



## 2007 HSR Impact Awardee

# Child Passenger Safety

### SNAPSHOT OF SUCCESS

#### Crash Surveillance System Leads to Improved Design and Regulation of Vehicular Child Restraints and Air Bags

#### THE ISSUE

*Motor vehicle crashes are the principle cause of death and disability for children older than one year. Federal government data reveal that almost half of children between the ages of 4 and 8 who were killed in vehicular crashes in 2001 were unrestrained. PCPS studies have demonstrated that using age- and size-appropriate child restraints can reduce the risk of injury to children resulting from a motor vehicular crash to less than one percent. Inappropriate use of adult seat belts for restraining children less than 4'9" also poses a significant threat to their safety. In fact, children ages 4 through 7 years who are restrained using booster seats are 59 percent less likely to be injured than child who use seat belts alone. While better than no restraint, poorly fitting adult seat belts leave children vulnerable to serious abdominal and spinal injuries, referred to as 'seat belt syndrome.'*



Partners for Child Passenger Safety (PCPS) is the largest child-specific vehicular crash surveillance system in the world. What began as a partnership in 1997 with the goal of understanding why motor vehicle crashes are the leading cause of death and disability in children over age one in the United States, is now a child-focused crash surveillance system that innovatively links a multi-disciplinary team of health services researchers with the automobile insurance industry. PCPS exemplifies the power of health services research to improve health and safety for our most vulnerable populations, in this case children. The work of this innovative partnership also demonstrates that health services research can have a significant impact outside of the medical setting.

PCPS is a partnership between The Children's Hospital of Philadelphia, the University of Pennsylvania, and State Farm Mutual Automobile Insurance Company. In addition to serving as a national resource for child safety, the efforts of PCPS have led to improved design and regulation of vehicular child restraints and air bags. PCPS encompasses a team of experts in the fields of medicine, epidemiology, biomechanics, engineering, and behavioral science.

Flaura Koplin Winston, M.D., Ph.D. serves as principal investigator for PCPS. A leader in the field of child occupant protection, Dr. Winston is a physician scientist with the Center for Injury Research and Prevention at The Children's Hospital of Philadelphia and the University of Pennsylvania School of Medicine. Dr. Winston was one of the first child safety experts to raise

the alarm about the dangers of front passenger air bags to children. In fact, a child's risk of injury is reduced by one-third when moved from the front to rear seat. The work of Dr. Winston and PCPS has contributed to a decline in the proportion of 4 to 8 year olds riding in the front passenger seat from 18 percent in 1999 to 6 percent in 2005.

Each day the PCPS research team collects information from the State Farm Mutual Automobile Insurance Company on almost 200 children involved in crashes across 15 states in the Eastern, Midwestern, and Western United States. Information gathered by the team includes claims for children involved in vehicular crashes who are under age 16 and who are represented by State Farm Insurance. The research team uses privacy safeguards and, with consent from policyholders, obtains electronic information about the crashes from State Farm headquarters. Cases are then selected to participate in in-depth phone interviews or for on-site crash investigations. As of December 31, more than 455,000 State Farm customers had participated in the study. In all, crashes represented in the study involve 669,000 children. The study includes more than 29,000 interviews and more than 800 crash investigations.

Findings from the PCPS database have increased understanding of the mechanics of child injury, factors that contribute to inadequate or successful child restraint, and the traumatic experience of parents and children involved in vehicular crashes. In addition, the work of PCPS has led to the rapid adoption of booster seats as the appropriate form of restraint for children who have outgrown convertible car restraint systems. And while the use of child restraints has increased from 51 percent in 1999 to 73 percent in 2005 for children through age 8, further education is needed to reinforce

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## Child Passenger Safety (continued)

appropriate restraint use and rear seating for children. PCPS reports serve as valuable reminders of the need for ongoing education on appropriate use of child restraints and the critical importance of rear seating for children.

A recent study by researchers at The Children's Hospital of Philadelphia highlights this need. The study found that parents with a high school education or less are among the least likely to use appropriate child restraints.<sup>1</sup> Published in *Traffic Injury Prevention*, the study sought to identify socioeconomic factors linked with inappropriate child restraint use in motor vehicles for children under age 9. Researchers found that level of education is the biggest determinant of whether parents use appropriate child restraints. Children of parents with a high school education or less are at the greatest risk of serious injury or death from a vehicular crash. In fact, these children are at 27 percent greater risk of being inappropriately

restrained compared with children whose parents attended some college.

This conclusion underscores the need for improved public education campaigns that seek to increase appropriate car seat use, particularly among those families at highest risk for crash injury. "What this research shows us is that broad educational campaigns to improve child passenger safety are no longer sufficient. Many parents who want to do the best for their children still do not understand the importance of booster seats in protecting their children," said Dr. Winston, who led the study. "In order to protect all children riding in cars, we need to develop more effective educational campaigns that provide a compelling and clear safety message which resonates with families who stand to benefit the most."

<sup>1</sup> Winston, Flaura K. et al., "Parent Driver Characteristics Associated with Sub-Optimal Restraint of Child Passengers," *Traffic Injury Prevention*, 7:373-380, 2006.

## What is health services research?

Health services research is the multidisciplinary field of scientific investigation that studies how social factors, financing systems, organizational structures and processes, health technologies, and personal behaviors affect access to health care, the quality and cost of health care, and ultimately our health and well-being. Its research domains are individuals, families, organizations, institutions, communities, and populations.

— *AcademyHealth*, June 2000

## RESOURCES

Parents seeking straightforward and accurate information about how to choose and install car safety seats or booster seats can visit [www.chop.edu/carseat](http://www.chop.edu/carseat) to find educational videos

and information in both English and Spanish, or they can locate a certified child passenger safety technician in their community who will teach them how to install the seat properly.

### Best practice child restraint use guidelines based on the American Academy of Pediatrics and the U.S. National Highway Traffic Safety Administration

	Infants (birth – 1 year)	Toddlers (1-4 years)	School Age Children (4-8 years)
Weight	Up to 20 pounds  If an infant is more than 20 pounds, use a seat that is labeled for rear-facing use up to 30 pounds	Over 20 pounds to the upper weight limit of the forward-facing seat (usually up to 40 pounds)  If a toddler is less than 20 pounds, use a rear-facing child safety seat	Over 40 pounds and up to 4 foot 9 inches (usually at least 8 years old and 80 pounds)  If a school age child is less than 40 pounds, use a forward-facing child safety seat
Type of Child Safety Seat	Infant only or rear-facing convertible	Convertible or forward-facing only	Belt-positioning booster

Source: Winston, Flaura K. et al., "Parent Driver Characteristics Associated with Sub-Optimal Restraint of Child Passengers," *Traffic Injury Prevention*, 7:374.

## WEB SITES

The Children's Hospital of Philadelphia  
[www.chop.edu/carseat](http://www.chop.edu/carseat)  
[www.chop.edu/asientos\\_infantiles](http://www.chop.edu/asientos_infantiles)  
[www.chop.edu/injury](http://www.chop.edu/injury)

SafetyBeltSafe USA  
[www.carseat.org](http://www.carseat.org)

Booster Seat Information  
[www.boosterseat.gov](http://www.boosterseat.gov)

American Academy of Pediatrics  
[www.aap.org](http://www.aap.org)

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