

Implementing a Comprehensive Child Restraint Program in a Pediatric Hospital: An Effective Model

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Motor vehicle crashes remain a leading cause of death and injury to young children. Appropriate child safety seats and child safety restraints can provide life-saving protection to children riding in motor vehicles. Many children, however, travel unrestrained or improperly restrained.

Consideration of appropriate child safety restraint systems for children is an important aspect of discharge planning and can provide families with the means to prevent unintentional injuries and deaths resulting from motor vehicle crashes.

Each year thousands of children are discharged from hospitals across the country. Many hospitals require, for safety and liability reasons, that children be taken by wheelchair and escorted by hospital staff or volunteers to the family vehicle. However, many hospitals may not provide families with recommendations regarding the safest way to transport their children home. By neglecting to offer appropriate child passenger safety information and resources to families, hospitals may be inadvertently exposing children to health risks associated with motor vehicle crashes.

Motor vehicle crashes remain a primary cause of death and injury to children. For children ages 14 and under, motor vehicle crashes are the leading cause of unintentional injury-related death (National SAFE KIDS Campaign, 1998). Many of these deaths and injuries could have been prevented with the proper use of child safety restraint systems (U.S. Dept. of Transportation, 1996a). Although properly used child restraints can provide life-saving protection in crashes, many children travel daily without benefit of child safety seats. Data indicate that as children become older, overall child restraint use decreases while the rate of injury increases (Johnston, Rivera, & Soderberg, 1994).

Health care and related costs resulting from motor vehicle crashes are staggering, estimated at \$150 billion annually (Children's Safety Network Economics and Insurance Resource Center, 1996). Correctly used child safety seats can effectively reduce this amount. For every \$1 spent on child safety seats for children ages 0-4, an estimated \$33 is saved (Children's Safety Network Economics and Insurance Resource Center, 1996).

Some children have special health care needs that can impact on how they travel. Discharging these children in child restraints that accommodate their medical conditions can present challenges for health care professionals who may be unaware of available resources. Recommendations by the American Academy of Pediatrics (AAP, 1999a) encourage health care professionals to take an active role in child passenger safety efforts and provide guidelines that can assist health care professionals in determining appropriate child restraint systems for children with special health care needs. The AAP suggests that appropriate alternative child restraints be available for children who are unable to use standard car seats (AAP, 1999a).

Incorporating child passenger safety education and child safety seats into the hospital environment can positively impact the health and safety of young children and foster safe transportation practices by families. This article describes a car seat distribution program that was devel-

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oped at James Whitcomb Riley Hospital for Children, Indiana University School of Medicine, by child passenger safety specialists and hospital staff to provide all children with the most appropriate child occupant protection options prior to discharge.

Program Description

In 1981, the Automotive Safety for Children (ASFC) Program at Riley Hospital for Children was established at the Indiana University Medical Center and funded by a grant from the Indiana Governor's Council on Impaired and Dangerous Driving, Office of Traffic Safety. The program's objective was to provide statewide education and resources regarding child passenger safety. One project of the program was the development and implementation of a car seat loan program for infants and toddlers at Riley Hospital for Children, a 228-bed facility offering a full spectrum of pediatric services in both inpatient and outpatient settings. Over the years, the program has evolved into a comprehensive service that reflects the diversity of the children treated at the hospital. Not only are infants and toddlers able to obtain standard child restraints prior to discharge, but children who require special consideration, including children with apnea, tracheostomies, and hip spica casts, also have access to appropriate child restraint systems.

Upon admission to Riley Hospital, each child's restraint need is identified by a registered nurse during the admission assessment. Anticipating the need for a child restraint early in a patient's hospitalization allows adequate time for nursing staff to determine an appropriate child restraint, identify a funding source, if necessary, and educate parents on the proper use of the child restraint. In some instances, physicians also identify patients who will require child restraints and write orders for car seat consultations.

Once the determination is made that a child needs a car restraint, a nurse who has received special training in child passenger safety is contacted to assess the patient's occupant protection needs. Every effort is made to select the most appropriate child car restraint for the individual child. Child restraint selection is based on a number of factors, including the child's size, age, and medical condition.

Child restraints are offered through either a purchase plan, material services as a patient charge item, or loan program, depending on the type of child restraint required. The purchase plan offers three types of child restraints in the hospital gift shop. These child restraints include an infant-only child safety seat, a convertible child safety seat with a five-point harness, and a car bed for babies who must travel flat. If a family is unable to afford a child restraint, vouchers for a free seat are available through a fund administered by the Social Services Department.

As new child restraints are introduced into the hospital, they are made available through the material services department as a patient charge item. This means of distribution has only recently become an option for a limited number of child safety restraints, including a car bed designed for low birth weight and premature infants and a harness restraint for children who are at least 2 years of age and must lie down.

Loan program child restraints are restricted to a car seat designed for infants and toddlers in hip spica casts and a car bed that will accommodate larger infants with involved positioning needs. By limiting the types of child restraints available for loan, problems associated with maintenance of a loan program, such as low return rates and adequate cleaning, are minimized. For a small, refundable deposit, the child restraints are borrowed by families for the length of time dictated by the child's medical condition or procedure. The

loan program restraints are stored in a locked cabinet that can be accessed by nursing staff 24 hours a day. In addition to child restraints, loan paper work (including a check list and liability release), specific manufacturers' instructions, locking clips, tethers, and resource information are kept in the cabinet. ASFC staff maintains and replenishes the contents of the cabinet.

Funding

Although child safety seats are available to families through a purchase plan, supplemental funding is still necessary to cover the cost of child restraints for those families who cannot afford to buy them and to purchase special needs restraints for the loan program. Funding to facilitate the operation of the car seat program is secured in a variety of ways. The Children's Miracle Network Telethon for Riley Hospital is instrumental in raising funds for child restraints. Through efforts by the Telethon, a generous donation from a coalition of car dealers, the Central Indiana Pontiac Pack, provides the money needed to cover the expense of child restraints for families that cannot afford them. The hospital volunteer organization, the Cheer Guild, provides annual funding to replenish and update the inventory of special needs restraints.

In addition to hospital-based funding, alternative sources for securing child safety seats are pursued. For example, over the last few years, ASFC has received donations of standard child safety seats and special needs child restraints through its affiliation with national organizations such as the National Association of Children's Hospitals and Related Institutions, the National Easter Seal Society, and the National SAFE KIDS Campaign.

Staff Training

A steering committee comprised of representatives from Nursing and Patient Care Services and ASFC oversees nursing responsibilities for the car seat program for inpatient and outpatient services. The committee determines training needs for the hospital, supports the nurses involved in the car seat program, updates policies and procedures, and assesses program quality.

Registered nurses who show a special interest in child passenger safety are selected by unit directors to be Automotive Safety Resource Nurses. These clinicians are specifically trained within the hospital to assess the transportation needs of the patients, including those with special health care needs (see Table 1), access appropriate restraints, and instruct families in proper use of the restraints (see Table 2). Nursing unit directors review the patient population of each unit and determine the number of nurses needed. For example, the unit receiving the majority of orthopedic patients in the hospital has trained two thirds of its nurses, including nurses on all shifts, so that discharges can be facilitated at any time. In addition to training a larger number of nurses on the units that frequently require restraints, at least one registered nurse on every unit in the hospital and in many of the outpatient services is trained.

Nurses selected for the special needs training are first required to complete a basic car seat self-study module, developed by the ASFC Program. Basic car seat safety training for staff includes reading a self-study manual, watching a video that provides an overview on child occupant protection, successfully completing a basic car seat safety proficiency check-off, and passing a written test. During the check-off, nurses demonstrate competency on use of infant only and convertible child safety seats by positioning dolls correctly in the seats and "installing" the child safety seats on a seat belt demonstrator. ASFC personnel,

Table 1. Guidelines for Assessment of Special Needs Restraints
(Automotive Safety Program, 1999)

Conditions	Solution	Comments
Low birth weight. Premature Infant.	Car seat with 3- or 5-point harnesses that meet dimension requirements: 5 inches distance from seat back to crotch strap; no more than 10 inches distance from lower harness strap to seat bottom. Avoid seats with trays, partial shields, or full shields. Car bed.	Center infant in seat with rolled receiving blankets; diaper roll between crotch area and buckle to prevent slumping. A tray or shield could impact the infant's head or neck. Refer to AAP policy statement and hospital protocol for monitoring guidelines. Check with physician about prone versus supine positioning in car bed. Do not place padding around child's airway.
Infants who must lie prone (e.g., Pierre Robin).	Car bed.	Do not place padding around child's airway.
Infant with osteogenesis imperfecta.	Car bed. Rear-facing seat if reasonable.	Do not place padding around child's airway. Work with OT for positioning.
Infant undergoing surgery for spinal defects.	Car bed.	Move into rear-facing seat when reasonable.
Infant or toddler with tracheostomy.	Safety seat with 3- or 5-point harnesses. Avoid safety seats with shields or trays. Contact with a shield or tray could cause injury or a blocked airway.	Make certain ventilators and respirators are positioned on floor with soft padding around them to curtail movement.
Infant or toddler in hip spica cast.	Car bed. Spelcast. Car seat/booster with low sides.	Car beds are only for infants. With Spelcast, use folded sheet to fill in space cast creates.
Infant or toddler in long leg cast.	Conventional car seat.	Thickness of casting material may interfere with buckling mechanism of tray shield or t-shield.
Infant or toddler in broomstick cast.	Conventional car seat. Spelcast.	Wide spread of legs may interfere with sides of conventional car seat.
Child with behavioral challenges.	Seat with 5-point harness. E-Z-On Vest	Assessment of behavior of individual child will determine restraint choice. E-Z-On Vest must be tethered in vehicle.
Toddler with poor head, neck, and trunk control.	Convertible seat that rear-faces to higher weights. Convertible seat with toddler recline feature.	Center child with rolled receiving blankets.
Older child in hip spica cast.	Modified E-Z-On Vest. An auxiliary best secures the leg. Requires two seat belts for installation. Child must fit lengthwise on vehicle seat.	Torso effectively restrained. Lateral head motion of concern. Best alternative for child too large for Spelcast or car bed. Add foam cushion on floor to height just above seat to reduce impact forces on head and neck.
Older child with long leg cast, abductor pillow.	Conventional, age appropriate restraint. Booster seat or safety belt.	Make sure there is adequate leg room. Build up floor space to support legs.
Older child with disability requiring trunk support.	E-Z-On Vest, Snug Seat 1000, Snug Seat I, Snug Seat II, Gorilla Seat, Columbia Seat, Carrie Seat, Carrie Bus Seat.	Follow manufacturer guidelines for use of tether. Optional positioning features available. Work with OT for positioning.

Table 2. What Every Pediatric Nurse Should Know About Transporting Children

- All 50 states have child restraint laws that require child restraint use in their states. Laws vary from state-to-state and may not reflect best safety practices.
- Motor vehicle crashes are one of the leading causes of injury and death to young children.
- When used correctly, child safety seats are 71% effective in preventing fatalities and 67% effective in reducing the need for hospitalization.
- Child safety seats should have labels that indicate that the seats meet or conform to federal motor vehicle safety standard 213. Seats that do not have or are missing labels should not be used.
- The Juvenile Products Manufacturers Association suggests the average “life span” of a child safety seat be 6 years.
- Child safety seats that have been involved in motor vehicle crashes should be replaced.
- Rear-facing infants must never be positioned in front of passenger air bags. Air bags can severely or fatally injure children in their paths.
- The National Highway Traffic Safety Administration recommends that all children under the age of 13 years ride in the back seat of vehicles. Even if the vehicle does not have a passenger side air bag, the back seat is considered a safer location in most crashes.
- Children should be restrained in the most appropriate child safety restraints for their size and development.
- Infants should ride facing the rear of the vehicle until they are at least 1 year of age and weigh at least 20 pounds in either an infant only seat or convertible seat “converted” to the infant position. Rear facing minimizes the risk of spinal cord or neck injuries. There are child safety seats designed to accommodate children rear facing to weights as high as 35 pounds.
- Once children over 1 year of age and weighing over 20 pounds face forward in a vehicle, they are provided the best protection by convertible or forward facing child safety seats with harness systems.
- When children outgrow child safety seats with harness systems at approximately 40 pounds and 40 inches, they can transition into belt-positioning boosters. Belt-positioning boosters raise children up in vehicles and assist with proper positioning of seat belts. Belt-positioning boosters must be used in conjunction with lap/shoulder belts.
- Seat belts are designed for adult bodies and do not provide optimum protection for children. In the event of a crash, internal injuries can occur from a seat belt improperly positioned across the abdomen instead of the hips. Child restraint systems, including belt-positioning boosters, provide optimal protection for children until they are large enough to properly wear seat belts, which is somewhere between 8 and 12 years of age, approximately 80 pounds, and approximately 4 feet 9 inches tall.
- Specialized or adaptive child safety restraints are available for children with special health care needs. Children who have special transportation needs because of a medical condition, such as apnea, casts, or neuromuscular disorders, should travel in restraint systems that provide them optimum protection.
- The “best seat” is the child safety restraint that fits the child, fits the family budget, and is easy to use.
- Misuse of child restraints is a serious problem with potentially deadly consequences. In order to use and install child restraints properly, the instructions for the restraints and vehicles must be thoroughly read and followed.
- Child safety seats must be installed with seat belts that stay locked during normal driving circumstances.
- Once installed, child safety seats should not move more than an inch side-to-side or back-to-front.

who have received in-depth child passenger safety training, and experienced Automotive Safety Resource Nurses from Riley Hospital conduct the check-offs.

After completing the basic car seat training module, the nurses attend a 3-hour workshop on special needs transportation conducted by ASFC staff. Training components cover assessment guidelines for determination of appropriate restraint devices for children with special health care needs, a description and demonstration of the various child restraints available to patients, and a practice and a proficiency check-off section in the use of all the special needs restraints. The process for loaning the special needs car seats is reviewed along with a discussion of staff liability.

Family Instruction

Misuse of child restraints has been recognized as a prevalent and potentially life-threatening problem. National sources have observed misuse rates as high as 79.5% in

some areas (U.S. Department of Transportation, 1996b). Misuse can range in severity from a twisted harness strap to not buckling a child into a child safety seat. To foster proper use of child safety restraints, family instruction of proper restraint use is a key component of the Riley Hospital car seat program. During a hands-on demonstration by a trained nurse, families are given the opportunity to ask questions and return a demonstration of the child restraint.

In addition to hands-on instruction, instructional videos that detail proper use of specific child restraints are available to supplement teaching. A video that provides a general overview on child passenger safety is shown daily on the hospital's closed circuit television and is also available for viewing on patient care units. *Special Delivery*, a video developed by ASFC that addresses the transportation needs of low birth weight and premature infants, is shown to parents in the neonatal intensive care unit.

Figure 1. Teaching Record for Parent Education



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1100 WEST MICHIGAN STREET INDIANAPOLIS, INDIANA 46202

...LE BASIC CAR SEAT SAFETY _____ (type of carseat)

INITIALS	SIGNATURE/TITLE	INITIALS	SIGNATURE/TITLE
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

In-Patient Out-Patient

TEACHING RESOURCES

- "Don't Risk Your Child's Life" Video
- Auto Safety for Children Child Restraint Device Instruction Video

Consult ASRN for Special Needs Car Seat Instruction

OBJECTIVES	Information/Demonstration Given Date/Initials	Verbalized Understanding/Returned Demonstration Date/Initials	
		No (requires focus note)	Yes
After the family has seen the corresponding videotapes & received instruction from staff they will:			
1. Open the car seat box & inspect the seat making sure all parts are intact & manufacturer's instructions & locking clip are included.			
2. Position infant/child correctly in car seat			
a. thread harness through appropriate slots			
b. adjust harness to snug fit			
c. position & fasten harness retainers			
d. center "newborn" with receiving blanket & crotch roll			
e. adjust seat to recline/upright position as required for vehicle installation			
3. Verbalize/demonstrate how to install carseat in their vehicle (Remind them to read vehicle owner's manual & car seat manual)			
a. correct location for carseat			
b. correct direction (rear-facing, or front-facing) for carseat			
c. safety considerations for vehicles with air bags			
d. correct seat belt path for installation			
e. understanding of locking clip			

MEDICAL RECORD COPY		TEACHING RECORD						W-33
B-CLIN. NOTES	E-LAB	G-X-RAY	K-DIAGNOSTIC	M-SURGERY	Q-THERAPY	T-ORDERS	W-NURSING	Y-MISC.

Although nursing staff does not assist with vehicle installation, written and verbal guidelines that describe the proper installation of child restraints in vehicles are given to families. During instruction, nursing staff stress the importance of reading and following child restraint and vehicle manufacturers' directions. For more detailed vehicle instruction, families may schedule appointments to have child restraints installed with the assistance of ASFC staff.

Documentation

Use of a teaching record has been implemented to consistently document parent education and to serve as an instructional guide for nurses, ensuring all pertinent information has been covered (see Figure 1). This teaching record lists objectives parents need to meet including proper positioning of the child in the child restraint and stated understanding of installation of the child restraint in the vehicle. This teaching record allows the nurse to document that information was given and learning was demonstrated. This record then becomes a permanent part of the child's medical record.

For specialized child restraints, a liability/loan agreement and a checklist are completed in addition to the teaching record. Families receive a copy of the loan paperwork and the originals are forwarded to ASFC for incorporation into a database.

Keeping Current

Changes in child passenger safety practice and technology necessitate continuing education of staff so that families are provided with accurate information and resources. When new child restraints are introduced into the system or significant changes occur, such as product recalls, nurses are notified via unit newsletters. Self-study materials are revised as needed to incorporate current information, and refresher courses are scheduled annually for Automotive Safety Resources Nurses. In addition, physicians are kept informed on the status of the car seat program through memos generated by the car seat steering committee.

Evaluation Component

Developing effective evaluation tools still remains one of the greatest challenges for the car seat program. Currently, families receive a postcard to complete that evaluates their satisfaction with the services they received. Data are recorded on the number and types of child safety seats distributed.

A pretest and posttest are in development that would evaluate a family's understanding of child safety seat use before and after instruction. A follow-up phone survey, to be conducted with families after discharge, is under consideration as a method to evaluate retention of instructional information received. Reviewing patient charts for documentation, which verifies that children identified on admission or via a physician's order received an appropriate child restraint, is another form of evaluation under discussion.

Liability Issues

Minimizing liability for staff involved with the car seat program is an issue under careful consideration. In order to minimize liability, ASFC consults with the university's legal department concerning all applicable documentation. In addition, the program supports transportation-related policy statements issued by the AAP and follows recommendations detailed in research commissioned by the National Easter Seal Society (National Easter Seal Society, 1991; Smith, 1997).

The AAP has strongly stated the importance of educating parents about the use of child safety seats and the role

of the hospital in this process (AAP, 1999b). The AAP recommends that car seat programs ensure that families receive hands-on instruction and that staff training is performed under the supervision of nationally-certified child passenger safety technicians and instructors. The National Easter Seal Society's recommendations include training staff, carefully inspecting child restraints prior to distribution, demonstrating use of the child restraint, requiring a return demonstration by the recipient, documenting instruction, checking child safety seats for recalls and repairing seats according to manufacturers' instructions, and destroying child restraints that have been involved in a crash.

Conclusion

The benefits of providing a car seat program to families far outweigh the challenges of implementing and maintaining the program. Changes in the delivery of medical care have necessitated redesigning the car seat distribution program, and those same changes have made it possible for the program to evolve into a comprehensive injury-prevention service sensitive to the needs of the children discharged from Riley Hospital for Children.

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