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CLASSROOM NOTES:

Communication Sets the Stage for Learning

Be aware of your attitude:

- Encourage learning while teaching and demonstrating
- Be aware of your body language/facial expressions
- Explain, don't lecture
- Be patient and positive
- Be prepared to explain the information in another way

1-12

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- Communication is important to learning. Caregivers will pick up on the tone of your voice and your body language. If you are negative toward the parent/caregiver, they may not listen to your message.
- Caregivers are trying to keep their children as safe as possible—that is why they have come to you for help.
- This is your opportunity to show the parent/caregiver that CPSTs are helpful and understanding.
- The first video that follows will show what makes a good technician and how to thoughtfully approach an inspection.

What Do You See?

What a CPS Tech Does



Play Video

Courtesy Lawrence Memorial Hospital

Communication Sets the Stage for Learning
Scenario 1



Play Video

Courtesy St. John's Hospital

Scenario 2



Play Video

1-13

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CLASSROOM NOTES:

- In the other two videos you will also see examples of good and bad communication skills. After viewing each of these videos, the class will discuss the communication skills used by the technicians in each scenario.

Please write your notes below:

- Scenario 1: _____
- Scenario 2: _____
- How well do I communicate? Do I really listen to others?

- What is my strategy for effective communication?

Best Practices and Tough Choices

- **Best Practices**
 - Find best way to transport a child safely
 - Explain best practice options to caregiver
- **Tough Choices**
 - You may not have a clear answer
 - You can give options to the caregiver
- **Tough choices are always made by the caregiver**

1-14

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- ***Best practice*** is the gold standard of protection. It is the most acceptable way to transport a child safely on the basis of the child's age, weight, height, and body development.
- Often, parents/caregivers do not choose the best practice because they do not understand the reason for it.
- As a technician, it is your job to understand the reason and explain it in simple, clear terms to the parent/caregiver.
- ***Tough choices*** are issues that may not have a clear answer regarding the safest way to transport a child. Parents/caregivers will then need to decide among the options.
- In many cases, there will be best practices related to the tough choices. A technician must provide

CLASSROOM NOTES:

**Consumer Information –
NHTSA Ease of Use Ratings**

- Overall grade is based on multiple categories:
 - Preassembled vs. assembly required
 - Clarity of labeling on CR
 - Ease of securing child in CR
 - Ease of installing CR in vehicle
 - Clarity of written instructions

3-9

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- Purpose of ratings is to educate parents/caregivers about child restraint features and assist them in finding the appropriate seat for their needs.
- Manufacturers often take these ratings into consideration when updating their products.
- Ease of Use Ratings are found on NHTSA’s Web site, <http://www.nhtsa.gov>. Ratings are announced yearly.
- The best seat is the one that fits the child appropriately, is the one parents/caregivers are most likely to use correctly every time, and fits the vehicle correctly. You may be asked this question many times by parents/caregivers. Do not offer personal opinions.

Chapter Review

- What is NHTSA?
- What are the basic Federal regulations for vehicles and CRs?
- What are non-regulated products?
- Give three examples
- List two ways to report a defect
- What is NHTSA’s Web site address?

3-10

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Activity 3:

- What would you do to provide a pre-crash locked seat belt?

5-16

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CLASSROOM NOTES:

Activity 3: What Would You Do to Provide A Pre-Crash Locked Seat belt?

Instructions: You will work in a small group for this activity. There are some times when belt-shortening clips must be used because:

- The seat belt buckle is on a long piece of webbing and must be shortened to permit a tight fit of the seat belt.
- The lap-only part of a seat belt is an ELR retractor with a sewn-on latchplate.

Workbook Activity: The instructor will read aloud each scenario, and as a group you will discuss your problem-solving steps to selecting the correct tool if needed:

What would you do to provide a pre-crash locked seat belt?

Scenario 1: ELR with sewn latchplate in front seat:

Scenario 2: ELR lap belt with sewn-on latchplate on school bus:

Scenario 3: ELR with locking latchplate:

Scenario 4: ALR with sewn-on latchplate:

CLASSROOM NOTES:

Scenario 5: ELR with sliding latchplate:

Scenario 6: ELR lap belt with sewn-on latchplate and regular locking clip:

Scenario 7: switchable retractor with sliding latchplate:

**Problem Solving:
Locking Latchplate Slips**

- Webbing loosens when firmly pulled up
- CR moves more than 1 inch
 - Flip the latchplate to change angle - **OR**
 - Twist the buckle stalk to shorten buckle webbing - **OR**
 - Use a locking clip if it is a lap and shoulder belt as a last resort
- Check for tightness

5-17

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- Sometimes when a seat belt passes through the CR belt path as directed by the manufacturer, the latchplate will be positioned so that the pre-crash locking mechanism is tilted and does not hold the CR tightly.
- The seat belt is most probably not broken — just out of position (remember that the webbing and the latchplate must be flat).
- There are three approved steps to fix this condition.
 1. flip the latchplate over one time to shorten the seat belt slightly. This changes the locking angle. Always test the seat belt to be sure it remains locked tightly.
 2. Twist the buckle stalk if it is flexible.
 3. Use a locking clip on a lap-shoulder seat belt with a locking latchplate as a last resort after flipping the latchplate and twisting the anchor stalk first to keep the seat belt from pulling out.

- Tests done at the IMMI Child Division in September 1998 found that seat belt buckle stalks could be safely twisted for use with child restraints without taking away the strength set by the Federal standard. The buckle may be safely twisted as long as the vehicle manufacturer approves. IMMI is a seat belt manufacturing company. (See IMMI letter in Appendix for more details).
- Remember to check the vehicle owner's manual to see if a different method to prevent the latchplate from slipping is recommended.
- It is important to remember to check the manufacturer's instructions for both items, as some buckles cannot be twisted and some latchplates cannot be flipped.

CLASSROOM NOTES:



- Sometimes even seat belts that are designed to lock can't because of the CR belt path.
- Flipping the latchplate over is a step that has been crash-tested and can be used in most vehicles if the locking latchplate is tilted and stays in an unlocked pre-crash position.
- Check the vehicle owner's manual to see if the manufacturer does not allow twisting a seat belt to shorten the webbing.

CLASSROOM NOTES:

When Do You Twist the Buckle Stalk?

- Helpful when the buckle does not lie flat, is in the belt path, or does not allow the lockoff to be secured
- Twisting the buckle will make the webbing shorter
- This will make the buckle lower
- 3 twists maximum



5-19

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Helpful when the buckle does not lie flat, is in the belt path or does not allow the lock off to be secured.

- Be sure buckle release is accessible.
- Always use the minimum number of twists, **maximum** of 3, and check vehicle owner's manual to see if buckle twisting is allowed.

Locking Clips and Belt-Shortening Clips Instructor Demonstration

- Demonstrate:
 - Locking clip/lock-off
 - Belt-shortening clip
 - Flipping a seat belt latchplate
 - Twisting a seat belt buckle
- Install a CR using:
 - Locking clip/lock-off
 - Belt-shortening clip
 - Flipped seat belt latchplate
 - Twisted seat belt buckle

5-20

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Demonstration of Locking Clips and Belt-Shortening Clips

Instructions: You have learned about the steps needed to provide a pre-crash locked seat belt for CR installation.

- Your instructor will now show you how to use the approved additional steps in a vehicle.
- Watch your instructor place a belt-shortening clip

CLASSROOM NOTES:

- Each device, either LATCH or seat belt, secures the CR to the vehicle and offers protection established by the Federal safety standard.
- Each LATCH set in the vehicle is made up of two lower anchor bars and one top tether anchor. If there are lower anchors in a seating position, there is usually a top tether for that seating position.
- Convertibles, sports cars, and some very heavy trucks need not have top tether anchors. These vehicle anchors and hooks, when used together with a CR that also has LATCH attachments, create a system that holds the CR firmly against the vehicle seat when used properly.
- Most rear-facing CRs use the lower anchors only (no tether).
- You will learn about rear-facing tether use later in the course.
- Almost all cars, vans, SUVs, and some extended cab trucks made after 2002 have at least three top tethers and two lower anchor sets.
- A seating position with a top tether only and no lower anchors would not be called LATCH. That seating position would use the top tether and seat belt to secure a CR.
- Top tether anchors are sometimes called top straps in owner’s manuals, and are frequently the last item discussed under the CR section (a useful tip if you are having trouble locating that term in the manual’s index).
- A top tether holds the back of the CR firmly against the vehicle seat to make it more secure and reduce the amount of forward and side movement.
- A top tether can reduce the distance that the child’s head moves forward by 4-6 inches and can thus lessen the risk of head injuries in a crash. In many vehicles, especially those with small back seats, this provides more protection for child occupants.
- You should remind parents to use top tethers whenever possible.
- You may also find an approved integrated (or built in) CR in place of one of the LATCH positions

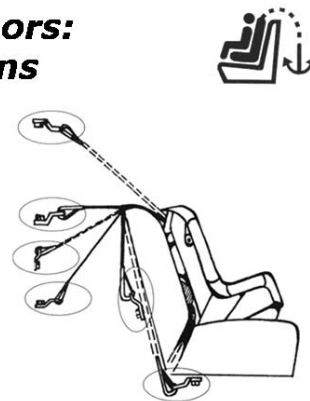
CLASSROOM NOTES:

required by NHTSA. These positions can be found in the owner's manual.

- If a lower anchor or top tether is hidden behind fabric or a cover in the vehicle, a symbol will identify the LATCH locations.
- Only the marked LATCH seating positions may be used. For example, if only the two side seating positions have LATCH, then the middle seating position cannot use the inner bars from each side's seating position unless approved in the CR and vehicle owners manuals.
- If the parent wants to use the middle seating position, they should use the seat belt to secure the CR.
- There is a nationally recognized LATCH Manual that is a good technician resource (<http://www.saferidenews.com>).
- Refer to "Frequently Asked Questions About LATCH and Tethers" found in the Appendix.

Top Tether Anchors: Possible Locations

- Ceiling above rear seating positions
- Rear window shelf
- Back of vehicle seat
- Floor of cargo area
- Under vehicle seat
- **Always check vehicle owner's manual for correct location and retrofit instructions**



6-4

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- Many older vehicles have pre-drilled holes, dimples, or actual tether anchors.
- Top tether anchors are located where the car body is strong enough to withstand crash forces. Top tether anchors have upper weight limits that vary. Always refer to the vehicle owner's manual and child restraint manual for installation guidance. Both manuals must be in agreement for tether and lower anchor use on seats with higher



weight limits. When no guidance is provided, discontinue use of the lower anchors and/or tether and use the vehicle seat belt for a child heavier than 40 pounds.

- Top tethers may look very different in pickup trucks. Remember, the only way you can be sure about LATCH use is to read the owner's manual.
- Top tether anchors alone have been required in vehicles made after September 2000, but many auto manufacturers provided them or marked the tether anchor location in much older vehicles so that tether anchors could be installed at a later date.
- You may find vehicles with more top tether than lower anchors.
- Students should encourage parents with young children and older cars to have top tether anchors added to their cars.
- The LATCH Manual can tell parents the part number for some older and newer vehicles. Most CRs that can be used in the forward-facing mode, as well as some seats that can be used forward facing made after September 2002, have a top tether strap attached from the factory.

CLASSROOM NOTES:

Lower Anchors

- Lower anchors can be:
 - Visible
 - Hidden
- Labels/buttons/tags identify lower anchor locations when they are hidden

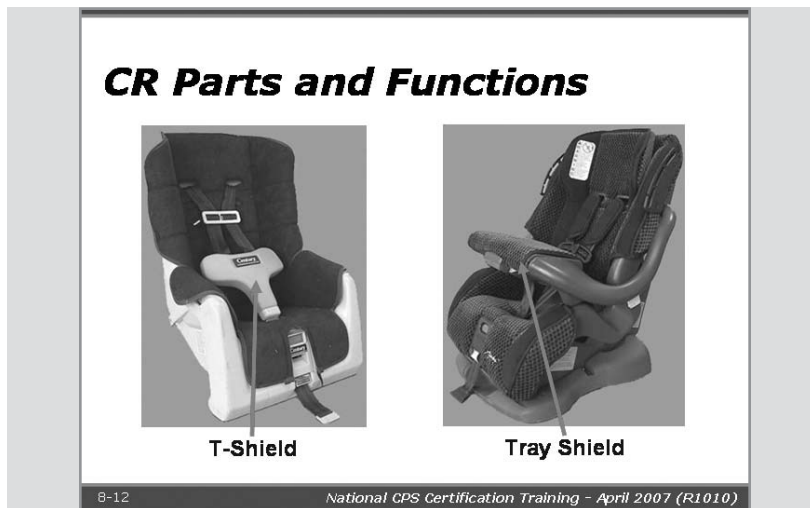


6-5 National CPS Certification Training - April 2007 (R1010)

- Most vehicles cannot be retrofitted with lower anchors.
- Only the owner's manual can tell you about this feature.
- Whenever possible, have the parent/caregiver locate the lower anchors.
- Try not to stick your hand in the seat bight.

- Manufacturers use this information to contact owners about safety issues, including recalls, and are not allowed to use owner data for other purposes.
- Recall lists and checklists need to be used for every seat check.
- Remember that a recall may be initiated through compliance testing or through defect monitoring. A CR that has a recall may be crashworthy and useable until the repair has been made. Follow the manufacturer’s recall instructions.

CLASSROOM NOTES:



There are several harness types that meet FMVSS 213:

- **Five-point:** A harness that has five points of contact; over each shoulder, one on each side of the pelvis, and one between the legs, with all five coming together at a common buckle.
- **Three-point:** A harness that has three points of contact; shoulder straps coming together at a buckle in the shell or on a crotch strap; not to be confused with three-point (lap-shoulder) vehicle belt.
- **T-shield:** A triangular or “T”-shaped pad that is attached to the shoulder harness, fits over the child’s abdomen and hips, and buckles between the legs.
- **Tray shield:** A wide, curved padded surface that swings down around the child’s body and is attached to the shoulder harness and crotch buckle. It looks like a padded armrest, but is a basic part of the harness system. It’s also called an overhead shield.

CLASSROOM NOTES:

CR Parts and Functions

- Padding/cover
- Shell/frame (behind cover)
- Labels
- Harness slots
- Harness straps
- Retainer clip
- Buckle



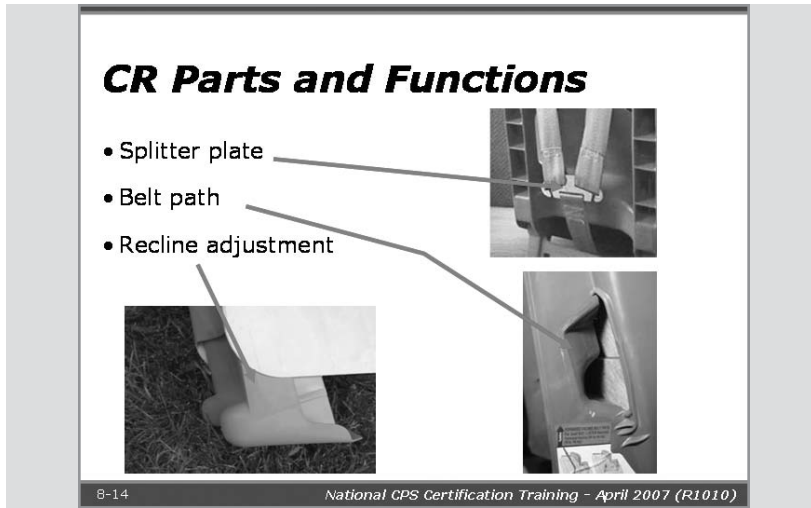
8-13

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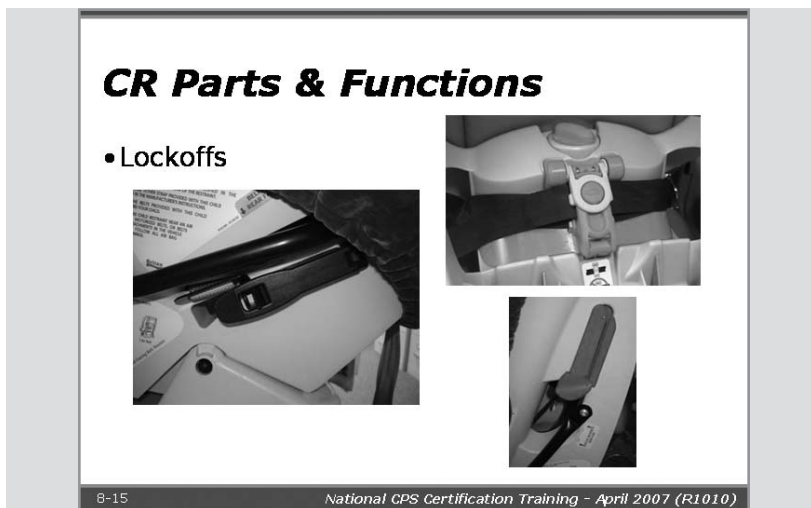
- Throughout the course you will have access to different kinds of child restraints.
- There are changes to new models, so what you see here may not be available next year or next month. Pay attention to labels and become familiar with how different seats look and adjust.
- Parts may be called different things by different manufacturers, such as a lock-off/built-in locking clip or splitter plate/connector.

Following are definitions we will be using for the different parts. We will go into more detail about them later.

- **Buckle:** Where the harness locks.
- **Harness:** The straps that keep the child in the CR and spread out the crash forces.
- **Retainer clip:** The plastic tie or clasp that holds the shoulder straps together over the child's chest at armpit level.
- **Harness Adjuster:** This part is used to tighten or loosen the harness.
- **Harness Slots:** The part of the CR where the harnesses go through.
- **Labels:** Information affixed to the CR that is required by Federal standards.
- **Shell/Frame:** The molded plastic structure of the CR.
- **Seat Padding:** This covers the shell and/or frame.
- **Instruction Book/Storage Location:** both are required



- **Belt Path:** The place on the CR where the seat belt or lower anchor strap is placed to secure the CR in the vehicle.
- **Recline adjuster:** This allows convertible restraints to be reclined for rear-facing and semi-reclined or upright for forward-facing use.
- **Splitter Plate:** The metal plate that connects the two ends of the shoulder harnesses to a single piece of webbing used for adjustment.
- As you look at and identify the different parts of the seat, remember to check for obvious defects such as frayed harnesses or other damage. When assisting parents and other caregivers and defects are seen, you will encourage them to contact the manufacturer and report the possible defect to the NHTSA hotline.



CLASSROOM NOTES:

- **Lock-off:** A built-in belt-locking feature on the child restraint system that works with certain types of safety belts in a similar fashion as locking clips.

CR Parts and Functions

- Locking clip



8-16

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- **Locking Clip:** A pre-crash positioning device that holds the CR in the proper position during normal driving.
- During a crash, the retractor will lock the seat belt and keep the CR in place.
- The clip is provided with each new CR that has a harness, unless the seat has a built-in lock-off.

CR Parts and Functions

LATCH

- Tether



- Lower anchorage attachments



8-17

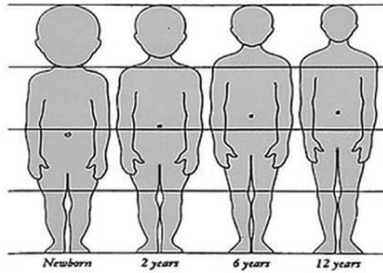
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- **LATCH:** Lower anchors and tethers for children.

Why Children Should Travel Rear-Facing

- Physical Development
 - Babies have big heads
 - Bones, tendons, and muscles are not fully developed

Child's Body Proportions



9-4

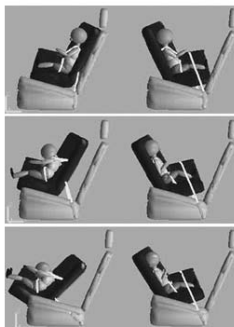
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- This slide shows how a child's body changes as the child grows. Different types of CRs are made to support the child's growth.
- The infant's head is larger and heavier in proportion to its body than that of an older child. The shoulders of an infant are narrow and flexible. This is important to know for proper placement and snugness of the CR harness straps.
- The child's pelvis is small, rounded, and not fully developed until puberty. This is important to know because the lap belt does not always stay below the hip bones in pre-school or elementary school age children.

Why Children Should Travel Rear-facing

Increased crash protection:

- Spreads crash forces along the entire head, neck, and back
- Protects head, neck, and spinal cord
- CR absorbs forces of the crash



Video

Courtesy of Children's Hospital of Philadelphia

9-5

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CLASSROOM NOTES:

- A rear-facing CR supports the entire head, neck, and back in a head-on collision.
- In a head-on crash, the restraint cradles and moves with the child, reducing stress to the neck and spinal cord.
- It is the shell of the CR itself that absorbs the forces in a head-on crash.
- Refer to “Rear Facing Quotables: Guiding Parents to Keep Children Rear-facing Longer” in the Appendix for information technicians can use in the field to communicate with parents about keeping children rear-facing longer.

Activity 1: Identifying Rear-Facing CR

- Infant-only CR



- Convertible CR used in rear-facing position

9-6

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- Rear-facing infant only CRs may have a 3-point harness or a 5-point harness.
- Some models have a detachable base that can be used with or without the base. Other models can only be used with the base.
- Convertible CRs have a 5-five-point, T-shield (no longer manufactured after 2002) or Tray shield.

Activity 1: Identifying Rear Facing CR

Instructions: You will be divided into small groups with each group having a CR. You will answer questions related to the CR. Each group will identify:

1. Type of CR.
2. Type of harness.
3. Minimum/maximum weight/height limits.

Rear-Facing Infant-Only CR

- *This CR is rear facing only*
 - *Use rear-facing CR to the highest weight or height allowed by the manufacturer's instructions*
 - *Note head should be 1 inch below the top of the shell*
 - *Use in semi-reclined position*
 - *Use harness straps at or below shoulder level*
- *CRs should be used only for travel, not sleeping*



9-7

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- The infant seat is designed to be used rear facing only.
- Many parents/caregivers may be tempted to place the infant seat forward facing to allow them to view their child more easily. This is a serious error and places the child at a significant risk of injury/death in the event of a crash.
- Parents need to understand why it is important for infants to always ride facing the rear.
- Some CR manufacturers recommend that infants under 5 pounds not be placed in their products. Always check the CR label for the starting weight. Some CRs say birth; others state a specific number of pounds.
- Do not use the rear-facing seat above the weight or height limits designated by the manufacturer. Once child outgrows seat move to a rear-facing convertible seat with a higher weight rating.
- The top of the child's head should be well contained within the shell (unless the manufacturer's instructions state otherwise) not less than 1 inch from top of shell.
- The harness needs to be snug and to hold the infant down in the seat so he/she does not slide up in a crash and suffer ejection from the car.
- CRs should be used only for travel. Sleeping children should be removed from their car seats in the home or at child care and placed in a crib that is free from pillows, blankets, stuffed animals, loose sheets, bumper pads, etc.

Appendix—American Academy of Pediatrics, “Car Safety Seats: A Guide for Families 2007”

Appendix—American Academy of Pediatrics’ Clinical Report, “Safe Transportation of Preterm and Low Birth Weight Infants at Hospital Discharge”

CLASSROOM NOTES:

Rear-Facing Convertible CR

- Use when babies outgrow infant-only CR
- Use rear-facing position to the highest weight/height allowed by the CR manufacturer's instructions
- Use in semi-reclined position
- Use harness slots at or below shoulder level



3 harness slots

9-8

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- Most new convertible CRs are approved for rear-facing use with up to 30- to 35-pound children and should be considered for infants whose weight and/or height have exceeded the limits of the rear-facing-only CR.
- *Always* check the CR manufacturer's instructions for upper and lower weight/ height limits.
- Parents may wonder if legs are at risk for injury. Children commonly sit with their legs crossed or resting on the back of the vehicle seat. Risk of injury to legs in a crash is low, and injuries to the lower extremity are usually less severe with fewer long-term complications than injuries to the head, neck, or spine, which occur more commonly when a child is seated in the forward-facing position.
- Because the rear-facing position is safest, children should ride rear facing as long as possible (but never exceed the manufacturer's weight and height limits).
- Older children with poor head control who are within height and weight requirements of a CR benefit from staying rear facing longer.

Installation – Seat Belt or Lower Anchors

- Tightly securing the CR:
- Install tightly using seat belt or lower anchors
- Grip CR at belt path to check
- Make sure CR does not move forward or side-to-side more than 1 inch
- Remember that parent or caregiver must be able to repeat installation



9-20

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- CR must be installed with a seat belt or with lower anchors — usually not both. While the systems are different, they are equally safe.
- CRs have not been tested with both systems being used together. Some manufacturers allow this now or at may at some time in the future, so always be sure to read both the vehicle and CR instructions for help.
- General methods to obtain a tight installation:
 - Place CR on vehicle seat in the proper direction and at the correct recline angle.
 - Place the seat belt through the belt path as directed by the manufacturer.
 - Place hand in the CR to compress the vehicle seat cushion.
 - Buckle, tighten, and lock the seat belt or lower anchorage system.
 - Remember that the CR should not move forward or side-to-side for more than 1 inch.
- Be sure to check CRS installation for tightness before each use.
 - To test the installation, grip the CR at or near the belt path and pull on the CR. There should be no more than 1 inch of side-to-side or forward movement at the belt path.
- Many parents who mistakenly grab their rear-facing CR near the baby's head (instead of near the belt path) think the CR is not installed properly because it moves more when tested at this point.
- To reduce the risk of entanglement from unused seat belts, technicians should educate the caregiver to evaluate and note unused seat belts that may be within reach of a child. If possible, switch the retractor to ALR mode to lock the unused seat belt against the seat back. Refer to vehicle and CR owner's manuals for guidance.

CLASSROOM NOTES:

**Installation –
Rear-facing CR and Tethers**

- Do not tether a rear-facing CR unless allowed by CR and vehicle manufacturers
- Read CR instructions and vehicle owner’s manual



9-21

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- The use of tethers on rear-facing CRs, while common in Australia and Sweden, is unusual in the United States.
- A rear-facing CR should never be tethered unless recommended by the CR manufacturer. Several products have optional tethers in the rear-facing position.

**Installation –
Situation to Consider**

- Space Requirements
- Seat slope



9-22

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Check the following to see if the CR fits in the vehicle:

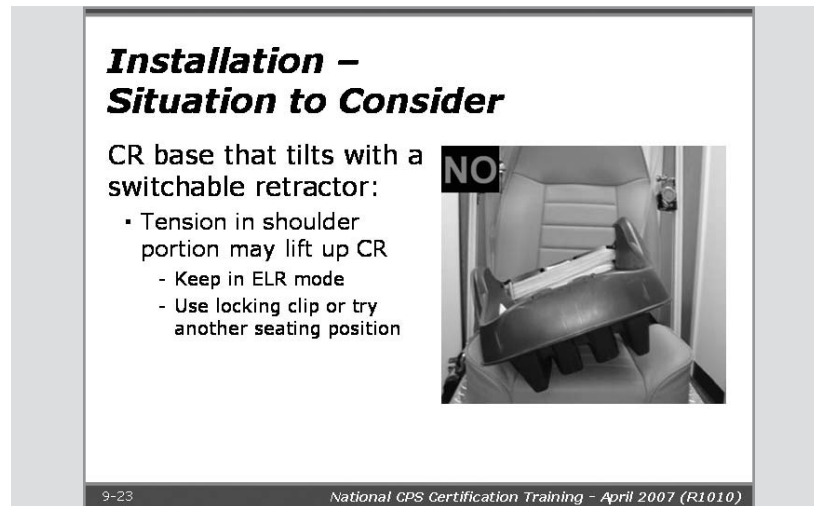
- Do the contours of the vehicle seat permit the CR to stay level?
- Is there enough space for the CR to allow for the correct angle?

- Does at least 80% of the CR base (footprint) fit on the vehicle seat? Many manufacturers say that no more than 20% of the CR can hang over the front edge of the vehicle seat. At least one manufacturer requires that 100% of the footprint fit on the vehicle seat.
- Does the seat belt/lower anchor allow for a tight installation?

CLASSROOM NOTES:

Special considerations for rear-facing infant seats and rear-facing convertible CRs:

- Steep angle may cause infant to ride too upright.
- Front seats may need to be pushed forward to make the rear-facing CR fit in the vehicle's back seat.
- A rear-facing CR can be installed so that it rests against the back of the vehicle seat in front of it if this is *not* against the CR manufacturer's instructions.



- Special situations — switchable retractor.
- Technician may need to instruct parent to switch to ELR and use a locking clip if the tension on the shoulder belt tilts the CR so much that it pulls off the cushion on one side. Or parent may need to try another seating position.
- This tilting may be due to over-tightening or pulling up on the shoulder belt.

CLASSROOM NOTES:

Common Selection Errors

- Using outgrown CR
- Child too small/young for CR
- Using non-FMVSS 213-certified device
- Using a CR that is too old
- Using a CR with unknown history
- Using a CR that has been involved in a moderate to severe crash
- Using a CR under current recall

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Common Selection Errors

- Using a CR the child has outgrown.
- Using a household carrier (or other device that does not meet FMVSS 213) as a CR.
- Using a CR beyond its usable life. (JPMA recommends a 6-year life for CRs. Some CR manufacturers allow their product to be used longer. Check instructions.)
- Using a second-hand CR that is missing instructions and parts and/or has an unknown history.
- Using a CR that has been involved in a moderate or severe crash. Using an unrepaired recalled CR. (Note: This is especially dangerous if recall is related to the crash-worthiness of the CR).

Harnessing Errors

- Not used
- Too loose
- Routed through wrong slots
- Not doubled back, if needed
- Knotted, pinned, or otherwise incorrectly secured
- Not placed on child correctly
- Frayed or damaged

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- Cargo areas are not designed for passenger seating under any circumstances.

CLASSROOM NOTES:

School Bus Safety Facts

Safest transportation:

- Larger and heavier
- Lower risk travel
- Conspicuous
- Meets stringent FMVSSs



13-4 National CPS Certification Training - April 2007 (R1010)

- School bus transportation is the safest form of ground transportation. School buses are nearly 8 times safer than passenger vehicles. **Getting to and from the bus is more dangerous than riding the bus.**
- Buses are larger and heavier than most other vehicles. The crash forces are distributed throughout the vehicle differently and are also experienced by the occupants differently.

Resources for bus transportation:

- <http://www.nasdpts.org>.
- <http://www.nhtsa.dot.gov>

School Bus Safety Facts (cont.)

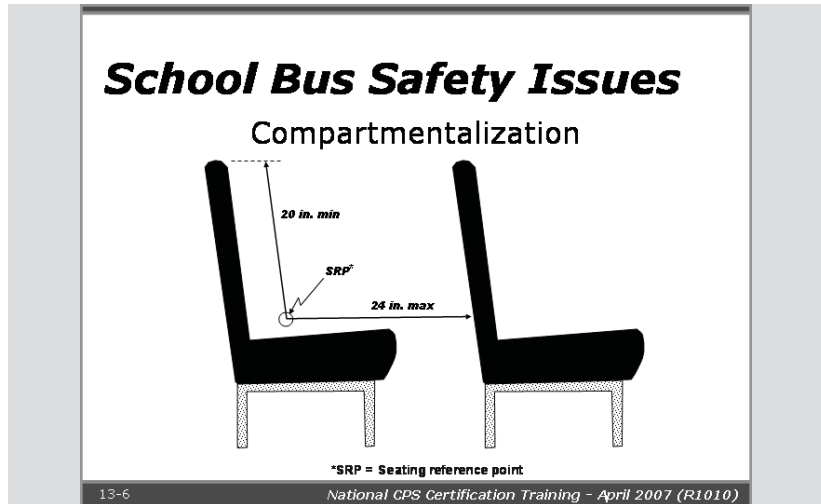
•Occupant protection:

- Compartmentalization
- Seat belts required on small buses
- LATCH required in two seating positions on buses under 10,000 pounds

13-5 National CPS Certification Training - April 2007 (R1010)

CLASSROOM NOTES:

- Passenger seating and crash protection, known as “compartmentalization,” is required on school buses.
- Small school buses (weighing less than 10,000 pounds) are required to have seat belts. Lower anchors are also required in at least two seating positions. Tether anchors are not required in school buses.



- Compartmentalization is a passive occupant protection system using the concept of eggs in a carton.
- Seats on school buses must have flexible, energy-absorbent, high seat backs (about 20 inches from the seat reference point.)
- The combination of energy-absorbent seat backs and narrow spacing creates a compartment within which each occupant is confined in a crash.
- For more information on the safety recommendations for school buses, go to <http://www.nts.gov/publicctn/1999/sir9904.pdf>.
- For AAP recommendations on school bus safety see policy statements at <http://www.aap.org>

Activity 1B: Where can everyone sit safely?

Using your new skills, review the needs of the family and identify possible safe seating arrangements. What seat belt system is required for each occupant? Where can they sit?

- Parent #2: _____
- 7 month old: _____
- 2 year old: _____
- 4 year old: _____
- 12 year old: _____

Working With Families

- What are caregivers really asking?
- Remember that learning and communication styles may vary among caregivers!
 - Define words
 - Use words caregivers will understand
 - Include the child/family whenever you can
 - Understand how the parent must feel

14-4 National CPS Certification Training - April 2007 (R1010)

Many CPS words may be confusing to the caregiver. For example:

- “Baby seat” may mean convertible seat to the parent/caregiver.
- “Infant seat” may mean infant carrier to the parent/caregiver.
- CPS may mean child protective services or child passenger safety.

Use words caregivers can understand:

- Some parents/caregivers may not understand the words that technicians use. For example, which makes more sense to the parent/caregiver: “Retractor” or “the part that winds up and stores the seatbelt”?

CLASSROOM NOTES:

CLASSROOM NOTES:

- Speak in simple terms.
- As a technician, your goal is to help the parent/caregiver use the seat the right way every time.

Include the family:

- When caregivers and children are left out of the process of education, they cannot learn. An important part of the CPST's role is to decide what caregivers are really asking when they request information and help.
- Use the caregiver's name, and use the children's names.

What are they really asking?

- When they ask: "Which car seat is escape-proof?" But mean: "My child can get out of the car seat himself."
- When they ask: "When can I turn him around?" But mean: "I want to see my child. Why is it safer to face the back?"

Look for information about the vehicle or children that can help you understand what the family may need, so you can communicate better:

- Who is in charge? The parent/caregiver or the child?
- Financial concerns: Old vehicle, old car seats.

Communication Skills

- Remember, your job is to educate, not install
- Speak slowly, clearly, and take your time
- Be positive and encouraging
- Practice installation with the caregiver
- Have caregivers explain what they are doing and why as they install the seat
- Remember that the caregiver should be a full partner from beginning to end

14-5

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- Some families will need more time than others to learn proper use and correct installation of the car seat. Do not rush them through the process. Allow enough time when you make appointments for families who may need it.
- Stay focused on the caregiver during the learning process.
- As the caregiver demonstrates correct installation, have him/her explain what he/she is doing. This provides a better learning experience.
- Technicians can actually talk a parent/caregiver through correct installation and harnessing without even getting into the vehicle. This is a challenge to some technicians who want simply to install the seat for the parent/caregiver.
- Your goal should be for the parent/caregiver to have a complete understanding of the seat and its use.

CLASSROOM NOTES:

Communication Skills

Be comfortable saying:

- “I don’t know the answer, but I’ll find out...”
- “I can’t tell you a safe way to do that...”

14-6

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- Even the most experienced CPSTs do not know all the answers. The field of CPS is always changing because of new technology.
- It is OK to tell the parent/caregiver that you do not know the answer, but you should find out the answer. It is a good idea always to have a phone available to contact CPSTs, instructors, or manufacturers if needed.

CLASSROOM NOTES:

- CPSTs need to know the facts to prevent misinformation. Other technicians may provide information to you that is misinformation because “we have always done it that way.”
- Make sure your information is correct before sharing it with the parents/caregivers.

Activity 2: Putting It All Together – Learn. Practice. Explain.

- How does Abbey respond in a positive manner to the caregiver?
- What examples of best practices does she provide?
- How would you describe her style of communication and body language?



Play Video

Courtesy Lawrence Memorial Hospital

14-7

National CPS Certification Training - April 2007 (R1010)


Activity 2: “Abby the CPS Tech” video

Watch the Abbey video (8 minutes)

Video discussion: (7 minutes)

- The “Abbey the CPS Tech” video shows and describes what a certified CPS Technician does.
- Think about what makes Abbey such a good technician and her thoughtful approach to the inspection:
 - How does Abbey respond in a positive manner to the caregiver?
 - What examples of best practices does Abbey provide to the parent/caregiver?
 - How would you describe Abbey’s style of communication and body language?

Planning a Checkup Event



- **What is a “safe zone”?**
- **Planning is essential**
- **Remember: the safety of ALL participants is a top priority.**
- **Take your time**
- **Document, document, document!**

Courtesy of Safe Kids Worldwide

14-8
National CPS Certification Training - April 2007 (R1010)

Activity 3: Planning a checkup event

- The main purpose for conducting a CPS checkup event is to provide a public service to educate and provide needed hands-on assistance to parents and other caregivers.
- Teams of checkers work with and teach parents/caregivers the basics of correct selection, use and installation of CRs and the proper fit and use of seat belts.
- Checkup events also provide opportunities to detect unsafe child restraints (recalled, damaged, missing parts or labels/instructions, etc.).
- Course Instructors will be reviewing important information about the end-of-class checkup event you must actively participate in to be eligible for certification as a CPS technician
- First, it is important to understand how checkup events are planned and operated. Note also that many of the details for setting up and operating a permanent inspection station are similar as those for a “parking lot” event.
- See “Map It Out” worksheet in the appendix as an example of a diagram to sketch your checkup event traffic flow.

Planning and Operating a Checkup Event—The following are several key issues to consider when planning an event or setting up an inspection station.

CLASSROOM NOTES:

Additional details may be found in the appendix under “Using Your New Skills” and “CPS Inspections and Checkup Events”.

- Do not wait until the last minute to plan your event!
- Who is your target audience?
- How many families do you expect at the event?
- How much time should be allocated per child seat?
- Determine who the event coordinator will be. Each event needs a designated event coordinator.
- Conduct a pre-site visit.
- At the event:
 - Physical Environment:
 - Staffing:
 - Educate the caregiver by fully involving the caregiver in the checkup
 - Have adequate supplies

WHAT TO EXPECT DURING THE END-OF-CLASS CHECKUP EVENT

Be sure you understand

- What will be the time allocations per child seat?
- Who will be the event coordinator?
- Which checkup form will be used and how to use it?
- Who will be responsible for reviewing the work of each checkup team?
- Where will supplies — forms, clipboards, recall lists, LATCH manual, CR manufacturers’ instructions, educational materials for caregivers, etc. — be available for technicians.

Remember that the safety of all participants is a top priority

- Promote one way traffic flow
- Turn off all vehicle motors
- Watch small children as parents may be distracted
- Walk around every car before starting the engine to be sure there are no children or materials around near or under the vehicle

- Announce “car moving” and guide car to exit

Take your time with conducting the checkup and documentation.

- Ask for help if you need it
- Read instructions and labels
- Fully involve the parent/caregiver in the event
 - Remember the Learn, Practice, Explain teaching method
 - By the end of the checkup, the parent/caregiver should feel confident and competent in their abilities
- Document, document, document
 - Everything you do
 - Advice you give the parent/caregiver
 - Choices the parent/caregiver makes, especially advice the parent/caregiver chooses not to follow
- Due to the sensitive nature of adjusting a child’s harness at the crotch, it is advisable to have the parent adjust the child’s harness under the supervision of the certified technician.
- There will be an event wrap up to talk about what you saw and what you learned.

For more details, refer to “Using Your New Skills” and “CPS Inspections and Checkup Events” in the Appendix.

CLASSROOM NOTES:

Activity 3: Design a Safe Checkup Event

- After the instructor provides information about the course checkup event location and parking area, use the grid to design a safe traffic flow and checkup area.
- Blank copy is provided in the appendix for designing planning future events.

CLASSROOM NOTES:

It is important that all CPS technicians understand the importance of planning and taking steps to design and conduct a safe and well documented event, no matter how large or how small.

Refer to the relevant resources in the Appendix, especially:

- National Child Passenger Safety Resources
- Using Your New Skills
- CPS Inspections and Check up Events
- Map It Out - CPS Check Up Events

***Working Together:
Tech and Caregiver***



- Check up events
- In-store education at point of CR purchase
- Answering questions (phone/email)
- Promoting proper CR use every day, every ride.

14-10

National CPS Certification Training - April 2007 (R1010)

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National Child Passenger Safety Resources¹

April 2007 (R10/10)

AAA Foundation for Traffic Safety

607 14th Street NW
Suite 201
Washington, DC 20005
202-638-5944
info@aaafoundation.org
www.aaafoundation.org

AAA Foundation for Traffic Safety is a not-for-profit, publicly-supported charitable educational and research organization that funds research projects designed to discover the causes of traffic crashes, prevent them, and minimize injuries when they do occur. This research is then used to develop educational materials for drivers, pedestrians, bicyclists and other road users.

American Academy of Pediatrics

Publications Department
141 Northwest Point Boulevard
Elk Grove Village, IL 60007-1098
800-433-9016
847-434-4000
www.aap.org

The AAP's child passenger safety information includes policy statements relevant to recommendations for transporting children safely. Pamphlets on safety seat use, restraint choice available. Produce a shopping guide for children with special transportation needs and an annual car seat shopping guide.

Automotive Safety Program, Riley Hospital for Children

575 West Drive, Room 004
Indianapolis, IN 46202
317-274-2977
www.preventinjury.org

The Automotive Safety Program provides general consumer information for the State of Indiana. In addition, information is available for transporting children with special needs including ambulance transport safety.

¹Please note that this list is not meant to be all inclusive.

Children's Hospital of Philadelphia

Center for Injury Research and Prevention
3535 Market Street, Suite 1150
Philadelphia, PA 19104
267-426-6092
www.research.chop.edu/programs/injury/
www.research.chop.edu/programs/carseat/

The Center for Injury Research and Prevention at the Children's Hospital of Philadelphia (CHOP) is a comprehensive pediatric trauma research facility at The Children's Hospital of Philadelphia dedicated to addressing injury, the leading cause of death for children and adolescents.

CHOP maintains the "Keeping Kids Safe During Crashes: Every Child Deserves a Safe Ride" web site that includes videos and other useful information on installing and using child safety seats and on seat belt use for older children and quick tips to help you review the information and links to other online resources.

Partners for Child Passenger Safety now has a Spanish version of their "Keeping Kids Safe" site on their *Cómo mantener a los niños fuera de peligro durante los choques: Todos los niños merecen viajar seguros* site.

Continuing Education Credits (CEUs) to Maintain Certification

Refer to the "National Child Passenger Safety Board" and "Safe Kids Worldwide CPS Certification Program" listings below.

Federal Aviation Administration (FAA) Child Safety on Airplanes

U.S. Department of Transportation
Federal Aviation Administration
800 Independence Ave. SW
Washington, DC 20591
1-866-835-5322
www.faa.gov/passengers/fly_children/crs/

Provides information and guidance for travelers with children. Downloadable brochure that caregivers may take with them when they travel. Additional information concerning travel tips, screening procedures, and traveling with children with disabilities may go to www.tsa.gov/travelers/airtravel/children.

Insurance Institute for Highway Safety

Communications Dept.
1005 N. Glebe Rd.
Arlington, VA 22201
703-247-1500
www.hwysafety.org

Distributes the newsletter "Status Report", and produces low-cost videos on a variety of highway safety topics. Produce fact sheets and lists of state seat belt and child passenger safety laws.

National Association for Pupil Transportation

NAPT Foundation
111 Scooter Lane
Hicksville, New York 11801
516-579-1620
www.napt.org

A nonprofit group committed to enhancing the safety of children transported by school buses. Provides resources to inform local communities about the benefits of school bus transportation, conducts research regarding safer school buses and provides additional training and educational opportunities for pupil transportation professionals.

National Center for the Safe Transportation of Children with Special Health Care Needs

Riley Hospital for Children
575 West Drive, Room 004
Indianapolis, IN 46202
800-755-0912
www.preventinjury.org/NationalCenter.asp

The National Center for the Safe Transportation of Children with Special Health Care Needs is funded by the National Highway Traffic Safety Administration and is based at the Riley Hospital for Children Automotive Safety Program.

The National Center for the Safe Transportation of Children with Special Health Care Needs serves as a resource for families, health care professionals, transportation providers, and child passenger safety advocates. The National Center has a toll-free hot line (Monday – Friday, 8:00 a.m. – 5 p.m. EST) staffed by child passenger safety technicians who are experienced in resolving issues associated with the transportation of children with special health care needs.

National Child Passenger Safety Board

1025 Connecticut Avenue N.W., Suite 1200
Washington, D.C. 20036-5405
202-296-6263
www.cpsboard.org

The mission of the National Child Passenger Safety Board (NCPSB) is to maintain the quality and integrity of the National Standardized Child Passenger Safety Training Program. This program is used to train and certify child passenger safety (CPS) technicians and instructors. The Board works collaboratively with the National Highway Traffic Safety Administration and with the CPS Certifying Body. The Board channels insight from their representative organizations to NHTSA and the Certifying Body.

The Web site of the NCPSB provides CPS Technicians with a variety of continuing education materials including *Tech Update*. *Tech Update* is an electronic newsletter published by the National Highway Traffic Safety Administration and the National Child Passenger Safety Board for certified Child Passenger Safety Technicians and Instructors. Technicians may qualify for up to 1 CEU per certification cycle for reading the Tech Update.

Individuals can sign up to be notified via e-mail whenever Tech Update is published or any significant announcements or updates to the CPS Board website are made. To read sign up for the CPS Board e-mail list, visit www.cpsboard.org/elist.htm.

National Highway Traffic Safety Administration

Washington, DC 20590
Auto Safety Hotline: 888-327-4236
www.nhtsa.dot.gov

Federal agency with primary responsibility for establishing and enforcing motor vehicle safety standards. NHTSA establishes and promotes national and state highway safety related programs and materials including child passenger safety. Pamphlets, technical reports; program manuals, recall lists, etc. are available through NHTSA.

Visitors to the NHTSA child passenger safety page can find information related to:

- Find a Child Safety Seat Inspection Station - Search NHTSA's Child Safety Seat Inspection Station Locator for Inspection Stations in your State or zip Code.
- Keeping Kids Safe Inside and Out - Addresses safety in and around vehicles for children. www.nhtsa.gov
- www.safercar.gov for information on vehicle safety such as Buying a Safer car, crash rating reports, air bags, rollover prevention, and NHTSA safety standards and regulations.

National Safety Council

1121 Spring Lake Drive
Itasca, IL 60143-3201
630-285-1121
info@nsc.org
www.nsc.org

Safety belt tips and other important information on how to protect yourself and your family on the road.

Safe Kids Worldwide

1301 Pennsylvania Ave., NW
Suite 1000
Washington, DC 20004-1707
202-662-0600
www.safekids.org
<http://cert.safekids.org>

Safe Kids Worldwide is the certifying body for the National Standardized Child Passenger Safety Certification Training Program and manages the online system for registration and other certification processes. Parents and other caregivers can find a Certified Child Passenger Safety Technician in their state or zip code by using the Safe Kids Child Passenger Safety Contact Locator.

For information on policies & procedures related to class scheduling, participant registration, certification, and recertification - as well as frequently asked questions and answers - visit the

Safe Kids CPS Certification web site. Recertification information available through the "Resources" section includes:

- Personal Re-certification Log
- Re-certification flow chart
- Verified Inspection Activity Worksheet
- Tips on How to Get CEUs
- Putting Together a Successful Tech Update

Also included are links to CEU opportunities including

- Examples of scientific articles
- Safe Ride News LATCH Manual quiz
- SafetyBeltSafe USA car seat manufacturer instructions quiz
- CPS Board's Tech Update
- www.SafeKidsWebinars.org
- www.cpsboard.org online presentations
- www.buckleupnc.org/training/index.cfm online videos from NC CPS Conference

Safe Ride News Publications, Inc.

PO Box 38
Edmonds, WA 98020
Phone: 800-403-1424 / 425-640-5710 • Fax: 425-640-5417
www.saferideneeds.com

Publisher of a national CPS quarterly (by subscription) newsletter and the LATCH Manual which is updated every 2 years. Technical updates and fact sheets related to child passenger, pedestrian, and bicycle safety are also available.

SafetyBeltSafe U.S.A.

PO Box 553
Altadena, CA 91001
310-222-6860
www.carseat.org
Safe Ride Helpline: 800-745-SAFE
Spanish Helpline: 800-747-SANO

SafetyBeltSafe U.S.A (SBS USA) produces pamphlets in multiple languages, flyers on correct use of safety seats, training courses, child restraint recall list, and other materials available for download and/or purchase. Technician and Instructors can subscribe to their CPS Tech Access Package which includes; internet access to new child restraint instructions, internet access to a printable version of the SBS USA List of Recalls and Replacement Parts for Child Restraints, SafetyBeltSafe News bi-monthly newsletter on child passenger safety and advocacy, Child Restraint Manufacturers' Instructions with Summary Sheets CD, and Safe Ride News newsletter subscription.

Tech Update

Refer to the "National Child Passenger Safety Board" listing above.

Child Restraint and Vehicle Manufacturer Contacts

Child Restraint Manufacturer Contacts

Angel Guard Products

c/o Mercury Distributing
7001 Wooster Pike
Medina, OH 44256
800-815-6330
330-723-5928
www.angel-guard.com

BESI

9445 Sutton Place
Hamilton, OH 45011
800-543-8222
513-874-0232
www.besi-inc.com

**Columbia Medical
Manufacturing**

13577 Larwin Circle
Santa Fe Springs, CA 90670
800-454-6612
www.columbiamedical.com

Evenflo

1801 Commerce Dr
Piqua, OH 45356
800-233-5921
www.evenflo.com

Harmony Juvenile Products

1600 53rd St
North Bergen, NJ 07047
877-306-1001
www.harmonyjuvenile.com

KIDSEmbrace

3940 Laurel Canyon Blvd.,
Suite #1172
Studio City, CA 91604
866-947-3287
kidsembrace.com

Mercedes-Benz USA

Accessories, P.O. Box 350
Montvale, NJ 07645
www.mbusa.com

Baby Trend

1607 S. Campus Ave
Ontario, CA 91761
800-328-7363
www.babytrend.com

Britax Child Safety

(Britax, Fisher Price)
13501 South Ridge Dr
Charlotte, NC 28273
888-427-4829
704-409-1700
www.britaxusa.com

Combi USA

1962 Highway 160 West
Suite 100
Fort Mill, SC 29708
800-992-6624
www.combi-intl.com

E-Z-ON Products

605 Commerce Way West
Jupiter, FL 33458
800-323-6598
www.ezonpro.com

Jané USA

P.O. Box 410007
San Francisco, CA 94141
866-355-2630
www.janeusa.com

Learning Curve

(Compass, The First Years)
1111 West 22nd St, Ste 320
Oak Brook, IL 60523
630-573-7200
www.learningcurve.com

Merritt Manufacturing

PO Box 17152
Indianapolis, IN 46217
317-409-0148
www.eztether.com

Bergeron Health Care

15 South Second St
Dolgeville, New York 13329
800-371-2778
315-429-8407
www.adaptivemall.com

Chicco

1826 William Penn Way
Lancaster, PA 17601
877-424-4226
717-735-6200
www.chiccousa.com

Dorel Juvenile Group

(Cosco, Eddie Bauer, Maxi
Cosi, Safety 1st)
2525 State St
Columbus, IN 47201
800-457-5276 (sales)
800-544-1108 (service)
www.djgusa.com

Graco Children's Products

150 Oaklands Blvd
Exton, PA 19341
800-345-4109
888-224-6549
www.gracobaby.com

Jeffco Fibres

(LaRoche Brothers)
451 Quarry St.
Fall River, MA 02722
508-673-1001
www.jeffcofibres.com

**Magna Aftermarket of
America (clek)**

600 Wilshire Dr
Troy, MI 48084
866-656-2462
www.magnaclek.com

Mia Moda

1 Meridian Blvd
Wyomissing, PA 19610
1-866-642-6632
www.miamodainc.com

Child Restraint Manufacturer Contacts

Orbit Baby

5437 Central Ave, Ste 10
Newark, CA 94560
877-672-2229
www.orbitbaby.com

Peg Perego U.S.A.

3625 Independence Dr.
Fort Wayne, IN 46808
800-671-1701
www.perego.com

Porsche Cars Of North America

980 Hammond Drive
Suite 1000
Atlanta, Georgia 30328
800-545-8039
www.porsche.com

ProRider

Children-N-Safety Program
7818 S 212th St #106
Kent, WA 98032
800-642-3123
www.prorider.com/nonprofit

Q'Straint

5553 Ravenswood Road, #110
Ft. Lauderdale, FL 33312
800-987-9987
www.qstraint.com

Recaro

3275 Lapeer Rd West
Auburn Hills, MI 48326
248-364-3818
www.recaro.com

Safe Traffic System

3343 W Eastwood Ave
Chicago, IL 60625
847-329-8111
www.safetrafficsystem.com

Safeguard / IMMI

18881 US 31 North
PO Box 408
Westfield, IN 46074
800-586-7839
www.safeguardseat.com

Safety Angel / Safe Start

P.O. Box 740151
Boynton Beach, FL 33474
888-743-3798
www.safetyangel.com

Sammons Preston Rolyan

1000 Remington Blvd
Bolingbrook, IL 60440
800-323-5547
www.sammonspreston.com

Serenity Safety Products

75 W Baseline Rd #29
Gilbert, AZ 85233
800-536-0676
serenitysafetyproducts.com

Snug Seat

12801 E. Independence Blvd
Stallings, NC 28105
800-336-7684
www.snugseat.com

Sunshine Kids Juvenile Products

3104 142nd Ave South, #105
Sumner, WA 98390
888-336-7909
www.skjp.com

Team-Tex America

(Nania, Car Seat Specialty)
PO Box 3194
Rock Hill, SC 29732
877-912-1313

Teutonia USA

150 Oaklands Blvd.
Exton, PA 19341
877-838-8664
www.teutoniausa.com

Triple Play Products

(Safeline Kids)
904 Main St, Suite 330
Hopkins, MN 55343
800-829-1625
www.tripleplayproducts.com

Volvo Cars of North America

Seven Volvo Dr
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Rear Facing Quotables: Guiding Parents to Keep Children Rear-facing Longer

Prepared by the National Child
Passenger Safety Board
May 2010

"Children should face the rear of the vehicle until they are at least 1 year of age and weigh at least 20 pounds to decrease risk of cervical spine injury in the event of a crash. Infants who weigh 20 pounds before 1 year of age should ride rear facing in a convertible seat or infant seat approved for higher weights until at least 1 year of age. If a car seat accommodates children rear facing to higher weights, for optimal protection, the child should remain rear facing until reaching the maximum weight for the car safety seat, as long as the top of the head is below the top of the seat back."

- *American Academy of Pediatrics, Selecting and Using the Most Appropriate Car Safety Seats for Growing Children: Guidelines for Counseling Parents, PEDIATRICS Vol. 109 No.3 March 2002, pp. 550-553.*

"For the best possible protection keep infants in the back seat, in rear-facing child safety seats, as long as possible up to the height or weight limit of the particular seat. At a minimum, keep infants rear-facing until a minimum of age 1 and at least 20 pounds."

- *National Highway Traffic Safety Administration, Growing Up Safe: It's a four step process. (publication: 4 Steps Flyer)*

"Use a rear-facing car seat to at least age 1 and 20 pounds. Use your rear-facing car seat longer if the seat has higher weight and height limits."

- *Safe Kids Worldwide (<http://www.usa.safekids.org/skbu/cps/index.html>; 6-18-2009)*

"Infants should ride rear-facing as long as possible until they reach the upper weight limits of their rear-facing convertible seat, usually around 30-35 pounds. At a very minimum, they should ride rear-facing until they are one year old and 20 pounds."

- *AAA (<http://www.aaa.com/carseat> "Stage 1: Rear-Facing")*

"Keep your baby's car safety seat rear facing in the back seat of your vehicle until your baby is at least 1 year old and weighs at least 20 pounds. It is preferable to wait even longer, until the baby reaches the highest weight or height allowed by the manufacturer of the seat."

- *Hagen JF, Shaw JS, Duncan PM, eds. 2008. Bright Futures: Guidelines for Health Supervision of Infants, Children and Adolescents, Third Edition. Elk Grove Village, IL: American Academy of Pediatrics.*

Safe Transportation of Preterm and Low Birth Weight Infants at Hospital Discharge

Guidance for the Clinician in Rendering
Pediatric Care

Marilyn J. Bull, MD, William A. Engle, MD, the Committee on Injury, Violence, and Poison
Prevention and the Committee on Fetus and Newborn

ABSTRACT

Safe transportation of preterm and low birth weight infants requires special considerations. Both physiologic immaturity and low birth weight must be taken into account to properly position such infants. This clinical report provides guidelines for pediatricians and other caregivers who counsel parents of preterm and low birth weight infants about car safety seats. *Pediatrics* 2009;123:1424–1429

INTRODUCTION

Improved survival rates and earlier discharge of preterm (<37 weeks' gestation at birth) and low birth weight (<2500 g at birth) infants have increased the number of small infants who are being transported in private vehicles. Car safety seats that are used correctly are 71% effective in preventing fatalities attributable to passenger car crashes in infants.¹ To ensure that preterm and low birth weight infants are transported safely, the proper selection and use of car safety seats or car beds are necessary.

Federal Motor Vehicle Safety Standard (FMVSS) 213, which establishes design and dynamic performance requirements for child-restraint systems, applies to children weighing up to 65 lb. However, the standard has no minimum weight limit and does not address the relative hypotonia and risk of airway obstruction in preterm or low birth weight infants. Most rear-facing car safety seats are designated by the manufacturer for use by infants weighing more than 4 or 5 lb, with some designated for use from birth regardless of weight.

Infant dummies as small as 3.3 lb have been shown to be satisfactorily restrained in standard rear-facing car safety seats during crash tests.^{2,3} Test dummies, however, cannot replicate the airway and tone variables that occur in preterm infants, and there is no information on restraint of infants who weigh less than 3.3 lb (1.5 kg).

Rear-facing car safety seats provide the best protection in a frontal crash, because the forces are transferred from the back of the restraint to the infant's back, the strongest part of an infant's body. The restraint also supports the infant's head. Severe tensile forces on the neck in flexion are also prevented by use of rear-facing car safety seats.⁴

The long-term experience and documented protective value of car safety seats make them the preferred choice for travel for all infants who can maintain cardiorespiratory stability in the semireclined position.⁴ A car bed that meets FMVSS 213 may be indicated for infants who manifest apnea, bradycardia, or low oxygen saturation when positioned semireclined in a car safety seat.^{2,5} Of note, some preterm and term infants positioned in car beds and car safety seats seem to have similar rates of apnea, bradycardia, and oxygen desaturation.^{6,7}

A car bed is designed to accommodate an infant in a fully reclined position and is oriented in the vehicle seat perpendicular to the direction of travel. An infant is secured in the car bed with an internal harness, and the car bed is secured to the vehicle with the vehicle's seat belt. Car beds, like car safety seats, have specific weight requirements designated by the manufacturer and, like car safety seats, should be used according to manufacturer recommendations.

The size of the infant, especially for those born preterm, is an important consideration when selecting a car safety seat or car bed.^{2,8} Weight, length, neurologic maturation, and associated medical conditions (especially bronchopulmonary dysplasia) all influence the potential risk of respiratory compromise for infants in seating devices.^{6,9}

Preterm infants are subject to an increased risk of oxygen desaturation, apnea, and/or bradycardia,¹⁰ especially when placed in a semireclined position in car safety seats.^{5,11–13} Furthermore, frequent cardiorespiratory events and

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Key Words

safe transportation, preterm, premature, low birth weight, car safety seats, car beds

Abbreviation

FMVSS—Federal Motor Vehicle Safety Standard

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intermittent hypoxia may adversely affect later neurodevelopment, psychosocial behavior, and academic achievement.^{14,15} In 1 study, mental development in preterm infants with 5 or more cardiorespiratory events during 210 hours or more of cardiorespiratory monitoring was associated with a lower mental development index on the Bayley Scales of Infant Development (95.8 vs 100.4; $P = .04$)¹⁴; physical developmental indices were not different (94.4 vs 91.7; $P = .37$). It is unclear whether the association of cardiorespiratory events and lower mental development reflects an underlying abnormality or a negative consequence of the events. It is rational, if practical, to attempt to reduce the frequency and severity of cardiorespiratory events experienced by preterm infants seated in car safety seats to minimize potential neurodevelopmental sequelae. Therefore, car safety seat monitoring in the infant's own car safety seat before discharge from the hospital should be considered for all infants less than 37 weeks' gestation at birth to determine if physiologic maturity and stable cardiorespiratory function are present, as recommended in the American Academy of Pediatrics publication *Guidelines for Perinatal Care*.¹⁶ Because information is limited about the severity and frequency of adverse outcomes in preterm infants who experience cardiorespiratory events, including those events that occur while in car safety seats, additional research is needed.¹⁷

Many infants are discharged from the hospital with cardiac/apnea monitors, supplemental oxygen, and, occasionally, portable ventilators, suction machines, batteries, and other equipment. These objects are heavy and could cause injury if they were to hit the child or another vehicle occupant in the event of a sudden stop or crash. Although there is no commercially available securement system for portable medical equipment, restraint is recommended.¹⁸

No data are available to establish a specific age or neurodevelopmental status at which an infant with respiratory compromise who was discharged from the hospital in a car bed can safely transition to a semireclined car safety seat. Before discontinuing use of a car bed, the physician can consider arranging for a follow-up study to determine when the infant can travel semireclined without apnea, bradycardia, or oxygen desaturation. The time to perform the test may vary depending on the rate of growth and neurologic maturation of the infant and the infant's respiratory status and should be determined by the treating physician.

Car safety seats are used frequently for positioning infants for purposes other than travel. Potential detrimental effects of excessive use of infant seating devices, including exacerbation of gastroesophageal reflux and potentiation of plagiocephaly, have been documented.^{19,20} Use of car safety seats for purposes other than travel also may increase the risk of adverse cardiorespiratory and other adverse medical events.

CLINICAL IMPLICATIONS

Several important considerations for transportation of preterm and low birth weight infants at risk for recurrent

oxygen desaturation, apnea, or bradycardia include the following.

1. The increased frequency of oxygen desaturation and episodes of apnea or bradycardia while sitting in car safety seats suggests that preterm infants should have a period of observation in a car safety seat, preferably their own, before hospital discharge. This period of observation should be performed with the infant carefully positioned for optimal restraint and the car safety seat placed at an angle that is approved for use in the vehicle. A period of observation for a minimum of 90 to 120 minutes or the duration of travel, whichever is longer, is suggested.^{5,6,11,21}
2. Hospital staff who are trained in positioning infants properly in the car safety seat and in detecting apnea, bradycardia, and oxygen desaturation should conduct the car safety seat observation.
3. Hospitals should develop protocols to include car safety seat observation before discharge for infants born at less than 37 weeks' gestation.²² Some hospital protocols include car safety seat observations for infants at risk of obstructive apnea, bradycardia, or oxygen desaturation other than those born at less than 37 weeks' gestation. Examples include infants with hypotonia (eg, Down syndrome or congenital neuromuscular disorders), infants with micrognathia (Pierre Robin sequence), and infants who have undergone congenital heart surgery.⁹
4. Families should be taught by trained hospital staff how to position the infant properly in the car safety seat.
5. The duration of time the infant is seated in a car safety seat should be minimized. Parents should be advised that car safety seats should be used only for travel.
6. A conventional car safety seat that allows for proper positioning of the preterm infant should be selected if a semiupright position can be maintained safely by the infant. Better observation of the infant may be possible when the child is in a rear-facing car safety seat adjacent to an adult rather than in a car bed. In addition, the protection provided by a rear-facing car safety seat is better documented than the protection provided by car beds.⁴
7. If events documented on cardiorespiratory monitoring in a car safety seat are deemed significant by the treating physician or the hospital policy, interventions to reduce the frequency of desaturation and episodes of apnea and bradycardia are recommended (eg, use of car bed; supplemental oxygen; continued hospitalization or further medical assessment). If a car bed is considered, a similar period of cardiorespiratory monitoring while the infant is in the car bed should be performed before discharge.
8. Infants with documented oxygen desaturation, apnea, or bradycardia in a semiupright position should travel in a supine or prone position in an FMVSS 213-approved car bed after an observation period

that is free of such events as described in point 1 above. This may need to be revised as new evidence becomes available from future research. Specific information regarding currently available car beds can be obtained from several resources.²³

9. Before transitioning from a car bed, a period of observation of an infant for apnea, bradycardia, and oxygen desaturation in the infant's own semireclined car safety seat should be considered. The study can be performed as a home oxypneumocardiogram, as an outpatient polysomnogram, or as an observed outpatient clinical evaluation performed similarly to that described in point 1 above.
10. Infants at risk of respiratory compromise in car safety seats may be at similar risk with use of other upright equipment, including infant swings, infant seats, backpacks, slings, and infant carriers. Consideration should also be given to limiting the use of these devices until the child's respiratory status in a semireclined position is stable.²⁴
11. 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 at least twice the duration of the expected transport time.
12. Commercially available securement systems for portable medical equipment such as monitors are not available; therefore, this equipment should be wedged on the floor or under the vehicle seat to minimize the risk of it becoming a dangerous projectile in the event of a crash or sudden stop.^{2,8}

Proper positioning of preterm and low birth weight infants in car safety seats is important for minimizing the risk of respiratory compromise. Specific national guidance for selecting car safety seats and positioning preterm and low birth weight infants includes the following.

1. Infants should ride facing the rear as long as possible and to the highest weight and length allowed by the manufacturer of the seat for greatest protection.²⁵⁻²⁷ By the time infants weigh 20 lb or reach the top length allowed by the manufacturer of the seat, they should ride facing the rear in infant seats or convertible car safety seats approved for rear-facing use at higher weights and lengths. Most convertible car safety seats are approved for rear-facing use up to 30 to 35 lb and 36 in. Parents of infants born preterm may benefit from specific counseling about this concept.
2. Infant-only car safety seats with 3-point or 5-point harness systems or convertible car safety seats with 5-point harness systems provide optimum comfort, fit, and positioning for the preterm or low birth weight infant. A small infant should not be placed in a car safety seat with a shield, abdominal pad, or arm rest because of potential breathing difficulty behind the shield or injury to an infant's face and neck during a sudden stop or crash.^{2,21}
3. Car safety seats with the shortest distances from the crotch strap to the seat back should be selected to reduce



FIGURE 1
Car safety seat with a small cloth between crotch strap and infant, retainer clip positioned at the midpoint of the infant's chest, and blanket rolls on both sides of the infant.

the potential for the infant to slip forward feet-first under the harness (ie, "submarining"). Some car safety seats have crotch-to-seat back distances as short as 5.5 in, which may accommodate some preterm or low birth weight infants well. A small rolled diaper or blanket between the crotch strap and the infant may be added to reduce the risk of submarining (Fig 1) in smaller infants. A car safety seat with multiple harness-strap slots provides more choice and may be more suitable for small but rapidly growing infants. Ideally, car safety seats with harness straps that can be positioned at or below the shoulders should be selected.²¹

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. 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 front of the neck (Fig 1).
5. Some car safety seats come with head-support systems as standard equipment. Many head-support systems, however, are sold as aftermarket products and may decrease the safety provided by the seat and harness system, because they introduce slack into harness straps. Only products that come with the seat or are sold by the manufacturer for use with their specific seat should be used. Most very small infants require positioning support in addition to the head support that comes with the seat. Blanket rolls may be placed on both sides of the infant to provide lateral support for the head and trunk (Fig 1).
6. The rear-facing car safety seat should be reclined approximately 45° or as directed by the instructions

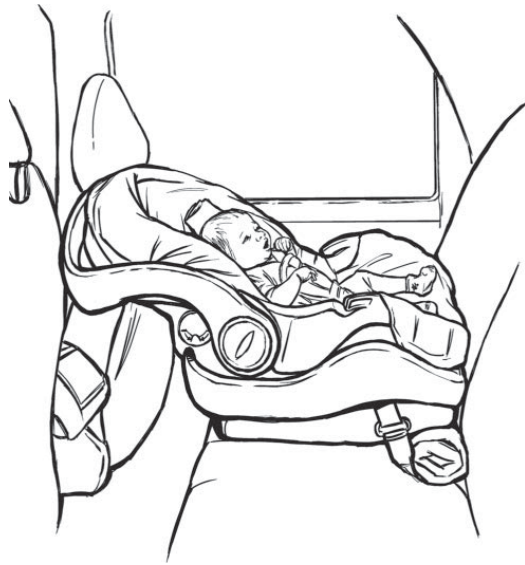


FIGURE 2
Seat with tightly rolled towel to recline seat halfway back at a 45° angle.

provided with the car safety seat. If the vehicle seat slopes and the seat is too upright, the infant's head may fall forward. A lightweight, noncompressible object, such as a tightly rolled blanket or pool "noodle," may be placed under the car safety seat to achieve the appropriate angle. Some car safety seats have built-in angle indicators and angle adjusters to assist with achieving the proper angle (Fig 2).

7. A rear-facing car safety seat should never 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. In some vehicles without rear seating positions, the air bag can be deactivated when the front seat is used for a child passenger. The back seat is the safest place for all children to travel.^{28,29}
8. Infants riding in the rear seat may be more difficult to observe, and whenever possible, parents should arrange for an adult to be seated in the rear seat adjacent to the infant. In the event of a monitor alarm, if a second caregiver is not available, the driver may need to come safely to a stop and assess the infant.
9. An infant should never be left unattended in a car safety seat inside or out of the car.

RESEARCH IMPLICATIONS

1. Studies are needed to gather more information on the severity and frequency of adverse outcomes in preterm infants who experience cardiorespiratory events, including those events that occur while in car safety seats.

2. Studies need to be conducted to determine the risk factors associated with cardiorespiratory events among preterm and low birth weight infants and criteria that indicate neurodevelopmental and physiologic maturity required for an infant to be positioned upright without respiratory compromise.
3. Studies should be designed to assess the correlation of car safety seat monitoring performed in the hospital, while stationary in the car, and while traveling.
4. Methods should be developed to better determine the relative protection provided by rear-facing car safety seats and car beds.
5. Design of car safety seats should be encouraged to specifically meet the positioning and transportation needs of preterm and low birth weight infants.
6. Methods should be developed to better secure heavy medical equipment, such as monitors and oxygen, in vehicles.
7. The efficacy of various protocols for car safety seat monitoring and car safety seats for different patient populations of at-risk infants needs to be determined.

SUMMARY

Proper selection and use of car safety seats or car beds are important for ensuring that preterm and low birth weight infants are transported as safely as possible.

The increased frequency of oxygen desaturation or episodes of apnea or bradycardia experienced by preterm and low birth weight infants positioned semireclined in car safety seats may expose them to increased risk of cardiorespiratory events and adverse neurodevelopmental outcomes.

It is suggested that preterm infants should have a period of observation of 90 to 120 minutes (or longer, if time for travel home will exceed this amount) in a car safety seat before hospital discharge. Educating parents about the proper positioning of preterm and low birth weight infants in car safety seats is important for minimizing the risk of respiratory compromise. Providing observation and avoiding extended periods in car safety seats for vulnerable infants and using car seats only for travel should also minimize risk of adverse events.

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MAP IT OUT CPS CHECK UP EVENTS

Prepared by the National Child
Passenger Safety Board
August 2010

- Design your safe checkup event by use a grid (such as the one included below) to draw a map of the physical environment to be sure you can fit it all in the space available and so you can explain it to your event volunteers.
- Draw the event location and the safety needs that must be in place for technicians, children and parent/caregivers. Personalize it to include:
 - Entrance and exit
 - Directional arrows to show traffic flow
 - Median curbs
 - Checkup lanes - you do not need to stay within the white lines at a shopping center, but be sure to have plenty of traffic cones to manage your traffic flow - put a circle for each traffic cone
 - Materials table
 - Registration location
 - Businesses (stores, gas stations, restaurants) relative to the event

“Map It Out” Sample Grid
