

Module on:

**Motor Vehicle Crashes:  
An Overview of the Problem and  
Interventions.**

**Ky Injury Prevention and Research Center  
Pediatric and Adolescent Injury Prevention Program**

**Kathy Adams R.N.  
Susan Pollack M.D.**

**Module for Contract No. PH 99-00-0034,  
KCHS, KDPH, ACH  
January 7, 2000**

## **Notes On Using This Module**

This module provides the most current information on the problem of motor vehicle crashes and the latest recommendations and guidelines for safe practice as of 1/7/2000. It is designed to be used by public health professionals (health educators, clinic, school and community nurses; family resource personnel, etc.) for training purposes. This module can: 1) be used as developed, 2) be modified and/or adapted by the trainer to meet the needs of a particular audience 3) serve as an educational tool to broaden the trainer's scope of knowledge. The content of this entire module can be adapted for sessions from 1.5 – 2.5 hours in length depending on the level of interaction with the audience.

Because of the technical nature of child passenger safety and the broad scope of this teaching, some areas of information have been condensed. If more in-depth information is desired on this topic, technical training classes are available. Contact the Ky Injury Prevention and Research Center at (606) 257-4954 for more information about the Ky Standardized Child Passenger Safety Program.

It is also strongly recommended that the reviewer of this information continually seek out the most up to date information. The area of child passenger safety has been and continues to be a rapidly changing field. Reliable, up to date sources of information include, but are not limited, to the National Highway Traffic Safety Administration (NHTSA) web site at [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov) and/or Safe Ride News Fact sheets on child passenger safety. Copies of the most current information sheets from Safe Ride news are made available in the appendices. This information can be copied and disseminated after purchasing a master copy from Safe Ride News at \$5.00 a piece. For more information call (206) 364 -5696.

It should be noted that that the content of this module has been adapted for KY public health professionals and was almost entirely based on information from the following sources: Emergency Nurses Association, NHTSA and Subaru: Crash Course in Injury Prevention, 1996; NHTSA Standardized Child Passenger Safety Training Program, 1998; and Kentucky Standardized CPS Training, 1999. Additional sources are cited in the content of the material and in the reference page.

## Table of Contents

I.	Introduction.....	1
II.	The Problem of Motor Vehicle Crashes.....	1
III.	Crash Dynamics: Why Car Seats and Seat Belts Work.....	2
	A. The Three Collisions.....	2
	B. Crash Forces.....	3
IV.	Age Specific Interventions to Prevent Injuries and Death From Motor Vehicle Crashes.....	3
	A. Selecting the Appropriate Child Passenger Seat.....	3
	B. Correctly Using the Appropriate Car Seat.....	5
	C. Other Child Passenger Safety Concerns.....	9
V.	Motor Vehicle Safety Issues for Children.....	10
	A. Children.....	10
	B. Young Adolescents.....	10
	C. Teenagers.....	10
	D. Adults.....	11
V.	Barriers to Proper Usage of Car Seats.....	11
VI.	Conclusion.....	12
VII.	Appendices.....	13
	A. Vocabulary.....	14
	B. American Academy of Pediatric Policy Statement.....	16
	C. Safe Ride News Fact Sheets.....	17
VIII.	References.....	18

# *Motor Vehicle Crashes: An Overview of the Problem and the Interventions*

## Introduction

Injuries are the leading cause of death for children between the ages of 1 and 18 in Kentucky. The number one cause of injury related deaths are motor vehicle crashes (MVC). Proven interventions can decrease motor vehicle deaths and injuries in a community. These interventions meet core public health functions and are a worth while priority for public health professionals to address.

## **Objectives**

- **Explain the problem of motor vehicle crashes.**
- **Discuss crash dynamics and why child safety seats and seat belts work.**
- **Apply knowledge of age specific interventions to prevent injuries and death.**
- **Discuss barriers that prevent the proper use of child safety seats.**

## **The problem: Epidemiology of motor vehicle crashes.**

MVC's are serious and often avoidable problems that have a devastating effect on the population. Awareness of the problem and the perceived risk of injury are key elements that can motivate individuals, groups and communities to change behaviors.

We know that in the United States:

- Every year about 40,000 people die as a result of MVC's.
- Each year more then 500,000 people require hospital admission because of motor vehicle crashes.
- MVC's are the leading cause of death for people between the ages of 1 and 35.
- Motor vehicle crashes are the leading cause of significant years of life lost after heart disease and cancer.
- They account for 47 % of all unintentional injury deaths.
- Motor vehicle crashes are responsible for 44% of the country's brain injuries and are the leading cause of serious permanent head and spinal cord injuries.

(Rivara et al, 1997)

## We know in Ky for 1997:

- MVC's were the #1 cause of death to children ages 1-18.
- 812 people died as a result of motor vehicle injuries.
- 103 of those people were children less than 18 years old.
- 47 % of all unintentional injury deaths for children between 1 and 18 were the result of MVC's.

(Ky Injury Prevention and Research Center, 1997)

## **Crash dynamics: Why car seats and seat belts work.**

- **The three collisions**
- **Crash forces**

Understanding what happens in a crash and why seat belts and child safety seats work is important. Individuals who believe that car crashes can cause serious harm and that seatbelts and child safety seats can make a difference in the event of a crash are more inclined to change their behavior.

### VIII. The three collisions

## When a motor vehicle crash occurs, there are actually 3 collisions.

1. Vehicle collision - when the vehicle collides with another vehicle or a fixed object.
2. Human collision - when the body hits the interior of the vehicle
3. Internal collision – when organs inside the body are propelled against other internal structures such as other organs or bones.

When a vehicle is moving at a speed of 40 mph and suddenly collides with a fixed object, the vehicle goes to 0 mph in a few fractions of a second. Unfortunately, the people inside the vehicle have not stopped and continue to proceed at a rate of 40 mph. When they reach the point where the slack in the seat belt is gone, the seat belt will stop them. This way of stopping is still more gentle than hitting a solid object. Finally, even though the outside of the body has stopped, each occupant's brain and other internal organs are still moving forward. The organs stop only when they hit the front of the skull or the inside of the rib cage and abdominal wall.

Seat belts and child restraints work by changing the second collision--the impact with the

inside of the vehicle -- into a controlled stop. This ultimately affects the crash forces and decreases the amount of injury.

## **Crash Forces**

The crash forces that occur during a collision can be extremely powerful. Ultimately crash forces determine the severity of injury.

The weight of the passenger and the rate of speed at which the car is forced to abruptly stop determine the crash force. This equation looks like this:

$$\begin{array}{ccccccc} \text{(speed of car)} & \times & \text{(weight of passenger)} & = & \text{crash force} \\ 40 \text{ M.P.H} & \times & 20\text{lbs} & & 800 \text{ lbs.} \end{array}$$

In the event of a crash, a person who is holding a 20lb infant in her arms would need to have the strength to hold 800 pounds in order for the infant to **not** be thrown forward. This is the reason why children are never safe while being held in the arms of a caregiver and should never be removed from their child safety seat while the car is in motion. This is also the reason why it is important for everyone to be properly restrained in the vehicle.

Seat belts and child safety seats are designed to be strong enough to hold the individual in place in order to distribute the crash forces over the strongest parts of the body. They also keep the occupant from colliding with the interior of the car and/or from being ejected outside the vehicle.

Seat belts have been shown to be the most effective means of reducing fatalities and serious injuries. When traffic crashes occur, seat belts are estimated to save 9,500 Americans each year. Research has also found that lap/shoulder belts, when used properly, decrease fatal injuries to front seat passengers by 45 percent and the risk of moderate-to-critical injury by 50 percent. For light truck occupants, seat belts reduce the risk of fatal injury by 60 percent and moderate-to-critical injury by 65 percent.

## **Age specific interventions to prevent injuries and death from motor vehicle crashes.**

- **Selecting the appropriate child passenger seat**
- **Correctly using the appropriate child passenger seat**
- **Other child passenger safety concerns**

## Selecting the appropriate child passenger seat

### Vocabulary

#### Six basic types of child passenger seats

IX.

X. Vocabulary

(See Appendix A)

XI.

XII.

XIII. Six basic types of child safety seat

1. Rear-facing (Infant) car seat
2. Convertible (Rear and Forward Facing) car seat
3. Forward-facing only car seat
4. Booster seat
5. Special needs restraints
6. Safety belt

**Infants** need to be rear facing until they are at least 20 lbs. **and** 1 year old. Convertible car seats in the past have been designed to be used rear facing only until 20 lbs. but many newer models can be used rear facing up to 30 lbs. The rear facing sitting position provides optimal safety for all ages. Cars however are not designed to accommodate this position. Keeping babies in rear facing seats for at least one year and until the infant's weight exceeds the upper limit of the manufacturers recommendations is a safe practice.

1. **Rear-facing Infant Seats-** These are used in the rear facing position only. They are designed for babies from birth until they weigh 20 - 22 lbs. and are less than 26 inches in length. The rear facing position supports the entire head, neck and back, avoiding stress to the neck due to the baby's heavy head. To be protective the baby's head must stay within the shell (come within an inch of the top of the shell). Babies who are too long may outgrow the infant seat before they reach the upper weight limit. They should be moved to a rear facing convertible seat. (Infants must be one year old and at least 20 lbs. before they can be turned forward facing)
2. **Convertible (Rear and Forward-Facing)**—A convertible safety seat is used *rear facing* for infants from birth to 20+ lbs. and at least one year old. It is used in a *forward facing* position for children at least one year and between 20 and 40lbs. The upper rear-facing limit is shifting to 30 lbs. because of improved crash testing technology.

A convertible child safety seat used *rear facing* should be in the reclined position (45 degrees) and with shoulder straps in the lowest slots. For *forward facing* usage, the

seat should be adjusted to the upright position (90 degrees) and the shoulder straps moved to the upper slots. The seat can be used forward facing until the child's ears are above the back of the shell or the child's shoulders are above the top slots.

**Toddlers** (children above one year and 20lbs) can ride forward facing in car seats. Safest practice is to keep them rear facing as long as possible. Once forward facing, it is important to keep toddlers in the car seat as long as possible, given the manufacturers upper height and weight limits. Early advancement into a booster seat designed for larger children fails to provide the best protection and can pose a serious threat to the child's safety.

3. **Forward-Facing**—**These seats are designed for forward-facing use only. They are designed for children older than one year and whose weights are between 20 and 40 lbs.**
4. **Booster Seats**—**A booster seat is designed to raise the child up high enough so the vehicle seat belt can properly restrain children who have outgrown forward facing car seats. They are designed for children approximately between 40 and 80 lbs. or ages 4 - 8 years old. The booster seat helps ensure that the vehicle seat belt fits across the child's hips (not waist) and shoulder (not neck).**
5. **Restraints for Children with Special Needs**—Designed for children whose needs preclude the use of conventional child safety. (Refer to next section for more information).
6. **Seat Belts**—Designed for individuals who are approximately 4'5" and 80 lbs. and higher and who can sit in a vehicle seat and be properly restrained by the vehicle restraint system.

## Correctly using the appropriate child restraint seat

### Rear Facing Infant Seats

Designed for:	<ul style="list-style-type: none"> <li>• Babies from birth until they weigh up to 20 – 22 pounds.</li> </ul>
Correct Usage:	<ul style="list-style-type: none"> <li>• These seats are used rear facing (The baby is facing the back of the seat). The rear facing position supports the entire head, neck and back avoiding stress to the neck due to the baby's heavy head. Babies should remain rear facing until at least one year.</li> <li>• Harness straps should be at or below the shoulder level.</li> </ul>

	<ul style="list-style-type: none"> <li>• The harness straps should be snug (allowing one finger of space under the harness strap at the collar bone.)</li> <li>• The chest plate should be at armpit level.</li> <li>• Never put thick padding under and behind the child. It will compress on impact leaving the harness slack and possibly allowing ejection. Babies can be covered once in the seat.</li> </ul>
--	--

(Rear Facing Infants Seats continued)

Correct Installation:	<ul style="list-style-type: none"> <li>• Safest place for a car seat is in the middle of the back seat.</li> <li>• Angle of the car seat should be at 45-degrees. This angle is important especially for young babies. The head may flop forward and obstruct airway breathing if the angle is greater than 45 degree. If the proper angle is difficult to achieve, rolled up towels placed under the car seat can help alleviate this problem.</li> <li>• The portion of the child safety seat nearest the vehicle's seat belt buckle and latch plate should not be able to move more than one inch in any direction.</li> <li>• Some infant car seats may need to be used with a special locking clip or with the vehicle seat belt in a special locked setting. Read the car owner's manual for correct usage.</li> </ul>
When the child has outgrown the seat:	<ul style="list-style-type: none"> <li>• When the baby's head comes within 1 inch of the top of the infant seat shell and/or the baby reaches the maximum weight limit of the infant car seat, he/she should be moved into a convertible car seat. If the baby is under 1 year of age and reaches the maximum weight limit (about 20 lbs.), there are special brands of convertible car seats that have been tested to be safe rear facing for up to 30 lbs. The child can move to a forward facing car seat when they are more than 1 year and 20 lbs.</li> </ul>
Miscellaneous	<ul style="list-style-type: none"> <li>• Some infant seats come with bases for convenience. The base stays anchored in the car. The car seat can be secured into and taken out of the base without disturbing the infant or the vehicle seat belt. This option provides the advantage of achieving correct installation and leaves it intact. Extra bases can be purchased for other vehicles.</li> </ul>

## Rear Facing Convertible Seat

Designed for:	<ul style="list-style-type: none"> <li>• Convertible seats are designed for children from birth to 40 lbs. They can be used <b>rear facing</b> from birth to 20-22 or 30 lbs. (depending on the manufacturers maximum weight recommendation).</li> </ul>
Correct Usage:	<p><b><i>Refer to the rear facing infant seat for correct usage</i></b></p> <ul style="list-style-type: none"> <li>• Designed for babies under 1 year of age.</li> </ul>
Correct Installation:	<ul style="list-style-type: none"> <li>• Convertible car seats have a special device that either gives</li> </ul>

	<p>them a 45 or 90 degree angle. This device must be placed in the position that allows for a 45-degree angle.</p> <ul style="list-style-type: none"> <li>• Convertible car seats also have several possible belt pathways. It is important to use the correct pathway.</li> </ul> <p><b><i>Refer to the rear facing infant only seat for other information on correct usage</i></b></p>
--	--

(Rear Facing Convertible Seats continued)

When the child has outgrown the seat:	<ul style="list-style-type: none"> <li>• When the child is at least one year old and 20 lbs. they can be moved to the forward facing position.</li> </ul>
Miscellaneous:	<ul style="list-style-type: none"> <li>• The types of convertible seats that are recommended by safety experts are those with a 5-point harness system.</li> </ul>

XIV. Forward Facing Convertible Seat and Forward Facing Only Seats

Designed for:	<ul style="list-style-type: none"> <li>• Children over age one who weigh between 20-22 and 40 lbs.</li> </ul>
Correct Usage:	<ul style="list-style-type: none"> <li>• These seats are used forward facing only.</li> <li>• <b>Harness straps must be threaded through the highest slot position.</b> (This is essential because only these slots are reinforced and can withstand the crash forces. Slots below are often not reinforced.)</li> <li>• The harness straps should be snug (allowing one finger of space under the harness at the collar bone.)</li> <li>• The chest plate should be at armpit level.</li> </ul>
Correct Installation:	<ul style="list-style-type: none"> <li>• Convertible car seats have a special device that either gives them a 45 or 90 degree angle. This device must be placed in the position that allows for a 90-degree angle.</li> <li>• Convertible car seats also have several possible belt pathways. It is important to use the correct path way</li> <li>• Safest place for a car seat is in the middle of the back seat.</li> <li>• The portion of the child safety seat nearest the vehicles seat belt buckle and latch plate should not be able to move more then one inch in any direction.</li> <li>• Some car seats may need to be used with a special locking clip or with the vehicle seat belt in a special locked setting. Read the car owners manual for correct usage.</li> </ul>
When the child has outgrown the seat:	<ul style="list-style-type: none"> <li>• Only when the child is at the maximum weight for the child safety seat should they be moved to a booster seat. (Approximately 40lbs.) If the child is particularly tall and the head is within one inch of the top of the car seat and they are less then 40 lbs., there is a special combination convertible/booster seats that has a harness system.</li> </ul>

Miscellaneous:	<ul style="list-style-type: none"> <li>The types of convertible seats that are recommended by experts are those with a 5-point harness system.</li> </ul>
----------------	---

### Booster Seat (belt-positioning)

Designed for:	<ul style="list-style-type: none"> <li>Children who weigh between 40 – 80 pounds who have outgrown a convertible seat.</li> </ul>
Correct Usage:	<ul style="list-style-type: none"> <li><b>Has to be used with a lap shoulder belt only!</b> Do not use this child safety seat with only a lap belt.</li> </ul>
<b>Correct Installation</b>	<ul style="list-style-type: none"> <li>Booster seats make the vehicle safety belt fit over the strongest parts of the child’s body. The appropriate places for a seat belt to cross are the collarbone and low on the hips.</li> </ul>
When the child has outgrown the seat:	<ul style="list-style-type: none"> <li>When the child can sit in a vehicle seat and have the seat belt ride low on the hips and cross the collarbone. (This generally occurs when the child is about 80 lbs. or 8 years old).</li> </ul>
Miscellaneous	<ul style="list-style-type: none"> <li>Another type of booster seat is the shield booster. It uses a plastic shield that comes around the front of the child. These are designed for lap only belts. These shields can be removable or stationary. <b>Based on current information nearly all shield boosters have failed the new FMVSS standards. It is strongly recommended that vehicles be retrofitted with lap shoulder belts so a belt positioning child safety seat can be used.</b></li> </ul>

XV.

XVI. Seat Belts

Designed for:	<ul style="list-style-type: none"> <li>Older children and adults who can sit in the vehicle seat and have the seat belt fit properly. Generally about age 8, 80lbs. and/or 4’5”.</li> </ul>
Correct Usage:	<ul style="list-style-type: none"> <li>Seat belt should cross over the collar bone and ride low on the hips.</li> <li>The shoulder belt should never be put behind the back.</li> <li>If they car is equipped with separate shoulder and lap belts, <b>both</b> lap and shoulder belts must be used.</li> </ul>
Correct Installation:	Not applicable

**Car Seats for Premature or Low Birth Weight Babies** - Refer to the American Academy of Pediatrics Policy Statement on “Safe Transportation of Newborns at Hospital Discharge” (RE 9617). (*See appendix B*)

XVII.

XVIII.

**XIX.** Restraints for Children with Special Needs – **These restraints are available for**

**XX.** **children who have conditions that do not allow for typical car seats. Some common problems include:**

- Small children in hip spica casts.
- Larger children who have full body casts.
- Children with poor trunk or head control.

More information about restraints for children with special needs can be located at the National Easter Seal Society’s KARS/Special KARS (Kids Are Riding Safe/Special Kids Are Riding Safe) program. They can be contacted at 1-800-221-6827.

## **Other Child Passenger Safety Concerns**

XXI. Air Bags

Air bags have saved the lives of many adults. They have however caused serious injury and death to children and small adults. Minor crashes, which have resulted in little damage to the vehicle, have decapitated infants sitting in rear facing child safety seats and broken the necks of small children. Because of the serious potential harm, these safety practices are outlined:

- *Never* place a rear facing infant seat on the passenger side with air bags.
- All children under the age of 12 should be sitting in the back seat.
- All adults, especially small adults should be sitting as far back from the dashboard and air bag as possible. The driver should be at least 10 inches away from the air bag.

All new cars manufactured have both driver and passenger side airbags. **The vast majority of people do not need an on-off switch.** However, the option of an on/off switch is available to the risk group below:

1. People who must transport infants riding in rear-facing car seats on the passenger side of the front seat.
2. People who must transport children age 12 and under in the front passenger seat.
3. Drivers who cannot change their customary driving position and keep 10 inches between the center of the steering wheel and the center of their breastbone.

4. People whose doctors say that, due to their medical condition, the airbag poses a special risk that outweighs the risk of hitting their head, neck, or chest in a crash if the air bag is turned off.

### **Tethers**

A strap which connects the top of the child safety seat to the rear deck or other secure point in the vehicle, to limit forward movement of the top portion of the child safety seat during the event of a crash.

As of September 30, 1999 all child restraint devices are equipped with a tether strap. Most vehicles are equipped with anchor points but may not have anchor attachments installed.

## **Motor Vehicle Safety Issues for Children**

### **XXII. Children**

Children need to be in the appropriate child safety seats. Many children are prematurely advanced to seat belts. Booster seats should be used with young children until they can properly fit into the vehicle seat belt system. Many children who have been moved too early into a seat belt and are in a car crash suffer from “seat belt syndrome”, a type of injury involving serious damage to the abdomen and/or spinal cord.

Parents need to be role models for safe behavior. Encouraging parents to use seat belts can lead to the establishment of life long habits for children. Studies also show that if the parent is buckled up, the child is 80 % more likely to be buckled up as well. Parents and children need to be educated on the proper use of seat belts. Parents need to understand the dangers of sharing seat belts. Children should learn to refuse to ride in any vehicle when there are not enough seat belts to go around.

### **XXIII. Young Adolescence**

Children at this age begin to ride with older brothers, sisters and friends who may be new drivers. While this may be convenient for the caregivers, it poses a high risk of potential injury. Young drivers may not have the experience that is needed to handle all driving situations.

### **XXIV. Teenagers**

A recent intervention to help reduce the disproportionate amount of MVC's among teenagers in Kentucky is the **Graduated Drivers Licensing Program**. This program allows young drivers the experience of driving in a low risk setting with adult supervision and places driving sanctions on individuals for driving offenses. Young drivers in Ky now have to meet the requirements of this program in order to maintain driving privileges.

Driving inexperience and speeding have caused more fatal Ky adolescent crashes than alcohol. Education, supervision and good role modeling in driving by adult caregivers will help instill good driving habits.

The issue of drinking and driving is also relevant for this age group. Pressure to fit in with other peers may lead to either driving while intoxicated or riding with an intoxicated driver. Open communication between teenagers and parents is important for handling situations where teenagers may find themselves in dangerous situations.

Many teen drivers are given older family vehicles. Careful attention should be given to the safety of any vehicle, particularly those that are older. Tires with good tread, working windshield wipers, headlights and brakes are key components to motor vehicle safety.

#### XXV. Adults

Adults need to be encouraged to buckle up. They can serve as valuable role models for children to be responsible and safe. Another important reason for everyone to buckle up is that objects that are not anchored down (including people) are projected with great force and can cause serious harm to other passengers. While properly restrained in the car, drivers can maintain better control of the vehicle during an unusual occurrence.

## **Barriers to proper usage of car seats**

Many factors keep caregivers from using child safety seats or from using them correctly. By understanding some of the reasons, interventions can be directed to help educate caregivers.

Many people are not aware of the risk and likelihood of injury involved with car crashes. Individuals have an 84% chance of being involved in a **serious** car crash at least one time in their life. There is also the belief that if they are involved in a crash, it will be a minor one. Yet one out four crashes involves an injury and one out of 182 crashes is a fatal.

Another common belief is if they are only planning to drive a short distance or if they drive only on neighborhood streets they will be safe and not need seat belts or child

safety seats. The vast majority of all crashes occur within 25 miles of home. Many of these crashes are within a 5-mile radius of home. Over half of all crashes occur on roads with low speed limits.

Other barriers that may lead to not using child safety seats properly include the complexity of how to use them properly. This may lead parents to avoid taking the time to understand the correct usage, or may encourage the parents to not bother with them at all. Education and a hands on demonstration may help the caregiver to feel more confident in using the car seat and ensure consistent and proper usage.

Another hurdle for the caregiver can be if the child doesn't want to sit in the car seat. Parents sometimes give in to a crying or acting out child to avoid a confrontation. This is a sensitive issue related to parenting. Helping the caregiver to 1) understand the risks associated with not using a car seat, 2) develop ways to make the car ride more enjoyable for their child, as well 3) know about appropriate behavior modification techniques can all be ways used to help the caregiver make better choices about child passenger safety.

## **Conclusion**

Motor vehicle crashes are a serious threat to children, families and can adversely effect an entire community. Public health providers are in the prime position to help educate community members on the need for proper and consistent use of seat belts and car safety seats. Through individual education, community projects, and public awareness campaigns, motor vehicle safety information can be passed along to help change individuals behavior and prevent unnecessary deaths from occurring. These interventions by public health professionals can increase the overall health of their community and meet core public health functions.

# Appendices

Appendix A  
XXVI.  
Vocabulary for Child Safety Seats

## Appendix B

American Academy of Pediatrics Policy Statement on Safe  
Transport of Newborns at Hospital Discharge

## *Appendix C*

*Safe Ride News Fact Sheets on Child Passenger Safety*

## XXVII. Vocabulary

- Shell - the plastic shell which provides the support for the child, as well as some protection from penetrating injuries in a crash. Often covered with a pad and a cloth or a vinyl cover.
- Harness System (5 point or 3 point)- The straps and buckles that secure the child into the child safety seat.
- Harness strap slots - The slots in the plastic shell through which harness straps are routed.
- Shield (T-shield or Tray shield) - a padded plastic piece connected to the harness system to help restrain the child occupant in the event of a crash.
- Belt path - The route that the vehicle safety belt takes through the child seat frame and/or shell in order to secure it to the vehicle seat. (Convertible seats may have 2 or more paths.)
- Harness adjuster mechanism - allows the harness system to be tightened to properly secure the child into the seat.
- Recline adjuster – used to adjust the recline angle of the convertible seat from 45 degrees to 90 degree.
- Locking clips - A flat H-shaped metal item intended to clip together belt webbing near the sliding latch plate to prevent the webbing from sliding through. (These often can be found on the back of the child restraint.)
- Tether - a strap which connects the top of the child restraint to the rear deck or other secure point in the vehicle. This is designed to limit forward movement of the top portion of the child safety seat in the event of a crash.
- Detachable Bases - A separate plastic device used with an infant car seat which is secured into the car using the vehicle seat belt system. An infant car seat can then snap into the base. This allows for an infant seat to be removed from the vehicle with out disturbing the restraint system.
- Registration cards - Cards that come with child seat that are to be filled out and returned to the manufacturer in order to notify the owner of any recall information.
- Buckle and latch plate(s) - the metal connectors on the vehicle seat belt which click together to hold a safety belt in place.

Owners manual - The information booklet that comes with a car that can provide valuable information on how to install a child safety seat and where tether anchors may be found.

Labels, instruction booklet and storage location - Provides information about the manufacturer, the model name of the child safety seat, the date seat was manufactured, and directions for how to use the child passenger seat properly. There is typically a specific storage location for the instruction booklet on the child safety seat.

Integrated child safety seat - A child-sized restraint or booster built into a vehicle seat.

FMVSS - Federal Motor Vehicle Safety Standards—the standards that pertain to all seating systems for children under 50 pounds that are intended for use in a vehicle.

## XXVIII. Appendix B

### American Academy of Pediatrics Policy Statement on Safe Transport of Newborns at Hospital Discharge

(Unable to place on web site. Refer to <http://www.aap.org> )

## *Appendix C*

### *Safe Ride News Fact Sheets on Child Passenger Safety*

(Unable to place on web site. Call Safe Ride News at (206) 364-5696.)

## References

- Emergency Nurses Association, National Highway Traffic Safety Administration and Subaru (1996). A crash course in injury prevention. Emergency Nurses Association, Parkridge Illinois.
- Ky Injury Prevention and Research Center, (1997). Analysis of Kentucky death certificate data. University of Kentucky.
- The Kentucky Standardized Child Passenger Safety Training Program, (1999). Ky Injury Prevention and Research Center, University of Kentucky.
- National Safe Kids Campaign, (1997). Motor Vehicle Occupant Injury Fact Sheet. Children National Medical Center, Washington, D.C.
- Presidential Initiative for Increasing Seat Belt Use Nationwide (1998). Department of Transportation. Washington, D.C.
- Rivara & Grossman, (1997). Injury Prevention (Parts one and Two). New England Journal of Medicine. 337: 534-548, 613-618.