

New Recommendations on Motor Vehicle Safety for Child Passengers

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Despite significant reductions in the number of children killed in motor vehicle crashes over the past decade, these crashes continue to be the leading cause of death for children and adolescents older than three years in the United States.¹ In 2010, more than 4,000 children and adolescents younger than 21 years died in motor vehicle crashes,² and an additional 600,000 were injured.¹ Promoting age-appropriate use of motor vehicle restraints for children of all ages, particularly those who would benefit from child safety seats and booster seats, is a cornerstone in making further progress in motor vehicle safety. For example, among children younger than five years, child safety seats saved an estimated 219 lives in 2008. If 100 percent of children younger than five years were using child safety seats in 2008, an estimated 323 lives could have been saved.³

Significant increases in the use of motor vehicle restraints in children, particularly booster seats among older children, have occurred over the past decade in response to public education programs, enhanced product availability, and improvements in child restraint laws in nearly every state.⁴⁻⁶ In addition, there has been a substantial increase in the scientific evidence on which to base recommendations for best practices in child passenger safety. Therefore, in 2011, the American Academy of Pediatrics (AAP) published updated recommendations for optimal protection of children in motor vehicles.^{7,8} To facilitate their widespread implementation in practice, the AAP presented recommendations in the form of an algorithm.

The AAP identified the following five evidence-based recommendations to optimize safety in passenger vehicles for all children, from birth through adolescence⁷:

- All infants and toddlers should ride in a rear-facing child safety seat until they are two years of age or until they reach the weight or height limit allowed by the seat's manufacturer.
- All children two years or older (or those younger than two years who have reached their rear-facing seat's weight or height limit) should use a forward-facing child safety seat with a harness for as long as possible, until

they reach the weight or height limit allowed by the seat's manufacturer.

- All children who reach the weight or height limit of their forward-facing child safety seat should use a belt-positioning booster seat until the seat belt fits properly, typically when the child is 4 ft, 9 in tall and between eight and 12 years of age.

- When children are old enough and large enough to use the seat belt without a safety seat or booster, they should always use the lap and shoulder belts.

- All children younger than 13 years should ride in the rear seats of vehicles for optimal protection.

Of note, the recommendation that all children younger than two years be restrained in a rear-facing, infant-only or convertible child safety seat is a significant change in wording from previous AAP policy, and was based on data from the United States,⁹ as well as extensive experience in Sweden.^{10,11} There are several developmental characteristics that put young children at risk of head and spinal cord injury in a motor vehicle crash, including incomplete vertebral ossification, more horizontally oriented spinal facet joints, and excessive ligamentous laxity. Facing the rear of the vehicle provides more support to a young child's torso, neck, and head. Children in forward-facing safety seats were more likely to be seriously injured in all crash types when compared with children in rear-facing safety seats (odds ratio = 1.76; 95% confidence interval, 1.40 to 2.20).⁹ When children 12 to 23 months of age were analyzed separately, those who were restrained in forward-facing child safety seats were more likely to be seriously injured (odds ratio = 5.32; 95% confidence interval, 3.43 to 8.24). It is important to note that most available rear-facing child safety seats have weight limits that can accommodate the new recommendations.¹²

Because motor vehicle safety for children is multifaceted and will continue to evolve, family physicians should familiarize themselves with additional resources to maintain their knowledge and to address unique situations that may not be covered by the child safety seat algorithm. In particular, many communities have child passenger safety technicians who have completed a standardized National Highway Traffic Safety Administration course and who can provide hands-on advice and guidance to families. You can search for safety seat inspection sites in your community at <http://www.seatcheck.org>, <http://www.nhtsa.dot.gov/cps/cpsfitting/index.cfm>, or <http://www.safekidsweb.org/events/events.asp>. ►

Editorials

Family physicians play a critical role in promoting child passenger safety. They must maintain a basic level of knowledge of best practice recommendations and promote and document them at every health supervision visit. Interested family physicians can also use this information to promote public education, legislation, and regulation at local, state, and national levels through a variety of advocacy activities, including ensuring that their state's child passenger safety law is aligned with best-practice recommendations.

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REFERENCES

- Centers for Disease Control and Prevention. Injury prevention and control: data and statistics (WISQARS). <http://www.cdc.gov/injury/wisqars/index.html>. Accessed March 21, 2012.
- National Highway Traffic Safety Administration. Fatality analysis reporting system (FARS) encyclopedia. <http://www-fars.nhtsa.dot.gov/Main/Index.aspx>. Accessed March 21, 2012.
- National Highway Traffic Safety Administration. Traffic safety facts. 2008 data. Occupant protection. <http://www-nrd.nhtsa.dot.gov/Pubs/811160.pdf>. Accessed June 18, 2012.
- Durbin DR, Kallan MJ, Winston FK. Trends in booster seat use among young children in crashes. *Pediatrics*. 2001;108(6):e109.
- Winston FK, Chen IG, Elliott MR, Arbogast KB, Durbin DR. Recent trends in child restraint practices in the United States. *Pediatrics*. 2004;113(5):e458-e464.
- Insurance Institute for Highway Safety, Highway Loss Data Institute. Safety belt and child restraint laws. <http://www.iihs.org/laws/SafetyBeltUse.aspx>. Accessed March 21, 2012.
- Durbin DR; Committee on Injury, Violence, and Poison Prevention. Child passenger safety. *Pediatrics*. 2011;127(4):788-793.
- Durbin DR; Committee on Injury, Violence, and Poison Prevention. Child passenger safety. Technical report. *Pediatrics*. 2011;127(4):e1050-e1066.
- Henary B, Sherwood CP, Crandall JR, et al. Car safety seats for children: rear facing for best protection. *Inj Prev*. 2007;13(6):398-402.
- Isaksson-Hellman I, Jakobsson L, Gustafsson C, Norin H. Trends and effects of child restraint systems based on Volvo's Swedish accident database. Warrendale, Pa.: Society of Automotive Engineers; 1997:316.
- Jakobsson L, Isaksson-Hellman I, Lundell B. Safety for the growing child: experiences from Swedish accident data. Washington, DC: National Highway Traffic Safety Administration; 2005.
- American Academy of Pediatrics. Car seats: product listing for 2012. <http://www.healthychildren.org/English/safety-prevention/on-the-go/Pages/Car-Safety-Seats-Product-Listing.aspx>. Accessed March 21, 2012. ■

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