



# Transporting Children With Special Health Care Needs

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Children with special health care needs should have access to proper resources for safe transportation as do typical children. This policy statement reviews important considerations for transporting children with special health care needs and provides current guidance for the protection of children with specific health care needs, including those with airway obstruction, orthopedic conditions or procedures, developmental delays, muscle tone abnormalities, challenging behaviors, and gastrointestinal disorders.

All children, including those with special health care needs, should have access to proper resources for safe transportation. The purpose of this policy statement is to assist caregivers and health care providers in ensuring that children with special health care needs travel in appropriate restraints and are properly positioned and secured in the vehicles in which they ride. This statement supplements the current American Academy of Pediatrics policy statements "Child Passenger Safety" and "School Transportation Safety."<sup>1,2</sup> Primary care providers and subspecialists caring for children with special health care needs as well as parents should be aware of the resources available for proper restraint during travel so that the most appropriate and protective resources are selected for the child each and every ride. This guidance may be used to help parents, caregivers, and others responsible for the safe transportation of a child to avoid products that are inappropriate or incorrectly used, avoid discomfort, and avoid increased injury risk to children transported in motor vehicles.

For many children with special health care needs, a standard car safety seat (CSS) provides the best protection for most travel needs. Federal Motor Vehicle Safety Standard (FMVSS) 213 regulates the design and performance of child restraint systems for children weighing up to 80 lb.<sup>3</sup> Some children with special health care needs will need to use an occupant restraint system beyond 80 lb, and some manufacturers have tested their restraints for weights beyond those regulated by FMVSS 213.

## abstract

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Unfortunately, the biomechanical effects of a crash on test dummies representative of children with special medical needs in any restraint system have not been adequately studied. Further research is needed, including development of such test dummies by the National Highway Traffic Safety Administration (NHTSA), to address these concerns.

In March 2014, the “Hospital Discharge Recommendations for Safe Transportation of Children” was published by an expert working group convened by the NHTSA.<sup>4</sup> This policy was endorsed by the National Child Passenger Safety Board, the Children’s Hospital Association, and the National Safety Council. It recommends that hospitals that discharge children should have a hospital-based, multidisciplinary child passenger safety program. Hospital discharge policies and programs should be based on best practice recommendations by the American Academy of Pediatrics and NHTSA. Development and implementation of these policies requires planning, collaboration with appropriate staff, proper training, ongoing competency assessment, and the ability to secure funds and resources to sustain the program. Hospitals should consider having resources for conventional CSSs as well as child passenger safety restraints for children with special transportation needs related to their medical condition. All pertinent interactions between primary care providers, therapists, and child passenger safety technicians (CPSTs) should be documented in the child’s medical record. The ideal child passenger safety programs should maintain an inventory of necessary child passenger restraints, have access to custom medical transportation products, and conduct program evaluations to ensure alignment with both patient needs and best practice guidelines.<sup>4</sup> Pediatricians should consider

advocating within their local health care community to promote policies so that all children have access to an appropriate, correctly used CSS. In addition, assessment of transportation needs, procurement of the most appropriate restraint, and training for the proper use of the device and its installation in the vehicle may be incorporated into hospital discharge planning for all children with special needs.<sup>4</sup> Any child with a medical condition should have a special care plan that includes what to do during transport if a medical emergency occurs. The individual or group responsible for disseminating emergency plans can be determined at the time the child’s individualized education program is developed. Plans should be shared with all individuals who have responsibility for the safety and welfare of the child during transport.

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 to school officials, who may be less familiar with the importance and availability of occupant protection systems for children with special needs.

#### **GENERAL GUIDANCE FOR SAFE TRANSPORTATION OF CHILDREN WITH SPECIAL HEALTH CARE NEEDS**

1. All child restraint systems should meet FMVSS 213.<sup>3</sup> Standard child restraint devices may be used for many children with special health care needs, and whenever possible, a standard child restraint is preferable. Use of a custom or “special” child restraint system for a child with special health care needs often may be postponed until a child exceeds the physical limitations of a standard CSS. CSSs with 5-point harnesses can be adjusted

to provide good upper torso support for many children with special needs. American Academy of Pediatrics recommendations state that all children should ride rear facing in a CSS as long as possible until they exceed the weight, length, and/or height of that seat as recommended by the seat’s manufacturer. These recommendations are based on expert opinion, highway crash data analysis, and sled crash tests.<sup>1,5,6</sup> Objective data from crash tests have shown that a rear-facing CSS provides support to the head and spine that significantly reduces neck loading in crashes that have a frontal component. By extension, small children with neuromuscular conditions will likely be at increased injury risk if forward facing. Thus, riding in a rear-facing CSS should be strongly encouraged as long as possible for these children until they exceed the weight and length limits of the device.

2. When a child has outgrown the length or weight limits of a conventional CSS with an internal 5-point harness, other resources are available for proper and secure occupant restraint. Some systems provide full support for the child’s head, neck, and back, accommodate children up to 115 lb, and may be customized to meet a child’s particular needs. Others, such as the conventional travel vests or specialized medical seating systems, 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 may be considerations for selection and proper use.<sup>7,8</sup>
  - a. Large medical CSSs are an option for occupants who

require additional positioning support once they exceed the manufacturer's weight and length recommendations of standard CSSs. Positioning accessories, such as abductor wedges, support pads, and seat depth extenders, are available to provide a child with a more customized fit.

- b. Some older children with disabilities who have poor trunk control can be transported in a special needs belt-positioning booster or a conventional belt-positioning booster with trunk support. These booster seats help ensure proper positioning of the vehicle shoulder and the lap belt across the child's chest and pelvis. Depending on the type of booster seat, positioning accessories may be available to help maintain posture and comfort. A CPST with additional training in the transportation of children and adolescents with special health care needs could be a resource to the providers and family in choosing the most appropriate vehicle occupant restraint system. Resources to locate local CPST support are located at the end of this policy statement.<sup>7</sup>
- c. Many older children and adolescents can be safely transported by using conventional lap-and-shoulder belt systems. Lap-and-shoulder belts should be used properly; the lap belt should be low and flat across the child's hips, and the shoulder belt should be snug across the chest. If the lap belt lies on the child's abdomen or the shoulder belt rests on the child's neck, the child must use either a belt-positioning booster or a different CSS. The

shoulder belt should never be placed underneath the child's arms or behind the child's back.<sup>9</sup>

3. Vehicle passengers should never be transported in a reclined vehicle seat. During a crash, the lap-and-shoulder belt system will not be positioned properly, thus imperiling the occupant.<sup>9</sup>
4. The rear seat is the safest place for all children, and children should never ride in the front seat until they are at least 13 years of age.<sup>1</sup> A rear-facing CSS may 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.<sup>1,9</sup> Children may also be at risk for injury if they are out of position or lie against the door of a vehicle with a side air bag. For specific information, consult both the vehicle operator's manual and CSS manual.
5. 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 FMVSSs approved by the NHTSA.<sup>9</sup>
6. 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, seating in the front seat may be considered; however, an air bag on-off switch should be considered for the vehicle. This can only be considered after the NHTSA approves a petition to disable the air bag.<sup>10</sup>
7. Recommendations and guidelines provided by the manufacturer of the vehicle and the manufacturer of the CSS should always be followed.<sup>1,9</sup>

8. Parents, health care providers, and educators should be encouraged to incorporate a child's special transportation needs into his or her individualized education program developed with the school.
9. For additional information on transporting low birth weight or preterm infants, refer to the appropriate policy statements by the American Academy of Pediatrics.<sup>11</sup>
10. Children with special health care needs may travel on commercial airlines. Each airline has its own policies in accordance with Federal Aviation Administration regulations regarding the use of assistive devices on a commercial aircraft. The use of medical assistive devices is allowed under the Air Carrier Access Act (14 CFR §382).<sup>12</sup> Caregivers may be advised to refer to the Federal Aviation Administration Web site for regulations regarding air travel for individuals with disabilities ([www.transportation.gov/airconsumer/disability](http://www.transportation.gov/airconsumer/disability)).

#### **GUIDANCE FOR SAFE TRANSPORTATION OF CHILDREN WITH SPECIFIC MEDICAL CONDITIONS**

Although research has been limited, current information suggests the following guidance when selecting an appropriate occupant protection system and positioning a child with special needs properly in the vehicle.

#### **Airway Obstruction**

Airway obstruction may occur in infants, children, or adolescents for many reasons. Conditions encountered may include hypotonia, craniofacial abnormalities, or primary airway problems. There are many ways to maintain a stable airway during the vehicle transport of an affected child. If there is any concern about airway or respiratory compromise during vehicle transport,

an evaluation should be performed before the child is discharged.<sup>11</sup> This evaluation should include a multidisciplinary team, including someone with advanced training in the transportation of children with special health care needs. For infants and young children, a car seat study using the child's CSS at the angle recommended for use in the vehicle seat during travel should be performed.<sup>11</sup> Abnormal results need to be addressed by the care team and may require coordination with the child's medical home. CSSs that are only rear facing with multiple recline options are useful for infants with many medical problems, especially respiratory conditions. Sometimes a firm, lightweight object such as a rolled towel or Styrofoam pool noodle can be placed in the vehicle seat crease to adjust the angle in accordance with manufacturers' instructions.<sup>9</sup> Convertible CSSs also can be used in the rear-facing position for children and can accommodate weights up to approximately 50 lb. These restraints may be especially useful for children with poor head and neck control. If a child has a specific medical condition such as Pierre Robin sequence and requires prone positioning for transport, the infant will need to be placed in a car bed and must be tested in the car bed before discharge.

Infants and children with a tracheostomy tube should not use child restraint systems with a harness or seat belts that could make contact with the tube and cause it to dislodge. An occupational therapist or CPST with training and experience in the safe transportation of children with special needs could provide guidance for best seat selection. Even with typically developing children, the risk of airway obstruction exists<sup>13</sup>; therefore, all children should use their CSSs only for travel and should not be left in the CSSs outside of the vehicle.<sup>9</sup> Children with significant

airway obstruction or who have a tracheostomy should have a trained person with them at all times who can relieve the obstruction and monitor the airway. These caregivers should be trained in the emergency replacement of the tracheostomy tube if it comes out during travel.<sup>7,8</sup>

### **Muscle Tone Abnormalities**

Muscle tone abnormalities, including both hypo- and hypertonia, can affect infants, children, or adolescents for many reasons. Muscle tone varies with each child and can fluctuate during the day. Airway issues in children with abnormal muscle tone may lead to airway obstruction. (Please refer to the previous section on airway obstruction for guidance.) For most situations, the infant or toddler with hypotonia will be safest in the rear-facing orientation within the vehicle as long as the height and weight of the patient does not exceed the CSS manufacturer's recommendations. Some manufacturers allow their forward-facing CSSs to be used in a semireclined position; these can be useful for larger toddlers with poor head control. 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.<sup>9</sup> Lateral support may be provided with rolled blankets, towels, or foam rolls to ensure proper upright positioning of the child. However, padding should never be placed between the child and the CSS.<sup>9</sup> Soft padding (such as blankets, pillows, or soft foam) compresses on impact and prevents harness straps from maintaining a secure, tight fit on a child's body. Only products that come with the seat or are sold by the manufacturer for use with the specific seat should be used.<sup>9</sup> Also, head bands or stiff cervical collars may not be used to restrain the child's head. For children with increased muscle tone whose opisthotonic posturing

makes sitting in a CSS difficult, a foam roll or rolled blanket under the child's knees may help with positioning.<sup>14</sup> Children with cerebral palsy or spina bifida may have scoliosis that makes it difficult to be seated in a conventional CSS. A large medical seat or an adaptive restraint may need to be obtained. Large medical seats can be customized to suit the individual needs of occupants who require positioning support beyond that offered by a conventional restraint system. For children who have sufficient head, neck, and trunk support to sit upright during travel but need supplemental support, adaptive belt-positioning booster seats may suffice. Like all belt-positioning booster seats, these seats must be used only with both the lap-and-shoulder belt system of the vehicle.<sup>9</sup> These adaptive boosters are easier to transfer between vehicles and may be an option for children who often ride in many vehicles. Use of car beds, large medical seats, and adaptive boosters may require an order by a physician and a letter of medical necessity. It is important that a rehabilitation therapist with training in the safe transportation of children with special health care needs be included in the evaluation, ordering, and implementation of the seat.<sup>7</sup>

### **Gastrointestinal Issues**

Many children with special health care needs suffer from emesis or severe gastroesophageal reflux or have gastrostomy feeding tubes. The angle at which the infant or child sits in the CSS may increase the intra-abdominal pressure and aggravate the reflux.<sup>15-17</sup> Solutions to addressing these issues can include waiting a period of time after feeding before traveling, optimizing the medical management of reflux, changing the angle that the infant or child travels with a CSS that allows multiple options for angle of recline, or using a car bed. Because there is potential for increased



gastroesophageal reflux during the time the child is in the CSS, the restraint device should only be used for travel, and the infant or child should be removed from the CSS when at the destination. Gastrostomy tubes may affect the CSS harness fit. It is important to select a CSS that does not have a harness that rubs against the feeding tube. Families should have an emergency plan to be able to replace the tube or to cover the stoma if the tube comes out during travel.

### **Casts**

Casts are often applied to a patient for a variety of circumstances, whether to maintain a bony alignment postoperatively or to allow a bone to heal after trauma. For most situations, the cast will not interfere with the use of a CSS. However, there are circumstances when a cast interferes with positioning the child in a CSS.

For children with spica casts, frequently the side of the CSS prevents proper positioning because of the fixed flexion and abduction of the femurs. Consultation with occupational therapists specially trained in the transportation requirements of children with special health care needs could be helpful in the selection of a CSS or an alternative that will provide protection and comfort during motor vehicle transportation. Availability of specialty CSSs can be labile, as new models are introduced and existing products are removed from the marketplace, and consultation with individuals familiar with current products will be helpful. Consideration of hospital-based loaner programs that obtain and maintain specialty seating systems should be considered to provide appropriate CSSs as needed.<sup>4</sup>

Planning for the transportation needs of the child before discharge may help prevent delays in leaving the facility.

Many older children and youth in body or hip spica casts have limited

resources available for safe transport in motor vehicles. Often, these children have outgrown the weight and height limits or simply do not fit into a conventional seat. Older children who might be able to correctly use the vehicle seat belt may not be able sit upright as required. A travel vest or harness can be a reasonable alternative for many such children. Such vests can accommodate a child sitting in a vehicle seat from 2 years of age and from 20 to 168 lb. This restraint system will not be appropriate for children with poor head, neck, or trunk control.

Another vest-style option for a child who must travel lying down is available commercially. The child must be able to fit lengthwise on a vehicle bench seat perpendicular to the direction of the vehicle. These vests are available for children 1 to 12 years of age who weigh between 20 and 100 lb. Two sets of seat belts are routed through the vest to secure the child at his or her 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. When it is not possible to fit a child onto a vehicle seat, use of an ambulance for transport is recommended.

### **Challenging Behavior**

Children may exhibit behaviors that preclude safe use of a particular CSS, are distracting to the driver, or otherwise place the child or passengers at risk. Although challenging behaviors can be observed among typical children, these behaviors can also be seen in children with developmental delay (or intellectual disability), autism, or emotional problems and may include impulsive, hyperactive, aggressive, and noncompliant behaviors in the vehicle, making transportation dangerous. In-depth discussions with parents or caregivers, teachers, therapists, or psychologists may be

helpful to identify triggers and develop strategies to possibly avoid inappropriate behavior. Monitors or aides trained in behavioral techniques and both qualified and capable of meeting the child's specific needs may be needed to help ensure safe transport. Although many of these children can be safely transported in standard CSSs, children with severe behavioral challenges may require specialized restraints during travel. Use of standard CSSs with higher-weight internal harnesses or large medical seats may be useful for some older and larger children who will not remain seated in a booster seat or seat belt. Families should never modify the CSS to make it more difficult to escape.<sup>9</sup> In addition, travel vests with rear back closure and a floor mount tether also may be helpful for use with children who have behavioral problems that interfere with safe travel.

### **Wheelchair Transportation**

Any child who can assist with transfer, be reasonably moved from a wheelchair, stroller, or special seating or mobility device to the 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 transferred accordingly for transportation. In these cases, "reasonably" implies that the child can be moved from the wheelchair to the bus seat or occupant restraint without significant discomfort or risk of injury to either the child or caregiver. 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.<sup>18</sup>

If the child must travel in a wheelchair, it should be secured in a forward-facing position. It is also recommended that the child or adolescent be transported in a transit option wheelchair. Transit option

wheelchairs have been specifically designed for vehicle transport and are thus safer to use in a vehicle than a wheelchair without a transit option.<sup>18</sup> Transit option wheelchairs should comply with American National Standards Institute/Rehabilitation Engineering and Assistive Technology Society of North America WC19, a voluntary standard to ensure that the design and performance requirements for use in motor vehicles are met.<sup>19</sup> If a transit option wheelchair is not available, the wheelchair should have a metal frame to which tie-down straps and hooks can be attached at frame junctions. Tie-down straps, restraint belts, and wheelchairs that meet current standards should be used during transport.<sup>20</sup> Any occupied wheelchair should be secured with 4-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.<sup>21</sup> An occupant restraint system 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. Head bands or stiff cervical collars may not be used to restrain the child's head separately from the torso or support the head.

## EQUIPMENT TRANSPORTATION

1. When transporting a child with special needs, ancillary pieces of medical equipment (eg, walkers, ventilators, pumps, oxygen tanks, monitors) should be secured on the vehicle floor or, if allowed by the vehicle manufacturer, underneath a vehicle seat or wheelchair or below the window line. These devices can become projectiles during a crash and can strike an occupant, making safe storage a critical consideration. In most passenger vehicles, the safest option is the vehicle trunk. The driver or caregiver should refer to the vehicle owner's manual or

consult the vehicle manufacturer to identify proper locations and methods for the safe storage of equipment.<sup>14</sup>

2. Children who require electricity-powered medical equipment for use during transit should have portable self-contained power for twice the expected duration of the trip as well as a fully charged backup system with them. Additionally, the child's medical equipment should include a connector to attach medical equipment to the vehicle power source in case of an emergency. The caregiver should contact the vendor, medical equipment provider, or manufacturer for the appropriate equipment. For improved safety, lead acid batteries, electricity-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.<sup>21</sup>

## CONCLUSIONS

It is essential that all children have the opportunity to be transported in the safest possible way. For children with special health care needs, life includes all the components that any other child enjoys. It must be ensured that they have access to the expertise and means to travel safely to help them achieve their greatest potential.

## RESOURCE AVAILABILITY

Resources can be found at the National Center for Transportation of Children with Special Health Care Needs, Riley Hospital for Children, Indiana University School of Medicine (1-800-755-0912), or <https://preventinjury.pediatrics.iu.edu/special-needs/>, which includes

photographs of specialized products for children with special needs.

Additional resources can be found at the Rehabilitation Engineering Research Center on Wheelchair Transportation Safety and the University of Michigan Transportation Research Institute. A detailed brochure on the use of a wheelchair as a transportation device on the bus or the family vehicle is available at <http://www.travelsafer.org>.

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## ABBREVIATIONS

CPST: child passenger safety technician  
CSS: car safety seat  
FMVSS: Federal Motor Vehicle Safety Standard  
NHTSA: National Highway Traffic Safety Administration

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