

Safe Transportation of Premature and Low Birth Weight Infants

Committee on Injury and Poison Prevention and Committee on Fetus and Newborn

ABSTRACT. Special considerations are essential to ensure the safe transportation of premature and low birth weight infants. Both physical and physiologic issues must be considered in the proper positioning of these infants. This statement discusses current recommendations based on the latest research and provides guidelines for physicians who counsel parents of very small infants on the choice of the best car safety seats for their infants.

Improved survival rates and earlier discharge of premature infants have increased the number of infants weighing less than 2500 g who are being transported in private vehicles. To ensure that these infants are transported safely, specific guidelines regarding the proper selection and use of car safety seats and other occupant restraint devices for this population are warranted.

Currently, Federal Motor Vehicle Safety Standard 213, which established design and dynamic performance requirements for child restraint systems, applies to children weighing up to 50 lb but has no minimum weight limit established in the standard. Most safety restraints on the market are designed for infants weighing more than 7 lb (3.1 kg),^{1,2} and only recently have studies been done that allow some prediction of the protective capabilities of restraint devices for infants weighing less than 7 lb. Research has indicated that some infants, particularly premature and low birth weight infants, may be subject to oxygen desaturation when placed in a semiupright position in car safety seats.³⁻⁵ Both growth and neurologic maturation may influence the potential risk of respiratory compromise in seating devices. Further investigation is necessary to define precisely the population at risk and the situations in which risk occurs.

Several specific recommendations can be made regarding transportation of infants at possible risk of respiratory problems:

1. Current information suggests that each preterm infant born at less than 37 weeks' gestation should have a period of observation in a car safety seat before hospital discharge to monitor for possible apnea, bradycardia, or oxygen desaturation. An appropriate hospital staff person should conduct the observation. Hospitals should develop policies to include this evaluation in their discharge planning

process.⁵ An Academy-endorsed video, "Special Delivery: Safe Transportation of Premature and Small Infants," contains additional information on this topic.⁶

2. Families should minimize travel for infants at risk of respiratory compromise.

3. Infants with documented desaturation, apnea, or bradycardia in a semiupright position should travel in a supine or prone position in an alternative safety device. The use of other upright equipment, including infant swings, infant seats, and infant carriers, should be avoided.

Alternative child restraint devices are available for infants who must travel in a prone, supine, or semiupright position. Specific information regarding currently available restraint systems can be obtained from the American Academy of Pediatrics brochure, "Family Shopping Guide to Car Seats."⁷

If a semiupright position can be maintained safely by the infant, a conventional car safety seat that allows for proper positioning of the low birth weight infant should be selected. Better observation of the infant is possible when the child is in a rear-facing car safety seat adjacent to an adult rather than in a car bed. (See guideline 7 in this statement for information on passenger-side front air bags.)

4. Infants for whom home cardiac and apnea monitors are prescribed should use this monitoring equipment during travel and have portable, self-contained power available for twice the duration of the expected transport time.

5. Because commercially available securement systems for all portable medical equipment such as monitors and oxygen tanks are limited and not designed for use in motor vehicles, such equipment should be wedged on the floor or under the vehicle seat to prevent it from becoming a dangerous projectile in the event of a crash or sudden stop.

Proper positioning of small infants in car safety seats is important to minimize the risk of respiratory compromise while providing protection in the event of a crash or sudden stop. Specific guidelines for selecting car safety seats and positioning small infants in them include the following:

1. Infant-only car safety seats with three-point harness systems or convertible car safety seats with five-point harness systems provide optimum comfort, fit, and positioning for the premature or small infant. A small infant should not be placed in a car safety seat with a shield, abdominal pad, or arm rest that could directly contact an infant's face and neck during an impact. Similarly, car safety seats designed

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.

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for use only by children who weigh more than 20 lb should not be used for small infants.

2. Car safety seats with a distance of less than 5½ in from the crotch strap to the seat back should be selected to reduce the potential of slumping forward of the low birth weight infant (Fig 1). A small rolled diaper or blanket between the crotch strap and the infant may be added to reduce slouching (Fig 2).

3. Car safety seats with a distance of less than 10 in from the lower harness strap to the seat bottom should be selected to reduce the potential of harness straps crossing the infant's ears (Fig 1).

4. The infant should be properly positioned in the car safety seat, with buttocks and back flat against the back of the car safety seat. Blanket rolls may be placed on both sides of the infant to provide lateral support for the head and neck (Fig 2).

5. In rear-facing car safety seats for infants, shoulder straps must be in the lowest slots until the infant's shoulders are above the slots; the harness must be snug; and the car safety seat's retainer clip should be positioned at the midpoint of the infant's chest, not on the abdomen or in the neck area (Fig 2).

6. If the vehicle seat slopes so that the infant's head flops forward, the car safety seat should be reclined halfway back, at a 45° tilt. Until engineering modifications can be implemented to prevent this problem, a firm roll of cloth or newspaper can be wedged under the car safety seat below the infant's feet to achieve this angle (Fig 3).

7. A rear-facing car safety seat must not be placed in the front passenger seat of any vehicle equipped with a passenger-side front air bag because of risk of death or serious injury from the impact of the air bag



Fig 2. Car safety seat with retainer clip positioned on the infant's chest.

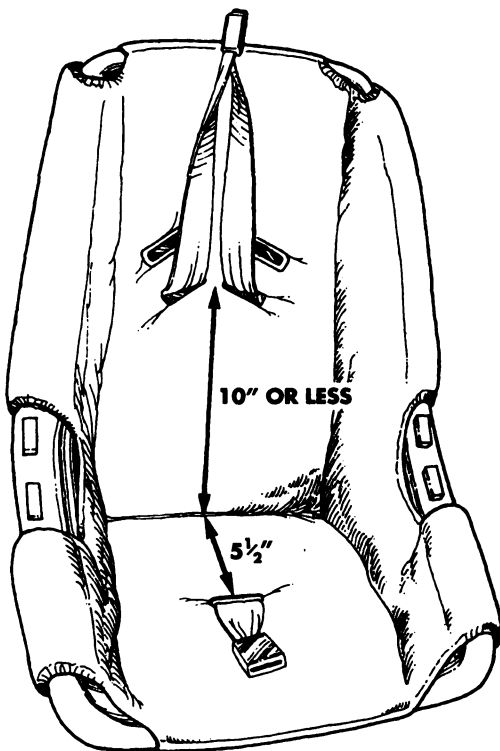


Fig 1. Car seat with a distance of 5½ in or less from the crotch strap to the seat back and 10 in or less from the lower harness strap to the seat bottom.

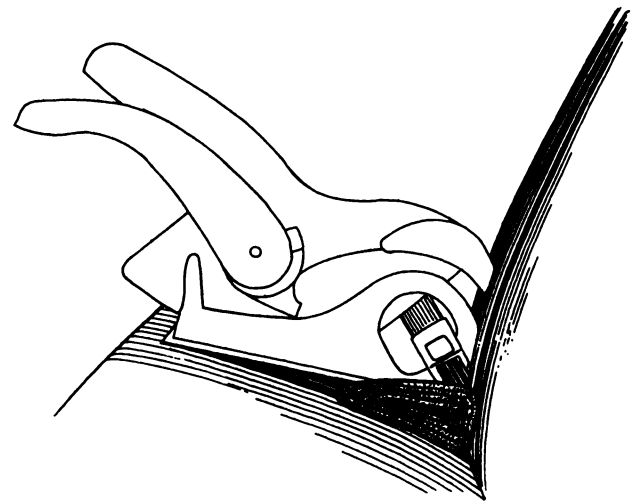


Fig 3. Seat with wedge to recline seat halfway back at a 45° tilt.

against the safety seat. All infants weighing less than 20 lb and younger than 1 year of age must ride rear facing when secured in standard car safety seats. Infants who weigh 20 lb before 1 year of age should ride rear facing in convertible seats or infant seats approved for higher weights until 1 year of age.⁸ The rear seat is the safest position in which a child can ride in a vehicle, and whenever possible, parents should arrange for an adult to be seated in the rear seat adjacent to the infant to observe the child closely.

8. An infant should never be left unattended in a car safety seat.

The recommendations provided in this statement are proposed for premature and low birth weight

infants. The safe transportation of children with respiratory compromise due to neuromuscular and orthopedic problems is addressed in the policy statement, "Safe Transportation of Children With Special Needs."⁹ Specific additional technical information on this topic also can be found in the Academy's speaker's and resource kit, "Child Restraint Systems: Getting It Right."¹⁰

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REFERENCES

1. Bull MJ, Stroup KB. Premature infants in car seats. *Pediatrics*. 1985;75:336-339
2. Bull MJ, Weber K, Stroup KB. Automotive restraint systems for premature infants. *J Pediatr*. 1988;112:385-388
3. Willett LD, Leuschen MP, Nelson LS, Nelson RM. Risk of hypoventilation in premature infants in car seats. *J Pediatr*. 1986;109:245-248
4. Willett LD, Leuschen MP, Nelson LS, Nelson RM. Ventilatory changes in convalescent infants positioned in car seats. *J Pediatr*. 1989;115:451-455
5. Bass JL, Mehta KA, Camara J. Monitoring premature infants in car seats: implementing the American Academy of Pediatrics policy in a community hospital. *Pediatrics*. 1993;91:1137-1141
6. Automotive Safety for Children Program. *Special Delivery: Safe Transportation of Premature and Small Infants*. Indianapolis, IN: Automotive Safety for Children Program, Riley Hospital for Children; 1991. Videotape and booklet
7. American Academy of Pediatrics. *Family Shopping Guide to Car Seats: 1996*. Elk Grove Village, IL: American Academy of Pediatrics; 1996. Brochure
8. Weber K. Rear-facing restraint for small child passengers—a medical alert. *Univ Mich Transportation Res Inst Res Rev*. 1995;25:12-17
9. American Academy of Pediatrics. Transporting children with special needs. *AAP Safe Ride News Insert*. 1993;Winter
10. American Academy of Pediatrics. *Child Restraint Systems: Getting It Right*. Speaker's and resource kit. Elk Grove Village, IL: American Academy of Pediatrics. In press

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