Injury and Poison Prevention, *Pediatrics* 1999;104:988-992

Note: certain vehicle bench seats cannot accommodate a car bed. Read the instructions that are provided with the car bed or contact the car bed manufacturer for more information on its use with different vehicle models.

Some parents may believe that their infant would be more comfortable if they place a blanket under the child or loosen the harness (Talty & Bull, 2000). It is critical that parents understand that this practice interferes with the functioning of the restraint as it makes the harness too loose. Even if a child has respiratory difficulties, harnesses should still fit snugly and parents should not place anything (e.g., padding) between the infant and the car bed or the infant and the harness system. Also, parents should not place padding on top of the infant's head.

A car bed may be suitable for infants who need to lie flat. Indications may include:

- ❖ Prematurity (less than 37 weeks gestation): infants who are tested prior to discharge in a conventional reclined infant car seat and have oxygen desaturation, apnea, or bradycardia (i.e., fail angle tolerance testing)
- ❖ Birth weight of less than 2.2 kg (5 lbs) and failure of angle tolerance testing
- ❖ Casts that prevent secure positioning in a conventional car seat
- ❖ Musculoskeletal or health conditions including:
 - Extreme risk of fractures (e.g., osteogenesis imperfecta)
 - Significant deformities or distortions (e.g., abnormally large head, spinal deformities)
 - After surgery (e.g., if wounds/dressings prevent use of conventional restraint straps or the child needs to lie flat)
 - Respiratory difficulties when in an upright or semi-reclined position
- ❖ Infants who must travel lying flat for a medical condition other than those listed above

Car beds must be labelled with the manufacturer or importer's name, date of manufacture and directions for harnessing the infant and restraining the car bed in the

vehicle. They must also be labelled as complying with CMVSS 213.5 and have the national safety mark (NSM).

Transport Canada's policy states that parents must obtain a prescription for a car bed from a physician or occupational therapist. This avoids parents using car beds when it is not necessary. If the infant does not have special needs, they should be using a rear-facing seat.

Currently, Dorel-Cosco's Dream Ride is the only available car bed that is certified under Canadian regulations. It is important to note that other car beds have been certified in the United States, but are currently not certified as complying with Canada Motor Vehicle Safety Standards.

If you answer "yes" to all of the following questions, a car bed **may** be suitable for the child:

- *Is the child unable to be seated in a conventional rear-facing infant seat?*
- *Is the child required to be transported lying down?*
- *Is the child within the car bed manufacturer's recommended weight/height limits?*

Production Restraints for Older Children with Special Needs

Some children with special needs still need the support of a car seat even after they have outgrown the weight and height recommendations of conventional models typically found in retail stores.

Most conventional forward-facing car seats have weight and height limits that usually allow for a child to ride forward-facing until they are about 102 to 122 cm tall (40 to 48 inches) or between 18 kg to 22 kg (40 to 48 lbs). As of May 2007, conventional forward-facing car seats with weight limits up to 30 kg (65 lbs) are permitted on the Canadian market (upon manufacturer's self-certification). This expands Stage 2, the forward-facing child seat stage of child passenger safety, so that heavier children can remain secured within a five-point harness system for a longer period.

Production restraints for those with disabilities include the same features as conventional forward-facing car seats but are able to accommodate children with a weight range from 9 to 48 kg (20 to 105 lbs).

A production restraint may be suitable for children who cannot be positioned safely due to neurological, developmental, musculoskeletal or health conditions including:

- ❖ Extreme risk of fracture (e.g., osteogenesis imperfecta)
- ❖ Significant deformities or distortions (e.g., abnormally large head, spinal deformities)
- ❖ After certain surgeries or

- ❖ Significant abnormal balance or postural tone affecting head, neck or trunk alignment or control

A production restraint may be used as long as the child is within the weight or height limits of the seat. Production restraints often come with extra padding and positioning features. It is recommended that caregivers work with an occupational or physical therapist to position the child correctly in these types of seats (Committee on Injury & Poison Prevention, 1999).

If you answer "yes" to the following two questions, a production restraint may be suitable for the child:

- *Is the child unable to be seated and secured in a conventional forward-facing car seat, booster seat, or seat belt (as indicated by weight/height)?*
- *Is the child within the production restraint manufacturer's recommended weight/ height limits?*

2) Custom Restraints for Persons with Disabilities

Custom restraint systems are created to meet the individual requirements of children with special needs. All custom restraints must have an accompanying document (see textbox on CMVSS Documentation required for custom restraint systems).

Currently, there are two types of custom restraints on the Canadian market: safety vests and modified safety vests.

Documentation Required for Custom Restraint Systems

The Motor Vehicle Restraint Systems and Booster Cushions Safety Regulations requires that every custom restraint system for those with disabilities must be accompanied by a document, in both official languages, that contains the following information:

- (a) a statement that the system is to be used only by the mobility-impaired occupant for whom it was designed;*
- (b) the name and principal place of business of the company that manufactured, imported or sold the system;
- (c) the date of manufacture of the system, in the form set out in Schedule 8 of the Motor Vehicle Restraint Systems and Booster Cushions Safety Regulations;
- (d) a statement that the system conforms to the prescribed Canadian standards applicable at the time of manufacture;
- (e) if the system is not designed for use at certain adjustment positions or for use with trays or tables or certain webbing assemblies, a warning that those adjustment positions, trays, tables or webbing assemblies should not be used;
- (f) if the system has a positioning harness with a hook and loop fastener such as a velcro fastener, a warning that a hook and loop fastener is not sufficient to restrain a

mobility-impaired occupant and that only belts that include buckles should be used in the restraint of the occupant;

(g) a statement that the tether strap must be properly attached to the vehicle and that indicates how to attach the tether strap; and

(h) if the system employs a fixed or movable surface to restrain a mobility-impaired occupant but also requires harness straps, a warning that the fixed or movable surface is not sufficient to restrain the occupant.

(*Note: This statement can be a letter from an occupational therapist or doctor that declares that the system can only be used by a specific child. The full name of the child must be included in the letter)

Safety Vest

Safety vests, such as the E-Z-ON Vest, are designed for children who cannot use a conventional car seat. The child must be at least two years of age and weigh between 9 and 76kg (20 and 168 lbs). A strong tether kit is required for children that are between 36 and 76 kg (80 and 168 lbs). These vests fit tightly and anchor to the vehicle with a tether strap and the seatbelt. The vests come in a variety of adjustable and non-adjustable models, with various fastening mechanisms, including back zipper closure, front push button buckle, and mini push button closure. On the extra small and small models, crotch straps are standard. The child may be fitted into the vest before being placed into the car.

A safety vest may be suitable for children with the following conditions:

- ❖ Children with severe behavioural problems originating from an underlying condition - e.g., autism (The vest prevents children from undoing the buckle)
- ❖ Children with poor trunk control
- ❖ Children with certain types of casts (most commonly hip spica casts)

If you answer "yes" to all of the following questions, a safety vest may be suitable for the child:

- *Is the child unable to use a conventional car seat?*
- *Can the child maintain a sitting position?*
- *Can the child bend and flex at the hip while seated?*
- *Can the child maintain head and neck control?*
- *Can the child maintain respiration in an upright position?*
- *Does the child meet the recommended height/weight limits of the vest?*

CAUTION: A safety vest is made to the specific height and weight measures of a child.

Modified Safety Vest

A modified safety vest differs from a regular safety vest, in that it allows the child to be lying down while travelling. It is designed for children who are 2 to 12 years of age and between 9 kg to 45 kg (20 to 100 lbs). There are adjustable models with a push button closure and also non-adjustable models that can be

custom-designed. The vest requires two seatbelts to secure it to the vehicle. As with the regular safety vest, this model should be secured on the child before the child enters the vehicle.

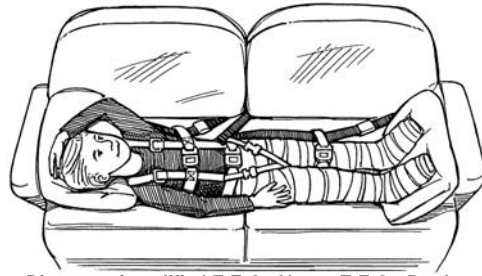


Diagram of modified E-Z-On Vest – E-Z-On Products, Inc :
Courtesy of Committee on Injury and Poison Prevention,
Pediatrics 1999;104:988-992

However, there may be vehicle bench seats that cannot accommodate a child lying down. In these cases, it is recommended that an ambulance be used for transportation. Read the instructions that are provided with the modified safety vest or contact the safety vest manufacturer for more information on its compatibility with different vehicle models.

A child restrained in a modified safety vest should be placed in the rear seat of the vehicle. It is important to ensure the greatest distance between the child's head and the side of the vehicle. It is also recommended that if the child has one leg in a cast, the leg with the cast should be placed against the back of the vehicle's seat.



- Children younger than two years of age should not be secured in a safety vest or a modified safety vest.
- A modified safety vest is designed for specific weight and height measurements.

A modified safety vest may be suitable for children more than two years of age, with musculoskeletal abnormalities that interfere with sitting, i.e., unable to bend at the hips and children in braces or casts that prevent them from sitting upright.

If you answer "yes" to the following two questions, a modified safety vest may be suitable for the child:

- *Is the child required to be transported lying down?*
- *Does the child meet the recommended weight or height limits of the vest?*

Functional Deficits

Parents and caregivers often seek advice on child passenger safety from healthcare providers, particularly in cases when the infant or child has special needs. Thus, there are some important actions that healthcare providers can take to assist parents in this area.⁴ When infants or children are discharged from a healthcare facility, it is important that education protocols are in place, so that professionals in the hospital are equipped to provide the needed education to parents. When applicable, healthcare providers should provide information on where to obtain production and custom restraint systems.

Healthcare providers and parents should refer to the manufacturer or certified car seat technicians for more instructions on the installation of child restraint systems.

The selection of a production or custom restraint will depend on the specific needs of a child. When recommending child restraint systems, consider the information contained in the following functional deficits.

Short-Term Needs

Some children will only have special transportation needs for a short period of time. It is still critical that these children be transported in the safest manner possible. While it may be possible to continue using conventional car seats, healthcare practitioners should recognize cases when a conventional car seat would not be suitable or where special considerations to the conventional car seat are necessary.

Premature or low birth weight infants

When discharging premature infants (born less than 37 weeks gestation), the American Academy of Pediatrics recommends monitoring the infant in a semi-upright position to determine possible respiratory or heart rhythm problems (Committee on Injury & Poison Prevention and Committee on Fetus & Newborn, 1996). In situations where a semi-upright position can be maintained safely by the premature or low weight infant, particular attention should be taken in choosing a conventional infant seat. Certain parameters should be followed:

1. Select an infant-seat with the recommended weight and height for the infant. Note that most conventional seats have a lower weight limit of 2.3 kg (5 lbs) and that many premature infants are discharged home before reaching this weight.

⁴ This information is adapted from Safe Ride News, 2006.

2. Select an infant-only safety seat with a five-point harness, for the best fit and positioning.
3. Do not select a car seat with a shield, abdominal pad or armrest.
4. Select a car seat with a distance of less than 14 cm (5½ inches) from the crotch strap to the seat back. This will reduce the chances that the infant will slouch forward.
5. Select a car seat with a distance of less than 25.4 cm (10 inches) from the lower harness strap to the seat bottom. This will reduce the chance that the harness straps will cross the infant's ears. If the harness crosses over the ear area or is above the infant's shoulders it cannot be used in the rear-facing mode. - see #8
6. Make sure that the infant's hips and back are flat against the back of the car seat.
7. To support the head and neck, blanket rolls or towels may be placed on both sides of the infant. Do not use head support cushions that did not come with the car seat. These add-on aftermarket products can interfere with the functioning of the harness straps. Parents should use a head support cushion only if the manufacturer provided it with the car seat. Do not add padding under or behind infant's head.
8. In rear-facing car seats, make sure that shoulder strap slots for the harness are at or below the infant's shoulders. The harness must be snug. The top of the chest clip should be positioned at the armpit level to avoid contact with the neck.
9. The car seat should be reclined at a 45-degree angle in the vehicle to minimize neck flexion and airway compromise.

A car bed should be considered in cases where a conventional rear-facing infant seat is not appropriate, such as: infants with a lower weight than allowed by the conventional rear-facing seats, a requirement that the infant be transported lying down while travelling or a compromised respiration or heart rhythm (apnea, bradycardia, desaturations) with upright positioning.

Postoperative and medical devices

Surgery or medical devices do not necessarily mean the child cannot use a conventional car seat. In all cases, the child must be within the weight and height requirements of the car seat and the seat must permit room for medical devices and dressings.

The types of suitable car seats will depend on the child's weight and height and the postoperative aid and medical device. In most cases, conventional infant and child car seats remain the best option for children weighing between 2.3 and 30 kg (5 to 65 lbs). Be sure to use the appropriate restraint for the child's weight: a rear-facing seat for infants weighing 2.3 to 13.6 kg (5 to 30 lbs) and a forward-facing car seat for children weighing 10 to 30 kg (22 to 65 lbs). Always refer to manufacturer's instructions for the specific weight and height requirements of a particular infant or child seat.

To accommodate postoperative and medical devices:

- Ensure that the seat has a flexible harness.

- Do not choose a car seat with overhead shields, trays, or armrests. They could interfere with the medical device on sudden impact.
- If the child has a tracheotomy and using a forward-facing seat, the seat should be semi-reclined to prevent the chin from interfering with the tracheotomy.

If the infant weighs between 1.8 and 4.5 kg (4 to 10 lbs) and recently had surgery, and/or have medical devices that cannot be accommodated in a rear-facing infant seat, you may consider using a car bed that allows the infant to be in a lying position.

When the child weighs over 18 kg (40 lbs), there are a number of options:

- Continue using a forward-facing seat until 30 kg (65 lbs).
- A conventional booster seat may be used, as long as the seat belt does not interfere with the medical device. If the seat belt interferes with the medical device, choose a forward facing car seat for children up to 30 kg (65 lbs) or a five-point harness production restraint for higher weight limits.
- If the above child restraint options do not work for the child, you may need to consider a safety vest, such as an E-Z-On Vest. These vests fit tightly and anchor to the vehicle with a tether strap and seatbelt. The child must be at least 2 years old, be between 9 and 76 kg (20 and 168 lbs), and must be able to sit upright.

Braces or Casts

Casts are often used in the following cases: developmentally (e.g., dislocated hip), postoperatively (e.g., tendon release), or following a trauma (e.g., fracture). Casts serve to immobilize the affected area. Children with most types of casts will be able to continue using conventional car seats, provided that they are able to sit upright and the casts do not interfere with the buckling mechanism or harness fit. If the child is 4.5 kg or less (10 lbs or less) and unable to fit properly in a rear-facing car seat, then a car bed should be considered.

Some children with hip spica casts are able to use a conventional seat with very low or no sides. Children with broomstick casts and most children with hip spica casts are not able to use conventional car seats since they cannot fit properly in the seat. A production restraint system with lower sides and a flexible five-point harness may be suitable, or alternatively, a safety vest, such as E-Z-On Vest could be employed if the child is over two years of age.

Long-Term Needs

Muscle tone and positioning problems

Muscle tone abnormalities and problems with positioning due to musculoskeletal deformities may make some children incapable of sitting up on their own

independently in a conventional seat. These conditions may include cerebral palsy, spina bifida, paralysis or severe scoliosis.

Infants with musculoskeletal deficits who continue to meet the weight and height recommendations for rear-facing seats should use this form of restraint until 14 kg (30 lbs), unless they must travel lying down. If there is an extreme risk of fractures or if the child has an abnormally large head, the infant should travel lying down. A car bed would be most suitable in these cases. Always refer to the weight and height ranges listed in the manufacturers' instructions.

If the child is above the weight and height recommendations of a rear-facing seat and you answer 'yes' to one or both of the following questions, the child may have muscular skeletal problems requiring non-conventional car seats or adjustments to conventional seats:

- Does the child's head fall forward due to poor head and neck control?
or/and
- Is this child unable to sit upright?

Children who can sit upright but have poor head and neck control

If the child weighs between 10 kg and 30 kg (22 to 65 lbs) and can sit upright on his or her own, the child may be secured in a conventional rear-facing seat until 14 kg (30 lbs) and/or a forward-facing car seat until 30 kg (65 lbs).⁵ Use of the recline feature will help to prevent the child's head from falling forward due to poor head and neck control. Refer to the manufacturer's instructions to ensure the particular seat can be semi-reclined.

After reaching 30 kg (65 lbs), it is possible for the child to be moved to a production restraint system for children up to 48 kg (105 lbs). Again, the seat should be able to be semi-reclined.

Children with musculoskeletal problems who cannot sit upright

For those children who are unable to maintain an appropriate posture without support, the following may be used with a conventional car seat or a production restraint up to 48 kg (105 lbs), provided that the child restraint manufacturer states that these supports can be safely used with their product.

- Crotch rolls can be added between the child's legs and crotch strap;
- Rolled blankets, towels, or foam rolls can be used for side support;
- A foam roll or rolled blanket can be placed under the child's knees;
- A soft collar may be used to prevent the head from falling forward. *Do not* use stiff neck collars and head straps, since they may increase the risk of neck injury.

⁵ Always refer to manufacturer's instructions for the specific weight and height requirements of a particular car seat.

Cardiac/Respiratory Conditions

If the child has cardiac or respiratory conditions, it is often not possible to use a semi-upright or upright conventional car seats.

If you answer 'yes' to the following question, the infant or child may have cardiac/respiratory problems requiring a non-conventional car seat.

- Does the infant or child have breathing difficulties or heart rhythm problems in a semi-upright or upright position?

For infants weighing less than 4.5 kg (10 lbs) and who must lie prone to maintain an open airway, such as for infants with Pierre Robin sequence, a car bed should be used.⁶ Children over two years and between 9- and 45 kg (20 to 100 lbs) may be secured in modified safety vests, such as the modified E-Z-On Vest.

Specialized production restraints can also be considered for children with cardiac/respiratory problems who can only sit up with assistance. Production restraint systems offer contouring and positioning for the child.

Behavioural Issues

There are some cases where non-conventional car seats are recommended for children with behavioural problems. These children must display severe or extreme behavioural problems, which may originate from an underlying condition such as autism or cognitive impairments and whose safety is at risk when using conventional car seats. Safety vests with rear-back closure, such as the E-Z-On Vest, prevent children from undoing the child restraint. However, it may still be possible for children to unbuckle the seat belt. Families should first examine different conventional seats to see which ones are the most difficult for their child to unbuckle before considering a safety vest.

Medical Equipment

Restraining Medical Equipment

Some children with special needs may be required to travel with medical equipment such as apnea monitors and oxygen tanks. Currently, the commercially available systems that are intended to secure portable medical equipment are not designed for use in motor vehicles. Medical equipment should be anchored to the floor of the vehicle or anchored under the vehicle seat (Canadian Paediatric Society, 2000). It is important to ensure that the equipment will remain secured in the event of a crash; otherwise, it becomes a projectile, putting passengers at risk of injury. Properly securing medical equipment will help prevent injury to the child and other vehicle occupants.

⁶ Always refer to manufacturer's instructions for the specific weight and height requirements of a particular car bed.

Wheelchair Restraints

When possible, a child should be transported in a certified restraint such as a car seat. If a child must be transported in a wheelchair, it is suggested that the wheelchair be installed in a forward-facing position with a 4-point tie-down devices attached to the wheelchair's main frame and the vehicle. The child should be restrained separately with the vehicle shoulder/lap belt (Committee on Injury & Poison Prevention, 1999). Tie downs should meet the Canadian Standards Association's (CSA) standards Z604 and Z605. Lap trays should be removed during transit as they could come into contact with the wheelchair occupant in the event of a crash and result in injury. The wheelchair should be in an upright position with the brakes activated. If a child is in a power wheelchair, the power should be turned off.

Some safety vest manufacturers produce a wheelchair mount so that a child in a wheelchair may be secured in a safety vest. However, these particular vests do not meet CMVSS.

Check with your province or territory for the regulations relating to the transportation of persons in wheelchairs.

! Positioning belts on wheelchairs are not restraint devices.

Financial Aid

Often, child restraint systems for the transportation of children with special needs can be very costly for parents. Families with children with special needs may already be facing additional costs for other areas of safety and lifestyle. Healthcare practitioners can provide assistance by directing parents to the financial assistance departments in their respective province or territory.

Loan programs for production restraints, such as car beds, exist in some pediatric and rehabilitation hospitals and centres in Canada. Those interested should contact their local health authority for information.

Concluding Remarks

As children with special needs grow and develop, their transportation needs may change. Medical conditions may unfortunately lead to deteriorating health, and

medical procedures may pose new transportation challenges. In contrast, certain conditions may be short-term, and no longer an issue after a certain length of time. When discussing child restraint options with parents and caregivers, it is important to be sensitive to the realities of families' situations and the individual needs of the children.

For children with special needs, outgrowing the weight or height limits of a restraint may not be the only sign that it is time to graduate to another restraint system. As a healthcare provider, it is your role to discuss the optimum restraint options for a child at the present time. It is important that you inform parents and caregivers of a child's restraint options for the future so that they can plan ahead. It is wise to talk to parents and caregivers about how they will be able to tell when a restraint is no longer suitable for a child, and discuss possible options for the future. Anticipating the type of restraint system that a child may need in the future will help ensure that the child is always restrained in the safest way possible when they are being transported to and from school, to social activities and to the many family activities that children enjoy.

Appendix A: Medical Seatbelt Exemptions

Exemption in Place (X)

Province/territory	Requiring medical certificate and/or time limited	Physical characteristics: Size or build
N.L.	X	X
P.E.I.		
N.S.	X	X
N.B.	X	X
QUE.	X	X
ON.	X	X
MB.	X	X
SASK.	X	X
ALTA.	X	X
B.C.	X	X
YUK.	X	X
N.W.T		
NVT.		

Source: Canadian Council of Motor Transport Administrators. October 2007. National Occupant Restraint Program 2006 Monitoring Report.

Appendix B: Child Restraint Listing

The following is a listing of products duly certified for and available in Canada and is for information purposes only. The authors of this manual and their respective organizations do not rate, endorse, or approve children's restraint systems and booster cushions.

Restraints that are CMVSS compliant:

Name of Restraint	Description	Weight and Height Requirements	Manufacturer and Ordering Process	Approximate Cost
Britax Traveller Plus Car Seat	<p>Forward-facing restraint designed and certified for children with special needs</p> <p>Features include a padded headrest, 5-point restraint harness system with adjustable shoulder straps, single strap adjustment & recline bar.</p> <p>The Traveller Plus can be used with either a lap belt or a lap and shoulder belt combination.</p> <p>Accessories include: a recline bar, crotch pommel & seat extension</p>	<p>Weight: 10-48 kg (22-105 lbs)</p> <p>Height: 76 -142 cm (30" - 56")</p>	<p>Manufactured by Britax Child Safety, Inc., Distributed by Snug Seat Inc., Imported by SOS Rehabilitation and The Motion Group</p> <p>Can be ordered by most medical dealers across Canada.</p>	<p>\$900 (Canadian)</p>
Cosco Dream Ride Infant Car Seat/ Bed	<p>Child restraint system designed for fragile and small infants who must travel lying down.</p>	<p>Height: <61cm (<24")</p> <p>Weight: 1.8 - 4.5 kg</p>	<p>Manufactured by Dorel Juvenile Group, Imported by Dorel Distribution Canada</p>	<p>\$100 (Canadian)</p>

	Features include 3-point harness and fully padded seat cover.	(4 - 10 lbs)	Can be ordered through Dorel Distribution Canada with a prescription from a physician or occupational therapist.	
E-Z-On Vests	<p>This safety vest is designed for children with poor trunk control, certain casts, and those with behavioural problems.</p> <p>Features include: sewn-zipper panel, adjustable shoulder straps, bar slides and loops.</p> <p>Accessories are available.</p>	<p>Vests are available in various sizes. Between all sizes, the E-Z-On Vests can accommodate persons whose weight ranges between 9 and 76 kg (20 and 168 lbs).</p> <p>Age: 2 years and up</p>	<p>Manufactured by E-Z-On Products Inc.</p> <p>Can be ordered through Perry Rand Transportation Group.</p>	Starting at \$175-\$225 (Canadian)
Modified E-Z-On Vest	<p>This safety vest is designed for children who must travel lying down.</p> <p>Accessories are available.</p>	<p>Vests are available in various sizes. Between all sizes, the E-Z-On Vests can accommodate persons whose weight ranges between 9 and 45 kg (20 and 100 lbs).</p> <p>Height: Child must fit lengthwise on the vehicle rear seat</p> <p>Age: 2-12 years</p>	<p>Manufactured by E-Z-On Products Inc.</p> <p>Can be ordered through Perry Rand Transportation Group...</p>	Starting at \$17 (Canadian)

Restraints that are not certified as complying with CMVSS as of December 2007

- Angel Ride Infant Car Bed
- Britax Hippo Car Seat
- Special Tomato Multi-Positioning seat
- Carrie Seat
- Cherish Car Bed
- Columbia TheraPedic Positioning Vehicle Restraint System - Child 2000 (Importation and distribution ceased in May 2007 due to certification issues)
- Columbia TheraPedic Positioning Vehicle Restraint System - Adolescent 2500
- Future 20/60 Car Seat
- Snug 1000 Booster Seat
- Snug Seat 1 Postural Seating System and Automotive Safety Seat (Snug Seat 1)
- Snug Seat 2 Postural Seating System and Automotive Safety Seat (Snug Seat 2)
- Spelcast Convertible Car Seat
- Spelcast CRD
- Tumble Forms 2 Carrie Seating System

Appendix C: Listing of Manufacturers, Importers and Distributors of Child Restraints for Children with Special Needs

Manufacturer, Importer, Distributor	Restraint
<p>Britax Child Safety, Inc 13501 South Ridge Drive Charlotte, North Carolina 28273 USA</p> <p>www.britaxusa.com tel: 1-888-427-4829</p>	<ul style="list-style-type: none"> • Britax Traveller Plus Car Seat
<p>Dorel Distribution Canada 873 Hodge St. Laurent, Quebec H4N 2B1</p> <p>tel: 1-800-721-3389</p>	<ul style="list-style-type: none"> • Cosco Dreamride Car Bed
<p>EZ-ON Products, Inc. 605 Commerce Way West Jupiter, Florida 33458 USA</p> <p>www.ezonpro.com email: info@ezonpro.com tel: In US - 1-800-323-6598 International & Local: 561-747-6920 fax: 561-747-8779</p>	<ul style="list-style-type: none"> • EZ-ON Vest • Modified EZ-ON Vest

<p>Snug Seat Snug Seat, Inc. 12801 E. Independence Blvd. P.O. Box 1739 Matthews, NC 28106 USA</p> <p>www.snugseat.com tel: 1-800-336-7684</p> <p>* U.S. Distributor of Britax Traveller Plus model.</p>	<ul style="list-style-type: none"> • Britax Traveller Plus Car Seat
<p>Perry Rand Limited "Transportation Group" PO Box 10, Waterville, Nova Scotia B0P 1V0</p> <p>www.thebusboys.com; www.perryrandltd.ns.ca tel: 902-679-7773 or 1-866-765-8825 fax: 902-679-0659</p>	<ul style="list-style-type: none"> • EZ-ON Vests
<p>SOS Rehabilitation 605 McCaffrey Saint-Laurent, Quebec H4T 1N3</p> <p>www.sosrehab.com tel: 1-800-667-3422 or 514-737-3422 fax: 1-800-671-6844</p> <p>* Importer of Britax Traveller Plus model.</p>	<ul style="list-style-type: none"> • Britax Traveller Plus Car Seat
<p>The Motion Group 231 Oak Park Blvd., Suite 214 Oakville, Ontario L6H 7S8</p> <p>www.themotiongroup.com tel: 1-888-850-9188 fax: 905-257-9640</p>	<ul style="list-style-type: none"> • Britax Traveller Plus

Appendix D: Aftermarket Products

There are many aftermarket products (sometimes called “add-on” products) that are available to consumers. While Transport Canada regulates the actual restraint systems, there are no regulations or standards that regulate third-party aftermarket products. In April 2004, Transport Canada issued a customer information notice regarding third-party aftermarket products for children’s restraint systems.

<http://www.tc.gc.ca/roadsafety/childsafety/notices/Dser/d200401/menu.htm>

Some aftermarket products present safety concerns. These include introducing slack in the shoulder harness system and adding compressible material behind the child, which will allow for slackness in the harness system during a crash. Slack in the harness can cause the child to be either partially or fully ejected from the restraint system. In other instances, the third-party aftermarket product may position a hard surface in front of a child that could pose an injury to the child should the child make contact in the event of a crash.

When choosing one of these products, it is always recommended to first check with the car seat manufacturer concerning safety issues that may be posed with the use of the product.

Some common aftermarket products for children with special needs include:

Babypod - Type of transport incubator

Buckle Guard - Prevents the easy opening of seatbelts by slipping guard over the buckle

Crotch Pommel - Attaches to the crotch strap of a restraint for extra padded comfort. Some manufacturers offer this as an accessory.

Extensor Thrust Wedge - Helps to change angle of sitting posture

Insert - Designed for very small or fragile infants, infants with tracheotomies, gastrotomies, or monitoring devices. Provides lateral stability

Lateral Positioning Pads - Pads to provide additional lateral support

Positioning Pads - pads used to customize car seat for size of child

Recline Bar - Provides an alternative seating position in some vehicles. Allows a car seat to be installed and used in a 45degree recline forward-facing position in some vehicles. Some manufacturers offer this as an accessory.

Seat Extension/Seat Depth Extender - Attaches to the front of the restraint seat for a deeper and more comfortable fit for larger children. Some manufacturers offer this as an accessory.

Swing Away Abductors - For use in car seat to control leg abduction

Appendix E: Resource Links

Note: The Committee is not responsible for the accuracy, currency or the reliability of the website links. The Committee is not responsible for the information found through these links, nor does it endorse the sites and their content.

Users should be aware that information offered by these sites may not be subject to the *Official Languages Act* and may be available only in the language(s) used by the sites in question.

Child Passenger Safety Terminology (U.S. Terminology - some terms may vary from Canadian terms)

www.carseat.org/Technical/tech_update.htm

Keep Kids Safe: Car Time 1-2-3-4 TP #13511

<http://www.tc.gc.ca/roadsafety/tp/tp13511/menu.htm>

Car Time Fact Sheet on the four stages of safe travel in cars

<http://www.tc.gc.ca/roadsafety/childsafety/menu.htm>

Motor Vehicle Safety Act, Motor Vehicle Restraint Systems and Booster Cushions Safety Regulations

<http://www.tc.gc.ca/acts-regulations/GENERAL/M/mvsa/menu.htm>

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