

AMERICAN ACADEMY OF PEDIATRICS

Committee on Injury and Poison Prevention

Transporting Children With Special Health Care Needs

ABSTRACT. Children with special health care needs should have access to proper resources for safe transportation. This statement reviews important considerations for transporting children with special health care needs and provides current guidelines for the protection of children with specific health care needs, including those with a tracheostomy, a spica cast, challenging behaviors, or muscle tone abnormalities as well as those transported in wheelchairs.

ABBREVIATION. FMVSS, Federal Motor Vehicle Safety Standard.

All children, including those with special health care needs, should have access to proper resources for safe transportation. Families and health care professionals should be informed of basic guidelines for selecting restraints, positioning children into them, and securing these restraints in all types of vehicles, primarily the family vehicle and school bus.¹ Parents should be informed of the resources available for proper restraint of children with special health care needs during travel² and thereby avoid use of substandard products, makeshift restraint systems, or unsafe methods of securement in motor vehicles.

Federal Motor Vehicle Safety Standard (FMVSS) 213, which regulates design and performance of child restraint systems, does not recognize that children with special needs may require the use of special occupant restraint systems.³ The standard also does not regulate specific design and performance criteria for occupant protection devices that can provide safe seating for children with disabilities. Crash testing of car safety seats that meet FMVSS 213 has been done with test dummies representing children without special medical problems that would affect restraint use in motor vehicles. The biomechanical effects of a crash on test dummies representative of children with special medical needs in any restraint system have not been studied. Further research is needed, including development of such test dummies by the National Highway Traffic Safety Administration to address these concerns.

Children with special needs should not be exempt from the requirements of each state's laws regarding child restraint and seat belt use. Pediatricians can serve as resources for information to legislators, policy makers, and law enforcement professionals, as

well as school officials who may be unaware of the importance and availability of occupant protection systems for children with special needs.

IMPORTANT CONSIDERATIONS

1. The rear seat is the safest place for all children, and rear-facing car safety seats must never be placed in the front seat of a vehicle that has a front passenger air bag. The impact of a deploying air bag can severely injure or kill an infant or small child. Children may also be at risk of injury if they are out of position or lie against the door of a vehicle with a side air bag.
2. For a child with special health care needs who requires frequent observation during travel and for whom no adult is available to accompany the child in the back seat, an air bag on/off switch should be considered for the vehicle.
3. Instructions provided by the manufacturer of the vehicle and the manufacturer of the car safety seat must be followed.
4. Plans for procurement of the most appropriate restraint and training for the proper use of the device and its installation in the vehicle should be incorporated into hospital discharge planning for all children with special needs.⁴ Any child with a medical problem should have a special care plan that includes what to do during transport if a medical emergency occurs.
5. Parents, health care professionals, and educators should be encouraged to incorporate a child's special transportation needs into the individual education plan developed with the school.
6. There have been rapid changes in development and availability of resources for safer transportation of children with special needs. The current version of the American Academy of Pediatrics' "Car Seat Shopping Guide for Children With Special Needs" should be a helpful reference for health care professionals, parents, and school transportation providers.⁵
7. For additional information on transporting newborns or premature infants and children with special needs on school buses, refer to the appropriate policy statements by the American Academy of Pediatrics.^{6,7}

GUIDELINES FOR PROTECTION

Although research has been limited, current information suggests the following guidelines be adhered to when selecting an appropriate occupant protection system and positioning a child with special needs properly.

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

PEDIATRICS (ISSN 0031 4005). Copyright © 1999 by the American Academy of Pediatrics.

General: Infants and Young Children

1. The child restraint system should meet FMVSS 213.³ Standard child restraint devices may be used for many children with special health care needs, and, whenever possible, a standard child restraint is the preferable choice. Use of a "special" child restraint system for a child with health care needs often may be postponed until a child exceeds the physical limitations of a car safety seat.
2. Car restraint systems should not be modified or used in a manner other than that specified by the manufacturer unless the modified restraint system has been crash tested and has met all applicable Federal Motor Vehicle Safety Standards approved by the National Highway Traffic Safety Administration.
3. Infant-only car safety seats with capacity to recline are useful for infants with many medical problems, especially respiratory conditions. Some convertible car safety seats also can be used in the rear-facing position for children up to a weight of 13.5 kg (30 lb). These restraints may be especially useful for children with poor head and neck control.
4. If the child's head drops forward while in a rear-facing car safety seat because the position of the seat is too upright, a roll of cloth can be wedged in the vehicle seat crease and under the car safety seat base at the child's feet, so that the child reclines at no more than a 45° angle or as specified in the manufacturer's instructions (Fig 1).
5. Premature and small infants should not be placed in car safety seats with a harness-tray/shield combination or an armrest that could directly contact the infant's neck or face during an impact.^{4,7,8}
6. Car safety seats with five-point harnesses anchored at both shoulders, both hips, and between the legs, can be adjusted to provide good upper torso support for many children with special needs.

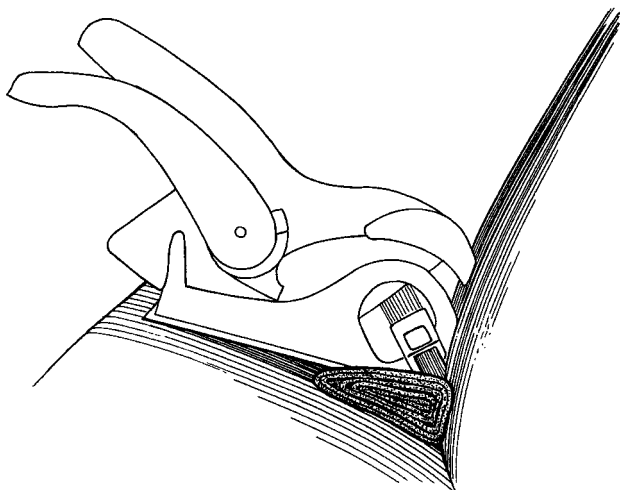


Fig 1. Rear-facing seat with wedge to recline seat at a 45° tilt.

General: Older Children and Adolescents

1. When a child has outgrown a car safety seat, other choices are available for proper and secure occupant restraint. Some systems provide for full support for the child's head, neck, and back and accommodate children up to 47.2 kg (105 lb). Others, such as the conventional E-Z-On Vest (E-Z-On Products, Jupiter, FL), can be used to provide additional trunk support for a child who already has stable neck control. Tethers, additional lap seat belts, or appropriate tie-down systems are required for some of these devices and should be a consideration for selection and proper use (Fig 2).
2. Some older children with disabilities can be transported in a special needs belt-positioning booster or a conventional belt-positioning booster for trunk support. The booster seats help to position the shoulder and lap belt across the child's chest and pelvis.
3. Conventional lap-shoulder belt systems may also be useful in providing for chest restraint of some children with special needs. Lap-shoulder belts should be used properly. Lap belts should be low and flat across the child's hips, and the shoulder belt should be snug across the chest. If a lap belt lies on the child's abdomen or if a shoulder belt rests on a child's neck, use of a belt-positioning booster seat will help assure proper placement of the belts. The shoulder belt should never be placed underneath the child's arm(s) or behind the child's back.

TRACHEOSTOMIES

Infants and children with a tracheostomy should not use child restraint systems with a harness-tray/shield combination or an armrest. On sudden impact, the child could fall forward causing the tracheostomy to contact the shield or armrest, possibly resulting in injury and a blocked airway.⁹ A rear-facing car safety seat with a three-point harness or a

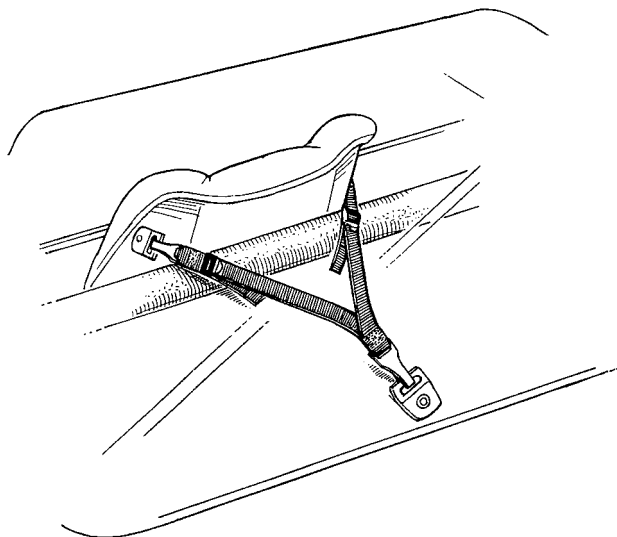


Fig 2. Large child forward-facing safety seat with tether anchored to vehicle.

car safety seat with a five-point harness should be selected for children with a tracheostomy.

MUSCLE TONE ABNORMALITIES

1. For toddlers with poor head control, a convertible car safety seat approved by the manufacturer for use in a semireclining position when facing forward may be beneficial.
2. Crotch rolls, made with a rolled towel or a diaper, may be added between the child's legs and the crotch strap to keep the hips against the back of the seat and prevent the child from slumping forward in the seat. This modification should be used for any child who cannot maintain appropriate posture.
3. Lateral support may be provided with rolled blankets, towels, or foam rolls (Fig 3).
4. Soft padding that does not alter the function of the harness may be positioned behind the neck and on either side of the head to promote anatomic alignment. However, padding should never be placed behind or under the child in the seat.¹⁰ Soft padding (such as blankets, pillows, or soft foam) compresses on impact and can prevent harness straps from maintaining a secure, tight fit on a child's body (Fig 3).
5. A foam roll or rolled blanket may be placed under a child's knees to inhibit hypertonicity or opisthotonic posturing (Fig 3).

PRONE AND SUPINE POSITIONING OF INFANTS

Infants who must lie prone after surgical repair of myelomeningocele or infants who must lie prone to maintain an open airway, such as those with Pierre Robin sequence, may require a restraint that allows prone positioning.^{5,11,12}

SPICA CASTS

1. For children with spica casts, a specially modified convertible car safety seat, the Spelcast (Snug Seat, Inc, Matthews, NC), has cut-away sides and seat



Fig 3. Child in convertible car seat with soft padding behind the neck, on either side of the head and along the sides to promote anatomic alignment. Foam roll or rolled blanket may be placed under knees to inhibit hypertonicity.



Fig 4. Child with spica cast seated in modified seat with cut-away sides and seat bottom.

bottom that provide room for a comfortable and snug fit into the restraint system (Fig 4). This seat fits infants up to a weight of 9.0 kg (20 lb) (rear-facing position) and toddlers who weigh up to 18.0 kg (40 lb) (front-facing position).

2. Many older toddlers and preschool and school-aged children in body or hip spica casts have limited resources available for safe transport in motor vehicles. One resource, the modified E-Z-On Vest, has performed satisfactorily during dynamic crash testing with a test dummy weighted to 47.2 kg (105 lb) and is available commercially. Two sets of seat belts routed through the vest are used to secure the child at the child's side against the vehicle seat. An ancillary belt loops around the casted leg or legs at the knees and is routed through the other seat belt (Fig 5). When it is not possible to fit a child onto a vehicle seat, use of an ambulance for transport is recommended. For lateral positioning on the vehicle seat (eg, as required by a car bed restraint or the modified E-Z-On Vest), position the child's head as far as possible from the side of the vehicle (Fig 6).

CHALLENGING BEHAVIOR

1. Older children with hyperactivity, autism, or emotional problems may require a safety restraint

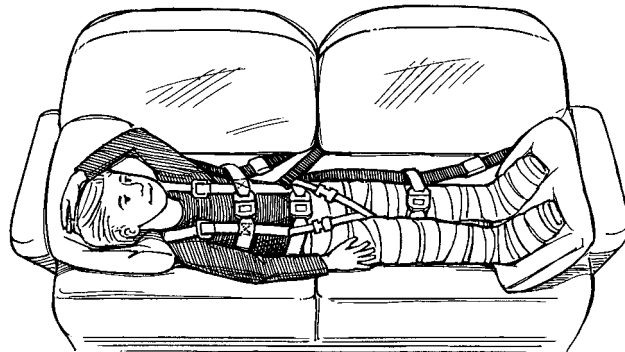


Fig 5. Child with modified E-Z-On Vest (E-Z-On Products, Inc, Jupiter, FL).

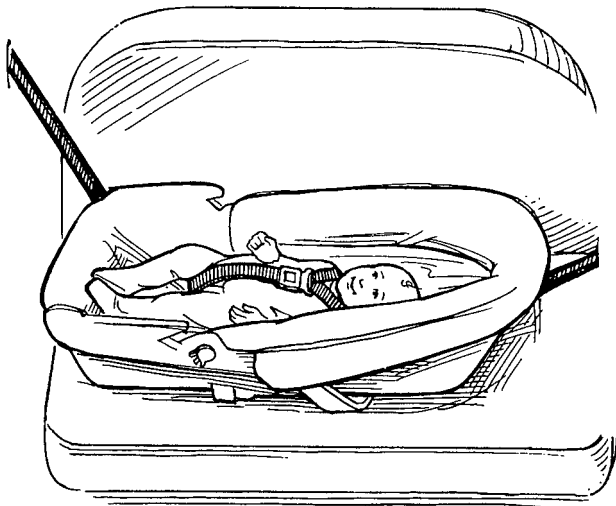


Fig 6. Infant positioned supine in the Ultra Dream Ride car bed (Cosco, Columbus, IN).

that is less likely to be unbuckled by the child. High back booster seats with internal harnesses that have seat belts routed underneath the seat base may be helpful in reducing the child's likelihood of unbuckling the restraint during travel. Large child car safety seats with a 5-point harness may be required for children weighing over 40 lb who cannot be restrained in a belt positioning booster seat with only a lap/shoulder harness.

2. Vests with rear back closure also may be helpful for use with children who have behavioral problems that may interfere with safe travel.⁵

WHEELCHAIR TRANSPORTATION

Any child who can assist with transfer or be "reasonably" moved from a wheelchair, stroller, or special seating device to the original manufacturer's forward-facing vehicle seat equipped with dynamically-tested occupant restraints or be "reasonably" moved to a child restraint system complying with FMVSS 213 requirement should be so transferred for transportation. The unoccupied wheelchair also should be secured adequately in the vehicle to prevent it from becoming a dangerous projectile in the event of a sudden stop or crash.¹³

Occupied wheelchair(s) should be secured in a forward-facing position. Any occupied wheelchair should be secured with four-point tie-down devices. Lap boards or metal or plastic trays attached to the wheelchair or to adaptive equipment should be removed and secured separately for transport. An occupant restraint system that has been tested at 30 mph and 20G force conditions and that includes upper torso restraint (ie, shoulder harness) and lower torso restraint (ie, a lap belt over the pelvis) should be provided for each wheelchair-seated occupant.¹⁴ Head bands should not be used to restrain the child's head separately from the torso.

EQUIPMENT TRANSPORTATION

1. When a child with special needs is in transit, ancillary pieces of medical equipment (eg, walkers, crutches, oxygen tanks, monitors) should be

secured on the vehicle floor; underneath a vehicle seat or wheelchair; or to the bus seat, bus floor, or bus wall below the window line so that they do not become a projectile during a crash and strike an occupant.

2. Electrical equipment for use during transit should have portable self-contained power for twice the expected duration of the trip. For improved safety, lead acid batteries or electrically powered wheelchairs or other mobile seating devices and respiratory systems should be converted, when possible, to gel-cell or dry-cell batteries. To house and protect batteries during everyday use, transportation, and collision, the use of external battery boxes is recommended.

RESOURCE AVAILABILITY

The National Easter Seal Society (800-221-6827) can assist identifying local community resources for procurement of specific restraint systems.⁵

COMMITTEE ON INJURY AND POISON PREVENTION, 1999-2000

Marilyn Bull, MD, Chairperson
Phyllis Agran, MD, MPH
Danielle Laraque, MD
Susan H. Pollack, MD
Gary A. Smith, MD, DrPH
Howard R. Spivak, MD
Milton Tenenbein, MD
Susan B. Tully, MD

LIAISON REPRESENTATIVES

Ruth A. Brenner, MD, MPH
National Institute of Child Health and Human Development
Stephanie Bryn, MPH
Maternal and Child Health Bureau
Cheryl Neverman, MS
National Highway Traffic Safety Administration
Richard A. Schieber, MD, MPH
Centers for Disease Control and Prevention
Richard Stanwick, MD
Canadian Paediatric Society
Deborah Tinsworth
US Consumer Product Safety Commission
William P. Tully, MD
Pediatric Orthopaedic Society of North America

SECTION LIAISON

Victor Garcia, MD
Section on Surgery

CONSULTANT

Murray L. Katcher, MD, PhD

REFERENCES

1. American Academy of Pediatrics, Committee on Injury and Poison Prevention. Selecting and using the most appropriate car safety seats for growing children: guidelines for counseling parents. *Pediatrics*. 1996;97:761-763
2. Stout JD, Bull MJ, Stroup KB. Safe transportation for children with disabilities. *Am J Occup Ther*. 1989;43:31-36
3. National Highway Traffic Safety Administration: Federal Motor Vehicle Safety Standards; child restraint systems; child restraint anchorage systems. *Federal Register*. 2127(1999)
4. American Academy of Pediatrics, Committee on Injury and Poison Prevention. Safe transportation of newborns at hospital discharge. 1999; 104:986-987
5. American Academy of Pediatrics. *Car Seat Shopping Guide for Children*

- With Special Needs* (brochure). Elk Grove Village, IL: American Academy of Pediatrics; 1998
6. American Academy of Pediatrics, Committee on Injury and Poison Prevention. School bus transportation of children with special needs. *Pediatrics*. 1994;93:129-130
 7. American Academy of Pediatrics, Committee on Injury and Poison Prevention and Committee on Fetus and Newborn. Safe transportation of premature and low birth weight infants. *Pediatrics*. 1996;97:758-760
 8. Weber K. Rear-facing restraint for small child passenger: a medical alert. *University of Michigan Transportation Res Inst Res*. 1995;25:12-17
 9. Stroup KB, Wylie P, Bull MJ. Car seats for children with mechanically assisted ventilation. *Pediatrics*. 1987;80:290-292
 10. Bull MJ, Stroup KB, Stout J, Doll JP, Jones J, Feller N. Establishing a special needs car seat loan program. *Pediatrics*. 1990;85:540-547
 11. Stroup KB, Weber K, Bull MJ. *Safe Transportation Solutions for Children With Special Needs*. In: 31st Proceedings of the American Association for Automotive Medicine; September 28-30, 1987; New Orleans, LA. Pages 297-307
 12. Bull MJ, Stroup KB, Everly JS, Weber K, Doll J. Child safety seat use for infants with Pierre Robin sequence. *Arch Pediatr Adolesc Med*. 1994;148:301-305
 13. American Academy of Pediatrics, Committee on Injury and Poison Prevention. School transportation safety. *Pediatrics*. 1996;97:754-757
 14. National Safety Council. *National Standards for School Buses and School Bus Operations*. Revised ed. Warrensburg, MO: Missouri Safety Center, Central Missouri State University; 1995

Transporting Children With Special Health Care Needs
Committee on Injury and Poison Prevention
Pediatrics 1999;104:988
DOI: 10.1542/peds.104.4.988

Updated Information & Services

including high resolution figures, can be found at:
<http://pediatrics.aappublications.org/content/104/4/988>

References

This article cites 9 articles, 6 of which you can access for free at:
<http://pediatrics.aappublications.org/content/104/4/988#BIBL>

Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):

Current Policy

http://www.aappublications.org/cgi/collection/current_policy

Council on Injury, Violence, and Poison Prevention

http://www.aappublications.org/cgi/collection/committee_on_injury_violence_and_poison_prevention

Children With Special Health Care Needs

http://www.aappublications.org/cgi/collection/disabilities_sub

For Your Benefit

http://www.aappublications.org/cgi/collection/for_your_benefit

Injury, Violence & Poison Prevention

http://www.aappublications.org/cgi/collection/injury_violence_-_poison_prevention_sub

Carseat Safety

http://www.aappublications.org/cgi/collection/carseat_safety_sub

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:

<http://www.aappublications.org/site/misc/Permissions.xhtml>

Reprints

Information about ordering reprints can be found online:

<http://www.aappublications.org/site/misc/reprints.xhtml>

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Transporting Children With Special Health Care Needs
Committee on Injury and Poison Prevention
Pediatrics 1999;104:988
DOI: 10.1542/peds.104.4.988

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://pediatrics.aappublications.org/content/104/4/988>

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 1999 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 1073-0397.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

