## National Child Passenger Safety Certification Training Program

## Instructor Manual



April 2007 (R10/10)

## NAME:

## CERTIFICATION ID NUMBER:

## EXPIRATION DATE:

http://www.nhtsa.gov
http://cert.safekids.org
http://www.cpsboard.org

April 2007
The National Highway Traffic Safety Administration, in cooperation with the National Child Passenger Safety Board and Safe Kids Worldwide, is pleased to provide the enclosed Instructor Manual of the revised edition of the National Child Passenger Safety Certification Training Curriculum. Use this manual for classes starting on or after June 1, 2007. Until then, the present curriculum should continue to be used.

Please carefully review the entire Instructor Manual and CD resources before teaching the course. The curriculum and testing procedures are significantly different than the previous edition. While content is the same, the organization and manner of teaching the content have been revised. Classroom content now focuses on "need to know" information parents and caregivers need to hear curbside from technicians. Most "nice to know" information from the previous edition is now provided in the appendix as resources for technicians.

The revised curriculum is framed with a "Learn, Practice, Explain" paradigm, so rather than serving as an installation service, technicians are equipped to explain installation procedures to parents and caregivers and empower them to confidently install and reinstall child restraints as needed.

There is a new assessment tool that does not involve computerized scoring. The assessment includes several skill-testing exercises and a series of open book tests so students become acquainted with using their manuals as an ongoing resource. This course assessment includes both hands-on skills and written pieces. There are three written quizzes. The quizzes are timed and open workbook. Students must get a total of at least 42 out of the 50 questions correct to pass the course.

The Instructor CD includes resources to assist you with teaching the revised curriculum and assessing student learning. Also, please visit the National Child Passenger Safety Board website at www.cpsboard.org where you will find Lifesavers 2007 presentations that further explain the revisions, PDF versions of the Student Manual and other materials to assist you. Remember: You have many other resources available to you - including your state CPS coordinator, training coordinator, the NHTSA Regional CPS Program Manager and other instructors in the field - as you work to improve children's safety by developing and maintaining technicians in your state.

## Table of Contents

Introduction ..... iii
Acknowledgements ..... ix
Blueprint For Teaching National Child Passenger Safety Certification Training Classes ..... xiii
Recipe for Successful Instructor Candidates and Mentors ..... xiv
Chapter 1: Learn, Practice, Explain ..... 1
Chapter 2: Basics of Injury Prevention and Crash Dynamics ..... 21
Chapter 3: Who Makes the Rules? ..... 43
Chapter 4: Seat Belt Systems With Pre-Crash Locking Features ..... 57
Chapter 5: Seat Belt Systems Without Pre-Crash Locking Features ..... 79
Chapter 6: Vehicle LATCH — Lower Anchors and Tethers for Children ..... 115
Chapter 7: Other Vehicle Occupant Protection Systems ..... 133
Chapter 8: Introduction to Child Restraints ..... 149
Chapter 9: Rear-Facing Child Restraints ..... 177
Chapter 10: Children in Forward-Facing Child Restraints ..... 227
Chapter 11: Children in Booster Seats ..... 271
Chapter 12: Kids in Seat Belts ..... 285
Chapter 13: Child Passenger Safety in Other Vehicles /Modes of Transportation ..... 297
Chapter 14: In the Field ..... 311
Appendix ..... 319
National Child Passenger Safety Resources ..... 321
Child Restraint and Vehicle Manufacturer Contacts ..... 327
Child Safety Seat Registration Form ..... 331
Child Safety Seat Questionnaire: To report a complaint, defect or incident ..... 333
Quick Reference Guide to Federal Motor Vehicle Safety Standards and Regulations ..... 335
FMVSS No. 213: Highlights of the Regulation for Child Restraint Systems ..... 339
LATCH Requirements: Summary of Changes to Federal Regulations (FMVSS 213 and 225) ..... 341
Child Crash Test Dummies ..... 343
IMMI Memorandum on Twisting Seat Belts ..... 345
Types of Seat Belt Systems, Latch Plates and Use of a Locking Clip or a Belt-shortening Clip ..... 347
Installation of Child Restraints with Different Types of Seat Belts ..... 349
Frequently Asked Questions About LATCH and Tethers ..... 351
LATCH Manual 2005 Excerpt - Appendix A: Vehicle Information ..... 355
Request for Air Bag On-Off Switch ..... 359
NHTSA Frequently Asked Questions About Side-Impact Air Bags (SABs) ..... 361
Compilation of Child Passenger Safety Checklist Forms ..... 365
Child Passenger Safety A Parent's Primer: 4 Steps for Kids ..... 379
Rear Facing Quotables: Guiding Parents to Keep Children Rear-facing Longer ..... 380A
Selecting and Using the Most Appropriate Car Safety Seats for Growing Children ..... 381
AAP Policy Statement: Safe Transportation of Newborns at Hospital Discharge ..... 385
AAP Clinical Report: Safe Transportation of Preterm and Low Birth Weight Infants at Hospital Discharge ..... 387
James Whitcomb Riley Hospital For Children Hospital Discharge Protocol Essentials ..... 391
Transporting Children With Special Health Care Needs ..... 395
Guideline for the Safe Transportation of Pre-school Age Children in School Buses ..... 401
School Transportation Safety ..... 405
Restraint Use on Aircraft ..... 409
FAA Approves New Child Safety Device ..... 413
The Do's and Don'ts of Transporting Children in an Ambulance ..... 415
Crash Protection for Children in Ambulances: Recommendations and Procedures ..... 417
Using Your New Skills ..... 419
CPS Inspections and Check up Events ..... 423
Map It Out - CPS Checkup Events ..... 428A
Child Passenger Safety Glossary of Terms ..... 429
Child Passenger Safety English-Spanish Translation of Terms ..... 435
Traducción de Términos de Español a Inglés Sobre la Seguridad del Niño Pasajero ..... 449
Index ..... 465

## Introduction

This educational program provides the basic technical skills and knowledge of the correct use and installation of child restraints (CRs) and safety belts that are necessary to conduct CRS inspection stations and community education. Successful completion of the education program will result in certification and these competent technicians will be valuable resources in their communities.

Each chapter now focuses on a single topic. This will eliminate topic duplication in several chapters. An effort has been made to concentrate on the "need to know" information necessary to assist parents and caregivers in the proper selection, use, and installation of the child restraint and to know when to appropriately move to safety belts once booster seats are outgrown. Information relative to children with special health care needs is found throughout the course. The background information, or "nice to know" supporting documentation has been placed in the appendix and should be used as a resource. Additional resources, such as pages from the LATCH manual that will assist the technician candidates during the classroom hands-on exercises/worksheets have been included in the appendix.

## The Outside Consultant Role

An outside curriculum design specialist worked along side the curriculum committee to question and help develop chapter focal points. An evaluation specialist reviewed literacy levels and helped reduce language levels to reach a larger audience without sacrificing quality. Assessment tools were designed and evaluated to be sure "need to know" information was included in the hands-on and written testing segments. Feedback from the CPS community (more outside consultants) were used to evaluate the first revision. Two pilot classes were conducted to determine course length, content and evaluation sufficiency.

## New Design Features

The technician manual is designed as a workbook.

- Technician candidates will complete worksheets throughout the course. The worksheets will assist in assessing the technician candidate's grasp of the information taught, and will provide the opportunity to practice their skills and explain important CPS concepts
and best practice recommendations. A note section has been added for comments and to record questions.
- The Technician can personalize their workbook to meet their information needs during and after the class.

Technicians are encouraged to regularly use the workbook upon completion of the class. They will take a timed final exam using their workbooks as a resource. Instructors will be provided with an answer key to correct the test. Instructors will immediately assign a technician number to all candidates who have successfully completed the course. Instructors will have increased responsibilities and under no circumstances should any answer be modified or changed by a member of the instructor team or another person to help a student pass the course. Any person who knowingly allows test altering to occur and does not take immediate action is at risk of certification sanctions.

The following outline highlights the limited focus for each chapter in the revised curriculum. It also includes a brief list of new information or activities. This list is not meant to be a complete overview of each chapter, but to draw attention to the significant changes in the format, additional exercises and activities, and the specific subject matter of each chapter.

## Learn, Practice, Explain

- This chapter explains the role of the child passenger safety technician and gives information on how to help parents provide safe transportation for their child.
- Students will be expected to learn the information, practice the information, and explain what they learned to others.


## Basics of Injury Prevention and Crash Dynamics

- This chapter is an introduction to injury prevention and crash dynamics and provides basic information to be shared curbside.
- In an effort to be "evergreen", the curriculum does not provide injury statistics but rather provides resources that can be used to assist technicians in obtaining current data. Resources are provided to assist in obtaining current misuse rates.
- Students will participate in an activity to learn the factors that can be taken before, during, and after a crash to minimize or prevent injury.


## Who Makes the Rules?

- The functions of NHTSA are discussed as they relate to occupant protection, as well as the Federal Motor Vehicle Safety Standards (FMVSS) 208, 213, and 225.


## Safety Belt Systems with Pre-Crash Locking Features

- Pre-crash locking latchplates and retractors are identified and demonstrated.
- Demonstration is a significant portion of this chapter. It is recommended that this chapter be taught in the vehicle.
- Not all locking latchplates look the same. There is no longer a distinction between regular/heavy duty or lightweight/cinching latchplates. All are categorized as a locking latchplate.
- Recommend reading the vehicle manual for every installation and to show parents where the information is located in the manual.
- When installing a CR, the weight from an adult hand should allow the seat to be tightened enough - Remember, 1 inch of movement is allowed.
- Workbook activities are provided to allow students to review pre-crash locking latchplates and retractors.
- Final activity allows students practice in identifying the pre-crash locking latchplates and retractors in the vehicle.


## Safety Belt Systems without Pre-Crash Locking Features

- Latchplates and retractors without pre-crash locking features are identified and demonstrated. Use of a locking clip/lock-off, belt shortening clip and flipping/twisting the buckle stalk are also identified as the four accepted and additional CR installation steps to secure a CR.
- Demonstration is a significant portion of this chapter. It is recommended that this chapter be taught in the vehicle.
- A workbook activity asks students to determine what additional CR installation steps are needed for the scenarios provided.
- Students will identify the latchplates and retractors in the vehicle as well as practice using a locking clip.
- A workbook activity that matches latchplate and retractor terms to definitions is provided to assist students in learning the parts and how they function.


## Vehicle LATCH: Lower Anchors and Tethers for Children

- This chapter focuses on LATCH and tethers.
- Students will locate LATCH features in the vehicle.
- A role-play activity is provided to allow students to practice talking with parents to determine whether their vehicle is equipped with LATCH, how to have a tether anchor installed, and the maximum weight allowed for the lower anchors.
- Common LATCH misuses are identified.
- The instructor demonstrates quickly what a correct LATCH installation looks like.


## Other Vehicle Occupant Protection Systems

- Automatic safety belts and air bags are discussed in this chapter.
- Air Bag Active Suppression (On-Off Switches) and Air Bag Passive Suppression (air bag turned off under certain conditions) are discussed.
- An activity is provided to allow students to practice finding air bag information and locations by reading the vehicle manual and looking for labels.


## Introduction to Restraints

- The types of child restraints are discussed along with an introduction to the parts of a child restraint and their functions.
- NHTSA's Four Steps of occupant protection are introduced, (rear-facing, forward facing, booster, and seat belt).
- There is also an activity to practice using owner's manuals determine the recall status.
- An activity to promote critical thinking is included in this chapter.


## Rear-Facing Child Restraints

- This chapter discusses selecting, securing and installing rear facing CRs. (NHTSA's 4 Steps-Step 1)
- The chapter is based on the four steps of correct use - Selection, Direction, Location, and Installation.
- Children with Special Health Needs are addressed—low birth weight, premature infants, breathing problems, and the use of carbeds.
- Selection, harnessing, and installation errors are addressed.
- A hands-on activity is provided for students to practice selecting the appropriate restraint, securing the child in the restraint, and installing the restraint in the vehicle.
- An activity is also provided to allow students to practice communicating best practice and tough choices.
- Slides are provided to practice identifying misuse.


## Children in Forward-Facing Child Restraints

## - This chapter discusses selecting, securing and installing forward facing CRs. (NHTSA's 4 Steps - Step 2)

- The chapter is based on the four steps of correct use - Selection, Direction, Location, and Installation.
- Children with Special Health Needs are addressed - Upright vests and harnesses, modified vest, large medical seats, specialized child restraints for children in casts.
- Selection, harnessing, and installation errors are addressed.
- An activity is also provided to allow students to practice communicating best practice and tough choices.
- Slides are provided to practice identifying misuse.
- A hands-on activity is provided for students to practice selecting the appropriate restraint, securing the child in the restraint, and installing the restraint in the vehicle.


## Children in Booster Seats

- This chapter discusses selecting, securing and installing booster seats. (NHTSA's 4 Steps-Step 3)
- A hands-on activity is provided for students to practice the proper use of a booster seat and to explain the proper placement of the lap and shoulder belt.


## Kids in Safety Belts

- This chapter discusses the appropriate use of a seat belt. (NHTSA's 4 Steps-Step 4)
- Misuse of safety belts and the consequences of misuse are discussed.


## Child Passenger Safety in Other Vehicles/Modes of Transportation

- This chapter discusses how vehicle design (pick-up truck, school bus, airplane, and emergency vehicles) affects CR selection and use.
- Recommendations are made for securing a child restraint in an ambulance.
- A workbook activity asks students to determine vehicle designs that affect the selection of child restraints and to determine what child restraints are available.
- An activity allows students to practice communicating best practice.


## In the Field

- Students will participate in a "where does everyone sit safely?" exercise to determine the safest locations in vehicles for all occupants
- Communication skills will be addressed and a video activity will show effective communication skills and describes what a certified CPS Technician does.
- Key issues to consider when planning an event or setting up an inspection station will be discussed.


## The Appendix

Many "nice to know" pieces of information are found in the Appendix. The Appendix will also be used extensively for Instructor Candidates to assure basic knowledge of both "need to know" and "nice to know" information relative to CPS.

Also included in the Appendix are two information sheets:

- Using Your New Skills provides examples to assist newly certified technicians to build community partners and develop CPS programs. It also includes resources for the new technician
- CPS Inspections and Check Up Events is adapted from NHTSA's "A Guide to Implementing CPS Inspection Stations." This has been included to provide students with information pertaining to policies and procedures that should be implemented and followed to help assure that each child leaves the event safer than when he/she came in while making safety the number one priority for staff as well as participants .


## Curriculum Updates and Policy Clarifications

Updates and corrections to the Instructor Manual, policy and procedures, as well as supplemental information that may change more frequently, such as the "Planning and Logistics Guide", are available for download from the Instructors' restricted access area on the cpsboard.org website. Instructors can gain access to this site through the "Instructor Downloads (CPS Board)" action item in their Safe Kids CPS Certification program profiles.

Instructors will be notified through emails and/or the "CPS Express" CPS Certification newsletter whenever updates or corrections are available. It is very important that all Instructors regularly check to be sure that their contact information in their online profiles is correct and up-to-date in order to be assured of receiving these alerts as well as other important certification information.

We thank you for your continued commitment to educating parents and caregivers on the importance of the safe transportation of their children, and we look forward to continuing to work with you in the future.

## Acknowledgements

This National Highway Traffic Safety Administration revised curriculum would not have been possible without the assistance of a substantial number of talented people from across the country. We are greatly indebted to those who gave so much of their time, knowledge, and expertise to help bring you this revised training program.

The foundation of this curriculum was provided by the exemplary dedication, expertise and passion provided by both past and present members of the all-volunteer National Child Passenger Safety Board, particularly the Curriculum Committee. Literally, without their energetic involvement, this curriculum would not be the first class training program that it is today.

Special appreciation is extended to all the dedicated technicians and instructors who volunteered their time to assist in the review.

Generous appreciation is extended to the two pilot sites for their willingness to conduct pilot classes.
Special thanks to the consultants who provided professional guidance as we developed this curriculum and assessment tools, and to those who developed the design and layout of this document.

And finally, thank you to all of the past, present and future technicians for your dedication and enthusiasm in helping keep our children safe on the roads.

Following are the names of those who provided assistance. If anyone has been left out, please accept our apologies and know that we appreciate your work.

## Present Board Members:

| Kristen Allen | Robert F. Dallas | Artie J. Martin | Thomas J. Vilt |
| :--- | :--- | :--- | :--- |
| Sharon Bilbrey | Carole S. Guzzetta | Michele Mount | Lorrie Walker |
| Janet B. Brooks | Lori Haskett | Tim Murphy | Eleanor J. Walters |
| Dr. Marilyn Bull | Carol Helminski | Paul L. Rizzo |  |
| Kerry Chausmer | Pam Holt | Deborah Trombley |  |
| Emilie B. K. Crown | Mike James | Wanda Vazquez |  |

## Past Board Members:

| Ann Burton | Susan Helms | Marilu Montalvo |
| :--- | :--- | :--- |
| Vicky Cassabaum, RN | Jeanne Johnson | Angela Osterhuber |
| Sharon Conrad | Melissa Miles | Irene Rodriguez |

## Curriculum Reviewers

| AAA Public Affairs | Children's Hospital of | Deborah Gardner | Kelly Hurst |
| :---: | :---: | :---: | :---: |
| Kelley Adams | Philadelphia | Ruby Gatling | Bernadette Jamele |
| Kathy Aldridge | Dory Collette | Susie Girten | Mike James |
| Mary Anderson | T. Glen Cooper | Gordon Glaser | Alexis Kagiliery-Lee |
| Deborah Baer | Daniel Couch | Felicia Glick | Beverly Kellner |
| Ed Baginski | Jamie Currier | Karenlynn Green | Cheryl Kim |
| Lillian Bartlett | Kathy Danner | Daphne Greenlee | Beth Kindschi |
| Karen Beard | Lisa Dau | Meagan Haak | Melba King |
| Laura Beeler | Michael Daul | Bill Hall | Gene Koopman |
| Joyce Bell | Kristi Davis | Kelly Hamilton | Danielle Kovarik |
| Wes Bender | Deana Davis | Carol Hancock | Stan Koy |
| Georgeanne Blumling | Robin Deal | Jennifer Harbison | Kathryn Kruger |
| Diana Bonilla | Lynne Dees | Barbi Harris | Virginia Lancaster |
| Myrna Boren | Raymond Delaney | Janelle Havey | Barbie Lee |
| Angie Bowles | Jim DelGiudice | Marcia Hayes | Deborah Lejeune |
| Joseph Boyd Tong | Kenneth Demmers | Cindy Hearrell | Kiki Luna |
| Tana Bradshaw | H. Joel Dishroon | Kim Herrmann | Jon Lupo |
| Robert Brasky | Carol Drehobl | Tracey Hewitt | Patricia Maag |
| John Brock | Jacquie Dukehart | Suzanne Hill | Karen Macauley |
| Karen Brock | Donald Dupray | Charles Hirata | Betty Mason |
| Torine Brooks | Sandra Elliott | Nichole Hodges | Fran Mayko |
| Skip Brownell | Julie Ely | Bonnie Hoffer | Nancy McClenny- |
| Jessica Butterfield | Sue Emery | Sandy Holt | Walters |
| Jerry Wayne Campbell | Tawna Foutch-Findley | Holt Productions | Regina McCurdy |
| Maricruz Cantu | Werner Freitag | Courtney Hood | Christine McIntyre |
| Child Restraint | Vera Fullaway | Jennifer Huebne | Susan McLain |
| Manufacturers | Ruth Gardner | Jennifer Huebner | Sue McLain |


| Beth McMillan | Lisa Pardi | Deborah Salvano | Sedley Tomlinson |
| :--- | :--- | :--- | :--- |
| Meetings Management | Kelly Parker | Michael Schmidt | Rebecca Turpin |
| Harvey Meshel | Anne Patton-Jerzewski | Deborah Schroeder | Cindy Tuttle |
| Sue Miller Smith | Jennifer Pavey | Sue Shiver Morrow | Vehicle Manufacturers |
| Lori Minor | Linda Pfafman | Delora Shedrick | Beth Washington |
| Rick Moore | Clare Pfotenhauer | Margaret Sirtak | Michael Whitehurst |
| Michael "Chris" Morris | Photographic Design | Dwayne Smith | Marcy Wieties |
| Group | April Sorace | Andrew Williams |  |
| Betsey Mowery | Chiley Hospital for | Deborah Stewart | Janice Williams |
| Sharon Munns | Julie Robbins | Pam Stottman | Janet Williams |
| Ces Murphy | Mary Ann Robinson | Andrea Swanson | Norraine Wingfield |
| Timothy Murphy | Janelle Rose | Judith Talty | Sara Woo |
| Keisha Nicholson | Romana Ruiz- | Holly Terry | John Yannaccone |
| Amy Norenberg | Villasensor | Teresa Thomas | Kim Yeager |
| Angela Osterhuber | Melanie Sadek | Stephanie Tombrello |  |

## Pilot Sites:

## Arizona:

Florin Bohatir
Bridget Doherty
Arnie Cuellar
Matthew Nelson
Steve Petrey

Florida:
Robin Butler
Greg Kirby
Philip Miller

## Professional Guidance:

Westover Consultants, Inc., Bethesda, MD
University of North Carolina Highway Safety Research Center
The Tevebaugh Group, Inc. / www.eInstruction.com

## Cover Photographs:

Safe Kids North Carolina / North Carolina Department of Insurance
University of North Carolina Highway Safety Research Center

## Blueprint For Teaching National Child Passenger Safety Certification Training Classes

## Check for curriculum updates and policy clarifications

- Updates and corrections to the Instructor Manual and policies and procedures are made available for download from the Instructors' restricted access area on the cpsboard.org website.
- Instructors can gain access to this site through the "Instructor Downloads (CPS Board)" action item in their Safe Kids CPS Certification program profiles.

Focus on instructor preparation - practice as if you were an instructor candidate no matter how many times you teach these classes

- Study the slides, the student notes and the instructor notes
- Study all activities and assessments in advance
- Review the contents of the Instructor CD carefully and follow instructions. Video clips are available for some of the slides. Read the instructions for the slides and videos and be sure the videos will work with the computer and projector that will be used in class.
- Study materials in appendix and resources throughout the manual
- Plan to teach as much of the class in vehicles as is possible in order to increase hands-on time
- Refer to "Recipe for Successful Instructor Candidates and Mentors" (Page xix) to review the roles and responsibilities of Instructor Candidates and Mentors.


## Have sufficient child restraints, equipment, aftermarket products, and vehicles on hand throughout the course

- Provide new and old child restraints for student use during class
- Arrange for a variety of vehicles to be on hand for activities and training
- Be sure to have vehicle and child restraint instruction/owner manuals available
- Be sure to have sufficient supplies of locking/shortening clips, pool noodles, and other equipment needed for instruction and demonstration


## Guidelines for Teaching

- This curriculum provides all the core teaching materials needed to convey the information to students. Be sure to cover everything in the lesson plan, but do not add to the content unless necessary for further explanation.
- Resist the urge to say "the way we used to teach this was..." This will only confuse the students and throw the schedule off track.


## Supplemental Materials

The provided materials should be used in their original form and may not be changed by instructors without the express written consent of the National Highway Traffic Safety Administration.

There may be limited occasions when approved supplemental information may be used, such as providing state or local passenger safety resources, data or legislative updates. If you feel the need to provide supplemental materials then the items must be: clearly identified as supplemental; must reflect up-to-date factual information and must not conflict with any standardized course information. In addition, students must be informed that they will not be quizzed on the supplemental information.

It is suggested that you use supplemental materials as the foundation of a post-class update shortly after the certification class. This will keep you in touch with your students and enable you to enhance their skills and knowledge after they have had some experience in the field.

## Assessments

Understanding the Assessments

- The new assessment tools do not involve computerized scoring.
- The assessment includes several skill-testing exercises and an open book test
- Course assessment includes hands-on skills and written pieces.
- There are three written quizzes.
o Quizzes are timed and open book - Be sure to stress to the students that they will have to have a good grasp on the content. The written quizzes are open book, but they are not easy.
o Students must get a total of at least 42 out of the 50 questions correct to pass the course.
- There are three hands-on skills tests
- Students must pass all three
o They have 3 attempts to pass each one.
- Should a student not pass a hands-on skills test, not participate in the check up event, or get an overall written score of less than 42 (85\%):
o The student will have to retake the course.
o There are no quiz retakes.
- If there are two passes (skills tests and check up) and at least 42 of 50 correct on the quizzes, the student will be processed as a technician.
- In addition to this immediate processing, the lead instructor will be able to print out and provide wallet cards for the new technicians, if desired and if a computer with internet access and a printer are available.


## Guidelines for Assessments

- Do not provide answers in any form or allow a student to change their answers once submitted
- Do not share the exams in any form with non-students
- Do not alter any tests or hands-on skills evaluations
- Do help students become familiar with their workbook-remind them that they will use it regularly during and after the class.


## Guidelines for Check Up Events

All events must include a safe environment for the students and families. A clear traffic pattern should be established and no vehicle should move without a "walk around" to be sure there are no kids or adults in harms way.

To successfully pass the certification course, all technician candidates must actively participate in a CPS checkup event. Any student who is not able to attend the event should be marked as having failed that section.

Under emergency circumstances, when an individual is not able to attend the event, the Lead Instructor (LI) may schedule a make up checkup event. This must be arranged prior to the original event and include supervision and feedback from a certified instructor who is on the team. The make up event must take place within 2 weeks of the original event. Again, this is an accommodation for EMERGENCIES only. Failure to successfully complete the make up event will result in a failing grade.

All efforts should be made to conduct the check up at the end of class. However, if you have a weather emergency - severe weather that could produce unsafe conditions for holding a
clinic - please reschedule the event as soon as possible. Any technician who does not attend that (or another LI-approved) event will receive a failing grade. Students should, under the supervision of a certified instructor, properly and appropriately educate parents/caregivers. The instructor will provide the LI with the student's grade so it can be entered into the online system.

- The event should be a minimum of 2 hours (excluding set up and break down).
- The checkup event may be open to the public or appointment-based. If by appointment, allow 45 minutes per seat
- A fitting or inspection station may be used as a site.
- A 5:1 technician candidate-instructor ratio is strongly recommended.
- A standardized check list should be used. An instructor must oversee work and approve the education and installation before the family leaves the event.
- It is strongly recommended that technician candidates work in groups of no more than 4 to allow active participation without stressing the parent/caregiver.
- When a car drives off, the team will carefully fill out/review the paperwork and discuss any themes, ideas or lessons from that check up with the instructor.
- At the end of the event, the lead instructor should log into the CPS online system and enter hands on and written grades for the course.
o Enter grades for all technician candidates on the course roster.
- All technician candidates with passing hands-on and written grades will be certified and the course will be finalized.
o After the grades are processed, the lead instructor and/or course administrator will have the ability to print wallet cards for all newly certified technicians.
o Students can receive their new technician numbers at the discretion of the instructor- either verbally or by written notification.


## Reasonable Accommodations

The following guidelines are intended to assist in meeting the Americans with Disabilities Act and apply to certification and recertification:

- Clearly indicate the vigorous physical requirements of this training program when providing a course description to participants. Potential participants should be told to contact the host agency or administrator if they have any doubts about their ability to fulfill course requirements. Certification is dependent upon satisfactory completion of all course components.
- Instructors should ask at the beginning of class if anyone has any special needs with regard to meeting the requirements for completion of the Standardized Course. (Participants should be asked to respond to an Instructor during break time instead of asking for a show of hands.)
- For those participants who have difficulty with reading, the written test may be given orally. If possible, this should be determined prior to the time that the written test is given so that reasonable accommodations can be made. During an oral exam, the instructor should read the question exactly as written and with a consistent tone of voice. During a written or oral exam, a term not related to technical content (such as frayed) may be defined to help the participant understand the question, but not in a way that would indicate the correct answer.
- If individuals are physically unable to install a child safety seat (due to size, disability, or illness) they should be permitted to verbally guide an instructor in correctly installing the CRS. Verbal instructions should be clear, concise, and include an explanation for decisions(s) and/or action(s). This procedure should not indicate inadequacy of the technician's skills as they should always have the parent or caregiver present when checking child safety seats and the parent or caregiver should always be the last one to install or make any changes to the seat.

Recipe for Successful Instructor Candidates \& Mentors

By Janelle Rose, Executive Director, Program Professionals, Inc., and the Sit Safe Child Passenger Safety Program

A mentor is a trusted coach. Successful mentors have a true and sincere commitment to the professional and personal development of the Instructor Candidate.
In addition to excellent technical skills and good presentation, classroom and instructor skills, a good mentor possesses all of the interpersonal skills being evaluated in the instructor candidate. These include patience, understanding, responsiveness and a positive attitude.
A mentoring relationship is one in which a person with greater experience, expertise and wisdom teaches, guides, directs and counsels another to develop, both personally and professionally. The mentor serves as a tutor to help the candidate sharpen their CPS skills, offering insight, perspective, and knowledge that is useful to him or her.
The relationship begins well before the first pre-class meeting and continues throughout the 32 -hour course, hopefully well beyond that! The goal is to provide a teaching/classroom environment that the candidate can learn and benefit from.

An effective mentor:

- Sets high performance expectations
- Offers challenging ideas
- Builds self-confidence
- Guides through example
- Offers encouragement
- Motivates
- Is a good communicator
- Shows respect
- Encourages and models professional behavior
- Understands the importance of empowering the candidate
- Is available as needed (and as required) to provide assistance, advice and support
- Allows the candidate to make decisions and have independence

Tips for success:

- Preparation and firm expectations are key to the success of a mentor/instructor candidate relationship. The pre-class meetings will provide this critical element.
- The candidate must be aware of each skill-set being evaluated and be familiar with the evaluation tools that will be used to complete this process. (Candidates should be encouraged to download and review all paperwork from the CPS Certification Web site so that they are completely familiar with all requirements.)
- A feedback session after each module is a significant part of the process. The candidate must expect and be prepared for these important sessions, which allow debriefing and sharing of thoughts, perceived successes and areas of concern.
- These meetings provide an opportunity for the mentor to give respectful and constructive feedback. The immediate feedback allows the candidate to feel good about his or her successes and gain a sense of confidence and comfort, knowing they are doing well. It also gives him or her a chance to make adjustments before teaching their next module or leading the next hands-on experience.
- These sessions can help reduce the stress level and provide a more comfortable teaching environment, too!
- These interactions should follow a specific outline, be brief, positive, constructive and informal.
- Mentors must recognize the ethical responsibilities inherent in the mentor/instructor candidate relationship. They should be willing to share honest comments, which may include criticism. Though this can be uncomfortable, it's a necessary step in the process and will help candidates become better instructors.
- Involving the entire instructor team can enhance the learning experience for the candidate. Each instructor has the potential to provide mentoring in some way, so he or she should be included when possible/practical. Team members are able to provide advice, support and encouragement -- and build a sense of camaraderie, which is positive for the entire team.
- An instructor candidate needs to be comfortable sharing his or her own concerns and asking questions without the fear of being ridiculed or judged. Working as a team and having open communication throughout the course helps to insure this. A good mentor is approachable!
- As with all classes, there should be a day-end meeting to debrief, discuss the candidate's progress, student progress, the day's successes, needed improvements, etc. Class set-ups, agenda assignment reviews for the next day, and any last minute issues should be handled before leaving the classroom at the end of each day. The instructor candidate should be included in these daily sessions - as he or she is an important part of the team.
The last step in the process involves a Final Feedback Session at which time each session's results are tabulated and reviewed with the candidate, and final recommendations made. This session is a formality and should involve no surprises. The candidate should already have a clear understanding and awareness of his or her progress from receiving feedback after each session, as well as at the end of each day. The final meeting is to let the candidate know if he or she has met the minimum requirements, and have what he or she needs to teach the program as a certified instructor!


# Chapter 1 Learn, Practice, Explain 

(Student Manual page 1)
Hand Snd
National Child Passenger Safety Certification Training

Chapter 1: Learn, Practice,
Explain

Chapter length of time: Approximately 55 minutes.

## Activity total time: $\mathbf{1 0}$ minutes.

- Activity 1: Meet Your Neighbor - 5 minutes
- Activity 2: Learn, Practice, Explain - 5 minutes


## Video:

Video clips are available for this chapter. Refer to the readme_first_video.txt file on the instructor CD.

## Pre-class setup:

- Collect completed vehicle forms from students. Note: These should describe vehicle make, model, year, license plate number, and color. At this time, instructors should quickly determine what types of occupant protection systems are available. If there is not enough variety of seatbelt systems, efforts should be made to obtain additional vehicles.
- Collect and label keys.
- Provide table tents for student and instructor names.
- Be familiar with state CPS law.
- Supply name tags (enough for entire course).
- Have a variety of child restraints (CRs).
- Have access to a variety of vehicles.
- Turn off cell phones

CLASSROOM NOTES:
$\qquad$
$\square$
$\square$ $\longrightarrow$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\square$
$\longrightarrow$
$\qquad$
$\qquad$
$\qquad$
$\longrightarrow$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\square$
$\square$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## Appendix Materials:

- "Using your new skills"
- "National CPS Resources"
- "Child Restraint and Vehicle Manufacturer Contacts"


## STUDENT NOTES

- This chapter will explain the role of the child passenger safety technician (CPST) and teach the certified technician how to help parents/caregivers safely transport their child based on the child's age, weight, height, physical development, and needs.


## Chapter Objectives

-Explain course expectations
-Discuss how to reach diverse caregivers
-Discuss the needs of caregivers
-Identify the best ways to communicate

- Explain best practice


## INSTRUCTOR NOTES:

Review chapter objectives.
State that this course will:

- Explain course expectations
- Explain Child Passenger Safety (CPS) Technician Role
- Introduce Learn, Practice, Explain


CLASSROOM NOTES: $\square$

## INSTRUCTOR NOTES:

## Activity 1: Meet Your Neighbor - 5 minutes (Be brief!)

Instructions: Ask all students to introduce themselves to the group by using the information in the slide.

- Review ground rules:
o Participants should show respect for fellow classmates.
- One person speaks at a time.
- Class will begin and end on time.
- Everyone should turn cell phones and pagers off or on vibrate.
- There is no such thing as a dumb question.
- Provide administrative information (e.g. location of restrooms, phones, etc.).
- In most cases, child passenger injuries and deaths can be prevented.
- Seat belts, air bags, and CR systems help save lives and prevent injuries; they need to be used every time and used properly.
- CPS stands for child passenger safety.


## Why Are We Here?

-Traffic crashes can happen to anyone at any time
-Education can prevent injuries and deaths
-We can make a difference before a crash occurs
-Nationally certified CPS technicians can make a difference

## INSTRUCTOR NOTES:

- Ask class members to raise their hands if they have been involved in a crash or know someone who has been.
- Point out that students can make a difference by providing basic education to others about safely transporting themselves and others in their care.
- Point out that "CPS" stands for "child passenger safety" and that you will explain new terms as they are introduced in each chapter.


## Course Expectations

-Stay for the entire course
-Use your workbook and participate in class discussions and hands-on activities
-Pass all assessment/skills evaluations -Attend checkup event
-Ask questions

- Students should dress comfortably.
- Activities will take place in the classroom and outside in vehicles regardless of the weather.
- Hands-on evaluation and assessment activities are required.
- Active participation in an end-of-class checkup event is required.
- The instructor team will assist students as needed and follow the schedule. In exchange, students should arrive to class on time.


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## Assessment:

- Three skills test
- Must pass each one
- Three written quizzes
o Must get a total of 42/50 correct


## Assessments

-Three skills tests

- Muat pase each one
-Three writhen quilzes
- Muat get a totai of 42 out of 50 tomect ( $84 \%$ )
* May ute all available restources
+ Your morkbook is your II resource
+ No rebests are alowed. II you fel to soore $42 / 50$ correct - you muat retaize the entire class
+ 'Open book' does not mean ewvy
- Use all available resources.
- Your workbook is your \#1 resource.
- If you fail— no retests are allowed.
- 'Open book' does not mean that the tests are easy. Students who do not read and study the material are likely to fail the written tests.


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Emphasize that the students know the material in their workbooks and must take advantage of all class exercises, both in the classroom and in the vehicles, in order to be prepared for and to pass the skills tests.
- Emphasize to the students that 'Open book' does not mean that the written tests are easy. Students who do not read and study the material are likely to fail the written tests.
- Emphasize that any students who may have difficulty with the written test due to English being a second language or other test-taking or reading difficulties should discuss possible accommodations with the Lead Instructor BEFORE it is time to take the first test.
- Emphasize the vigorous physical requirements of this training program. Students should talk to the Lead Instructor if they have any doubts about their physical ability to fulfill course requirements due to size, disability, or illness.



## CLASSROOM NOTES:

- Learn the facts/skills/information.
- Practice your new skills/information.
- Explain (teach) what you have learned to parents/caregivers.

GOAL: Gain the information to help parents/caregivers safely transport their families.

Learn, Practice, Explain (LPE) applies to technicians, instructors, and parents/caregivers. The LPE principle begins today and continues once you are certified

## INSTRUCTOR NOTES:

- Explain the guiding principles, letting students know that they will use these principles to help parents/caregivers safely transport their families.
- Point out that this course will be taught using these principles.
- It is better to work with a partner who has more experience whenever possible.
- Keep updated on new CPS changes (for example, new child restraints and new policies).
- Go to the CPS Certification Web site to find Technicians in your area and to read about current recertification requirements
http://www.safekids.org/certification
- Refer to "National CPS Resources" and "CR and Vehicle Manufacturer Contacts" in the Appendix.


## INSTRUCTOR NOTES:

- Provide an example of the benefits of certification, such as helping the community.
- Stress the need to learn more about the certification process and policies by going to the CPS Certification Web site, updating your profile, etc.
- Stress that Technicians and Instructors must recertify every two years. Refer students to the CPS Certification Web site for current recertification requirements. Stress that they must keep their profiles updated with current contact information in order to be reminded in a timely manner about recertification requriements and deadlines.
- Discuss how to keep updated on changes in CPS by going to conferences, reading publications, and Web sites.
- Point out that it is OK to say, "I don't know." It is important to follow up by finding out the answers to any questions.
- Refer students to "National CPS Resources," "CR and Vehicle Manufacturer Contacts," and "Using your new skills" in the Appendix.

When You Successfully Complete This Course, You Will...
-Be a nationally certified CPS Technician -Know the basics about vehicle occupant protection
-Be able to talk to parents/caregivers about CPS

CLASSROOM NOTES:
$\square$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## National CPS Certification Program: A Partnership

## - NHTTSA

+ Dreeloped the onginal curricilum in the mis-1995s
+ Updetes contert as needed
- National CPS Board
* Overnees the quality and integrity of the trwing and certication requirements
- Certifying body - Safe Kids Worldwide
+ Responsible for administering all aspects of certifation
- The National Child Passenger Safety Certification Program certifies individuals as child passenger safety technicians (CPSTs) and instructors.
- Tens of thousands of individuals have been certified since the program began in 1997.
- CPSTs and instructors put their knowledge to work through a variety of activities, including child safety seat checks in which parents and caregivers receive education and help with the proper installation and use of CR and seat belts.

NHTSA: National Highway Traffic Safety Administration

- http://www.nhtsa.gov.
- CPS information.
- CPS recalls.
- Curriculum updates.

National CPS Board:

- http://www.cpsboard.org.
- Latest certification manuals.
- Committee information.

Certifying body-Safe Kids Worldwide:

- http://www.safekids.org/certification.
- Policies and procedures available online, including recertification and instructor candidacy information.
- Latest certification manuals.
- Frequently Asked Questions.
- Links and resources.
- Directory of nationally certified CPSTs and instructors.
- Communication with technicians (CPS Express, Tech Update).


## INSTRUCTOR NOTES:

- Encourage students to visit these sites for more information.


## NHTSA's Diversity Position:

The United States is a Nation of people with different ethnic, cultural, and religious backgrounds. NHTSA recognizes the need for a broad range of traffic safety programs and partnerships that reflect the rich diversity of America's communities and ensure that everyone benefits from the Agency's lifesaving work. Given that traffic safety problems affect some communities more than others, NHTSA is committed to working with diverse national and

## Diversity and CPS

-Respect differences in attitude, behaviors, and the needs of each caregiver

- Become familiar with NHTSA's position on diversity
-Remember that diversity includes gender, cultural, age, religious, as well as, community differences community-based partners to create, implement, evaluate, and market culturally specific programs and materials.
These efforts will help raise greater awareness within diverse communities about the importance of traffic safety.

Some cultural differences to be considered:

- In some Hispanic and Latino communities, the car seat is blessed before it can be used.
- Some African American and Hispanics feel more comfortable holding a child on their lap in vehicles.
- Some minorities will not seek advice from a public authority such as a police officer.
- Some Arab American communities do not allow the mother to be spoken to if the father is present.
- Think about the diversity within your own community.
- Identify your strategy for reaching your community.
- What are your challenges? What are potential solutions?


## INSTRUCTOR NOTES:

- Review NHTSA's position on diversity.
- Point out that diversity refers not only to cultural or racial differences, but also to differences in learning and communication styles.
- Point out the need for students to be aware of the different ethnic groups in their community.
- Share examples of cultural diversity successes and failures. (Example: Don't hold a checkup at a police station if the community is fearful of the police.)


## How Did The Caregiver Come To You?

-Voluntary

- Checkup event
+ Salety fair display
- Telephone call
-Mandatory
- Judge
- Law enforcement
- Social Services
- Caregivers seek CPS information for many reasons.
- Their reasons may affect the questions they ask and their attitude.
- Whatever the reason, thank them for coming and do your best to make them confident about their new information and skills.


## CLASSROOM NOTES:

- 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.


## 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
- The first video that follows will show what makes a good technician and how to thoughtfully approach an inspection.


## INSTRUCTOR NOTES:

CLASSROOM NOTES:

- Point out that good customer service is an important role for the CPST. Good customer service builds trust with caregivers.
- If the caregiver feels that he/she is not being judged, he/she will be more likely to listen and practice what the technician is teaching.


## What Do You See?



- 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.

Instructions: After viewing each video, the class will discuss the communication skills used by the technicians in each video. 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?


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

## Show the Abbey video 8 minutes

## Instructions:

- Explain to the class that the video will provide a good overview of what a technician does.
- Do not discuss the video at this time since you will discuss it fully in Chapter 14.
- Also mention that the other two video clips that follow will show good and bad examples of a technician as well.


## What Do You See? 10 minutes

Instructions: After showing each video, use the following questions to lead discussion. This discussion should help the class practice good communication skills.

- Did the technician respond in a positive manner to the caregiver?
- Did the technician communicate well with the caregiver?
- Did the parent/caregiver seem to listen to the technician?
- Did the technician seem to listen to the caregiver?
- What could the technician have done differently to better communicate with the caregiver?


## Video 1: What do you see?

## Answer:

- The technician does not communicate in an effective manner.
- The technician is not approachable, nor does she have an empowering attitude toward the parent/caregiver.
- The technician is negative, hostile, not an educator, rude and chewing gum.
- She is negative and makes the parent/caregiver feel that installing the car seat will be almost impossible.


## Video 2: What do you see?

## Answer:

- The technician includes the parent.
- She is an educator.
- She is friendly and open.


## Activity Objective:

To show obvious communication errors to the students

## Materials Needed:

Video Clips

## Best Practices and Tough Choices

-Best Practices

- Find best way to transport a child sately
- 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
- 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 caregivers with available options. Parents/caregivers are then better able to make tough choices about how best to restrain their own child.
- Tough choices are always made by the parent/caregiver, not the technician.
- As a technician, you should never support a parent/caregiver in breaking the law or going against the manufacturers' instructions.
- You should place the parent/caregiver's tough choice on your checklist to prevent liability and risk.

Remember: Watch your attitude and body language when a parent/caregiver does not choose a best practice.

## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

- Give students State Law Handouts.
- Point out that the instructor needs to be comfortable explaining best practices and tough choices and understanding how they are different.
- Show students where to document tough choices on the checklist in the Comments section. Give the following examples:


## EXAMPLE:

- Best practice standard:

1. Children should ride in a booster seat until the adult lap and shoulder belt fits properly, usually when a child reaches around 4 feet 9 inches tall.

## - Tough Choice:

1. The law where you live does not require children to ride in booster seats until they have reached 4 feet 9 inches tall. Instead, the law requires only that children ride in booster seats until the age of 6 .
2. A parent/caregiver wants to follow the law rather than follow best practice.
3. As a technician, it is your job to help the parent/caregiver understand the reason for the best practice.
4. If the parent/caregiver chooses to let the child ride without a booster seat, you cannot stop the parent/caregiver from doing what he/she chooses. In this situation, you should help the parent/caregiver understand the reason behind the best practice standard.
5. Document the parent/caregiver's choice not to follow best practice.

## Activity 2: Learn, Practice, Explain

-Learn: Seek ways to stay updated
-Practice: Look for ways to practice and
share new information
-Explain: Teach families how to travel safely

- Listen to caregivers
+ Support the ability of each caregiver


## Activity 2: Learn, Practice, Explain

## INSTRUCTOR NOTES:

Instructions: Pick two volunteers. One student should be the learner and the other is the teacher.

Have one student (teacher) explain to another student how to tie a shoe. The person giving the instructions should not demonstrate the proper technique. This person should use only words to communicate.

- Activity objective: Simply knowing how to do something doesn't mean it is easy to explain to others.


## STUDENT NOTES

## Chapter Review

Instructions: On the basis of this chapter, please answer the questions below.

1. The role of a CPST is to: $\qquad$
2. What are two things you need to know about a child before you can help a parent/caregiver with CPS?
a. $\qquad$
b. $\qquad$
3. What are two effective communication techniques?
a. $\qquad$
b. $\qquad$
4. Tough choices are made by: $\qquad$
5. What is a best practice? $\qquad$

## Food for thought:

- Do I understand the role of a CPST?
- How will I make tough choices?
- How will I handle questions that I don't know the answers to? How will I get those answers?
- My questions for this chapter: $\qquad$


## INSTRUCTOR NOTES:

## Chapter Review - 5 minutes

Activity instructions: Instruct students to answer the questions on their worksheet.

## 1. The role of a CPST is to:

Answer: Educate and determine attitudes, behaviors, and needs of caregivers.
2. What do you need to know about a child before you can help a parent/caregiver with CPS?

## CLASSROOM NOTES:

$\longrightarrow$
$\qquad$
$\qquad$
$\qquad$

## Answer:

a. Child's weight.
b. Child's height.
c. Child's age.
d. Growth needs, activity needs, or body limitation.
3. What are two effective communication techniques?

## Answer:

a. Use simple language.
b. Speak slowly and clearly.
c. Be patient.
d. Be positive.
e. Listen to the caregiver's needs.
f. Understand how the parent/caregiver feels.
g. Explain, don't lecture.
h. Have an encouraging attitude.
i. Be mindful of culture and learning style.
4. Tough choices are made by:

Answer: The caregiver.

## 5. What is a best practice?

Answer: Standard that will provide the occupant with the most protection.

## Chapter 2 Basics of Injury Prevention and Crash Dynamics

## (Student Manual page 13)

## 

National Child Passenger Safety Certification Training

## Chapter 2: Basics of Injury

Prevention and Crash Dynamics

Chapter length of time: Approximately 25 minutes.

Activity total time: 5 minutes.

- Activity 1: How Do You Prevent an Injury From Becoming More Serious? - 5 minutes.


## Pre-workshop activities:

As an instructor you should research and be able to provide your students with current injury data both locally and nationally. A possible resource is your state Highway Safety Office.

## Video:

Video clips are available for this chapter. Refer to the readme_first_video.txt file on the instructor CD.

## Trainer Tip:

Remember to define terms and concepts, check for understanding, and encourage questions from students.

## Appendix Materials:

"National CPS Resources"

## Chapter Objectives

- Describe signficence of motor wehicle crash imjuries - Explain the CPS and irjury prevention connection - Explain the concept of crash lorces *Narne the types of orawhes
* Describe five wipt that rantisints pievent iepury - buplain why people will not surwwe all crashes
- Distuss common myths about why people don? buckle v9

This chapter is an introduction to injury prevention and crash dynamics and will provide basic information to be shared "curbside" to help the parents/caregivers understand why they need to do what they are asked to do.

## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Resources are available to help students understand these concepts.
- Please direct students to resources and encourage them to seek out local data specific to their community.
- A list of National CPS resources is provided in the Appendix.
- An injury can occur when too much energy is applied to part of the body. This could be the energy of heat in a scald burn, electricity in an electrocution, or the force in a crash.
- An injury can cause death or affect someone for life.


## Injury Prevention

Tr a dipnase werp killing oor chidimen af me rase unintentional iqurres are the puble would be outroged and demand that ini
 Oenery

Our goal is to reduce the risk of injury

- Motor vehicle crashes are one of the single greatest killers of Americans.
- An average of 117 people die each day in motor vehicle crashes - about 1 every 12 minutes!
- Injury prevention is a process used to decrease injuries or death due to an injury.
- Injury prevention does not work $100 \%$ of the time. There can be many factors in a crash that determine the outcome, such as vehicle size, speed, and point of impact.


## INSTRUCTOR NOTES:

Refer students to these resources:

- Motor Vehicle Occupant Protection Facts.
- National Highway Traffic Safety Administration's National Center for Statistics and Analysis.


## Injury Prevention

- Parents should be a role model: Kids will do what adults do
-Children depend on adults for protection in and around vehicles
- Buckle up
- Dove responsbiy
- Drivers who buckle up are more likely to have child passengers who are buckled up. Many studies have confirmed this fact.
- Our goal as CPST is to educate children and caregivers to make buckling up a habit for life.
- We should also share other safety information to make sure children are safe in, under and around vehicles, even when not on the road. Avoiding vehicle backovers, being locked in a trunk, and children being caught in power windows, require on-going education, supervision and attention.

Key message:

- Children may not hear what you say, but they will do what you do!
- Caregivers must buckle up!
- Children must be taught not to play in, under or around vehicles.

CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- The bottom line is: Avoiding a crash is the best prevention.
- Remind student's to share the dangers of backover incidents with parents and caregivers.
- We can get data on deaths related to motor vehicle crashes.
- It's not easy to get data for injuries and figure out the costs involved.
- There are higher health care costs related to injuries than to deaths.

For current injury data:

- Centers for Disease Control and Prevention: http://
 www.cdc.gov/ncipc/wisqars
- Children's Hospital of Philadelphia: http://www.CHOP.edu/injury
- Insurance Institute for Highway Safety (IIHS): http://www.highwaysafety.org or www.iihs.org
- National Highway Traffic Safety Administration (NHTSA): http://www.nhtsa.gov
- NHTSA's National Center for Statistics and Analysis (NCSA): http://www.safercar.org
- State office for highway safety
- State public health department
- Trauma registry
- Vital statistics bureau


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

Share the following information:

- For every death there are approximately 45 injuries that require hospitalization and 1,100 other injuries requiring medical care.


## What Are the Challenges to Crash Survival?

Restraint use decreases as children get older


- Studies show that vehicle restraint use drops as children get older.
- Most children are restrained during the first year of life because they appear to be more fragile and need more protection.
- Experience shows a drop in use for children from 1 to 3 years of age.
- A more important drop in child restraint (CR) use takes place for children from 4 to 7 . This age group is seen as too big for a CR yet too small for vehicle seat belts alone.


## CLASSROOM NOTES:

$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

- For current CR usage rates, please refer to the most recent National Occupant Protection Use Survey and the Partners for Child Passenger Safety Web site: http://www.nhtsa.dot.gov (search-NOPUS) or http://www.CHOP.edu/injury.
- Be sure the class understands that CR means child restraint.
- Non-use of CRs/safety belts remain a problem.
- As a technician you can help educate your community about CR and seat belt use.
- Misuse rates vary from $73 \%$ to over $90 \%$.
- Correct selection, installation, and use of a CR can sometimes be difficult.
- Review educational materials (videos, brochures, handouts, etc.) every year to be sure you are providing

What Are the Challenges to Crash Survival?

1. Nonuse
2. Misuse
3. Outdated or incorrect educational materials
4. Changing behavior accurate and current information.

- By understanding correct use of CRs and seat belt systems, it is easy to see misuse and offer education to correct it.
- It is harder to change the views and actions of those not using restraint systems.
- An example of changing people's actions might be to have the parent/caregiver move a child to the rear seat of the car. That behavior may conflict with parents'/caregivers' desires or beliefs. They may want to see the baby easily or to believe that their child is ready to "graduate" to seat belts and front-seat riding.
- Your job as a technician is to educate parents/caregivers about correct installation and how to avoid future misuse.

Where can you get current information about misuse of CRs locally? Statewide? Nationally?

1. $\qquad$
2. $\qquad$
3. $\qquad$

## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Provide students with resources for finding out current misuse rates in their community and across the nation.


## Examples:

- Children's Hospital of Philadelphia
http://www.CHOP.edu/car seat


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## Activity 1: How Do You Prevent an Injury From Becoming More Serious

Instruction: By understanding the basic principles of crashes and injury prevention, you will be better prepared to educate parents/caregivers.

List three things that may affect a crash other than what is on the slide:

## Activity 1: How Do You Prevent an Injury From Becoming More Serious <br> -There are factors that can be taken into account before, during, and after a crash to minimize or prevent injuries from occurring. <br> - Examples <br> - Road conditions-before the crash <br> - Seat belt use-During the crash <br> -EMS Response Time-After the crash

1. $\qquad$
2. $\qquad$
3. $\qquad$

## INSTRUCTOR NOTES:

## Activity 1: How Do You Prevent an Injury From Becoming More Serious - 5 minutes

## Instruction:

Ask students to list three things that may affect a crash other than what is on the slide?

- Explain to students that there are factors that can be taken into account before, during, and after a crash that can prevent or minimize an injury.
- Use the examples on the slide to start the discussion. Can you think of other factors?


## Examples:

- Drugged/medicated driver—before the crash
- Vehicle maintenance - before the crash
- Road conditions (icy, wet) —before the crash
- Lighting - before the crash
- Presence of median/guardrail—during the crash
- Health (treatment for older, brittle bones) —after the crash


## Newton's Law of Motion

- An object in motion sontinues in motion at the original speed until it connects with an outside force.
- The outside force
- Cen be hemblal (e.g. the sitering mbees, winforiale. porevent, str.)
© Can be tenigent to protect


- Sir Isaac Newton's theory of gravitation and motion states that "An object in motion continues to remain in motion at the original speed until acted on by an outside force." In other words, an object keeps moving in the direction it was headed until it is stopped by something.
- For a vehicle, that object may be the brakes, another vehicle, or a tree.
- For the occupants of that vehicle, it could be the windshield, a seat belt, or CR.
- In a motor vehicle crash, occupants will hit something.

There are three collisions in a crash.
The first collision is the vehicle collision.

- The vehicle begins stopping as it collides with another object.
- The time from crash to full stop in a $30-\mathrm{mph}$ crash is about one-tenth of a second.
- As the vehicle slows, the front of the vehicle crushes,
 taking some of the energy of the crash.
The second collision is the human collision.
- In the human collision, the occupant continues to move toward the point of impact at the same speed even though the vehicle begins to stop once impact occurs.
- The occupant will begin to stop once he or she connects with an outside force.
- An unrestrained occupant will hit the inside of the vehicle, such as a window or other object in the path of motion.
- As that individual collides with the vehicle interior, he or she slows down from 30 mph to a stop in a few hundredths of a second, with only the body to absorb the energy of the crash
- For a restrained occupant, however, the outside force will be met by a seat belt or the harness of a CR.

The third collision is the internal collision.

- In the internal collision, the occupant's internal organs move toward the point of impact and hit other organs, bones, and the skull.
- Even though the body may appear uninjured, the liver, spleen, heart, or other organs may be torn, bruised, and/or caused to bleed.
- Impacts to the head may cause "closed head injuries" resulting from the soft tissue of the brain hitting the skull or being torn as the skull fractures.
Any of these injuries may be hard to see immediately, yet they can be deadly.


## INSTRUCTOR NOTES:

CLASSROOM NOTES:
Make the following points:

- People may be disturbed by the second photo. This picture shows a 2 -year-old child who was thrown out an open window during a side impact crash.
- This child and her sister were killed in Fairfax County, VA. Her sister hit the inside of the vehicle and was thrown out the same window onto the roadway because she was unrestrained.

- In any crash, even a minor one, the people in the vehicle can be seriously injured.
- Most people don't know how much force a moving vehicle has.
- Consider this: A car going 40 mph would hit a tree with the same force as hitting the ground after falling off a 50 foot cliff. A person inside the car would hit the windshield with the same force as hitting the ground after a fall from a five-story building.
- It is important for parents/caregivers to understand that the forces involved in a crash can kill or cause serious injuries to their child.
- One way to help the public understand such forces is to explain that the force needed to restrain an occupant roughly equals the weight of the occupant times the pre-crash vehicle speed. For example a 10 -pound infant in a motor vehicle moving at 30 mph could require at least 300 pounds of force to keep from moving forward.
- How much do you weigh? If you were in a crash at 40 mph , what is the restraining force? $\qquad$ .
- It is important for parents/caregivers to understand that holding a child in their lap or unrestrained may by dangerous to the child.


## CLASSROOM NOTES:

$\qquad$

## INSTRUCTOR NOTES:

- Stress to students that this formula is very effective when they talk to parents/caregivers about crash forces.
- Different types of collisions pose different risks to vehicle occupants.


## Types of Crashes

-Different types of collisions pose different risks to vehicie occupants

INSTRUCTOR NOTES:
CLASSROOM NOTES:

- Point out that we will be looking at the different types of injuries can be expected in different types of crashes.


Frontal collisions: most frequent type of crash.

- Vehicle is moving forward and is stopped suddenly by an object.
- Common injuries: skull fractures, spinal fractures, broken ribs, cuts and bruises to head and face, larynx injuries, liver and spleen injuries.

CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Point out characteristics of car from impact: crumple zones, opened air bag.

Side impact collisions:

- Vehicle is impacted on one side.
- There is not a lot of space between the striking vehicle and the occupant.
- Side impacts are the most dangerous for occupants sitting on the same side as the impact.
- Many occur at intersections as result of motorists' running
 a red light, ignoring yield/stop signs, or not paying attention to oncoming traffic when turning left or right.
- There is no significant difference in the number of fatalities for right- and left-side impacts.
- Injuries can occur whether or not the occupant is belted, but tend to be more serious if restraints are not used.


## INSTRUCTOR NOTES:

Ask what kind of injuries you would expect.
Answer: Chest and pelvic injuries, facial and skull fractures or lacerations (torn wounds), liver and spleen injuries


Rear collisions: accounts for a small number of fatalities.

- May occur when both vehicles are moving forward and when the front vehicle is stopped.
- After impact, the vehicle moves forward, pushing the occupant's body out from under the head. The head rotates back (unless held in place by a properly positioned head restraint) and then is thrown forward. The occupant's head moves toward the point of impact.
Common injuries: cervical fractures and stretching/tearing of anterior ligaments and tendons.


## CLASSROOM NOTES:

$\qquad$
$\qquad$ INSTRUCTOR NOTES:

- Point out the damage to the rear of the car while sides and front appear to be untouched.

There are several types of rollovers.

## Rollovers:

- Rollover crashes occurs when the vehicle rolls over onto side or top (upside down) one or more times.
- Rollovers are often responsible for occupants being thrown from vehicles.
Vaults:


A vault is the type of rollover crash when a vehicle flips end over end one or more times.

## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Students may hear people say they ignore vehicle restraints because they are afraid of being trapped by their belt in a fire or deep water.
- Explain to students that even in the very rare chance of a vehicle fire or landing under water, a properly belted occupant are more likely to be uninjured and conscious, and thus able to free him/ her from the vehicle.
- Point out the damage to all areas of the vehicle.


## Non-Collisions and Other Events

- Non-collisions = spins, skids, swerves, emergency braking
-Common causes of occupant infuries:
+ Thrown out of windows or doors
- Collded with other ocoupanes
- Struck vehile irterior

Two dangerous crash events can occur in almost any crash or chain of crash events:

- Rotations or spins: In a rotation, unrestrained occupants are more likely to be injured as they hit the vehicle interior repeatedly and are much more likely to be thrown from the vehicle than restrained occupants are.
- Ejection: People who are thrown out a window or door skid along the pavement and may be pinned or crushed under a vehicle. Landing gently on a soft surface is highly unlikely.


## INSTRUCTOR NOTES:

- Define non-collisions and discuss cause of injuries.
- A common myth about seat belt use is that people are better off being thrown clear of a crash. People thrown from a vehicle are four times more likely to be killed than those who remain inside.
- Restraints are designed to contact the body at the strongest parts of its structure. For an older child and adult, these parts are the hips and shoulders.
- Restraints are designed to spread crash forces over a wide area of the body, putting less stress on any one part.


## Five Ways Restraints Prevent Injury

1. Keep peopie in the vehicle
2. Contact the strongest parts of the body
3. Spread forces over a wide area of the body
4. Help the body to slow down
5. Protect the brain and spinal cord

- Lap-and-shoulder belts and CR harnesses spread the force across a large area of the body.
- A rear-facing CR spreads the force along the entire back, neck, and head.
- A quick change in speed is what causes injury. When a vehicle impact occurs in a crash, the vehicle crush zones help to extend the time it takes for the vehicle and its occupants to slow down.
- Restraints allow the body to slow down with the crash. This extends the time when the forces are felt by the occupant during a crash.
- Restraint systems protect the head and spinal cord.
- A shoulder belt or harness helps to keep the head and upper body away from the hard interior surface of the vehicle.
- Correct fit is very important.


## INSTRUCTOR NOTES:

- It is important that your students understand these five key points in order to educate caregivers effectively about preventing or reducing injuries through proper restraint use.
- An example of spreading crash forces:
- Poke your arm with your finger directly with pressure.
- Do you feel it in one place or all over? If you did it hard enough and long enough, could it possibly cause a bruise or sore spot?
- Now use the palm of your hand with the same pressure. Does it feel the same?
- The force has been spread to a wider area and is not as intense.
- Also note that unbuckled front or back seat passengers can hit and injure other people in the vehicle.

CLASSROOM NOTES:
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

You Can't Survive Every Crash
-5ome crashes are so violent that even
properly restrained occupants are injured or billed

- Many factors determine injury outcome (size, weight, and speed)
-Seat belts and air bags or a CR =
The Best Chance of Survival
- Some crashes are so violent that even properly restrained occupants are injured or killed.
- Factors such as the size, weight, speed, and direction of the vehicles involved in the impact will affect the outcome.
- If the occupant compartment is crushed, restraints may be unable to prevent injury or death.


## CLASSROOM NOTES:

$\qquad$

## INSTRUCTOR NOTES:

- Emphasize that the best way to reduce injury in a crash is through proper restraint systems for all ages.
- Point out that students may hear from crash survivors that they were better off because they were unbelted.
- Unrestrained occupants occasionally survive crashes in better condition than those restrained.
- Such exceptions do not change the fact that seat belts, air bags, and CRs increase the chances of survival.

There are many common myths in our communities about CR and restraint use. It is helpful to be familiar with these as you will encounter them curbside.

## Common Myths

1. "It is better to be thrown out. The car might burn or I might drown. I don't want to be trapped in my belt."

Response:

- Your are four times more likely to be killed if you are thrown from the vehicle.
- Less than one half of one percent of all crashes involves fire or water. It is generally better to be restrained during the crash so you are more likely to be conscious, uninjured, and able to escape.


## 2. "I can hold my baby in a crash."

Response:

- The forces (weight x speed) in a crash are so great that it is impossible for any person to hold onto a baby's body.
- If the adult is also unrestrained, it is likely he or she will crush the child.

3. "Restraints are uncomfortable for me and my cbild."

Response:

- People who get in the habit of buckling up find it uncomfortable to ride without them.
- It is a lot more uncomfortable to be injured.


## 4. "I am a good driver, so I won't get into a crash."

Response:

- You can never predict or control what other drivers will do, or how the weather may have changed the roadway.

5. "I'm only going down the street to the store. I always buckle up when I drive on the highway."

Response:

- Most crashes happen close to home.
- Roads and streets are more hazardous than highways because traffic is usually going two ways and there are many intersections and distractions.
- Major highways are less hazardous because they have one-way traffic, good signs, lighting at intersections, and gradual curves.
- They are also more like to have guard rails and break-away poles that help minimize incidents or crashes that do occur.


## Chapter Review

-How do you calculate crash forces?
-What is the most common type of collision?
-What are the 5 ways restraints help prevent ar reduce injuries?

- How do you calculate crash forces?
- What is the most common type of collision?
- What are the five ways restraints prevent or reduce injury?

CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Review key information covered in this chapter.


# Chapter 3 Who Makes the Rules? 

(Student Manual page 31)
"oting ind
National Child Passenger Safety Certification Training

Chapter 3: Who Makes the Rules? Understanding the Governnment's
Role in Vehicle and Child Seat Safety

Chapter length of time: Approximately 15 minutes.

Pre-workshop activities: None.
Activities total time: 0 minutes.
Video: None.

## Instructor Tip:

- This chapter contains technical information.
- Explain terms as they are introduced to the group.
- Give examples.
- Check for understanding.


## Appendix Materials:

- NHTSA Child Safey Seat Registration Form
- NHTSA Child Safety Seat Questionaire to Report a Complaint, Defect or Incident
- NHTSA Quick Reference Guide to FMVSS's
- SBSUSA Highlights of FMVSS 213
- SBSUSA Highlights of FMVSS 225
- NHTSA Child Crash Test Dummies

CLASSROOM NOTES:

## Chapter Objectives

-Describe the relationship between NHTSA and vehicle and CR manufacturers
-Identify non-regulated products

- The National Highway Traffic Safety Administraton (NHTSA) is the Federal agency responsible for motor vehicle and highway safety.


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Inform students that many acronyms will be used in this course - for example, NHTSA stands for National Highway Traffic Safety Administraton.
- Many of these terms appear in the Glossary; refer students to the Glossary throughout the course.


## STUDENT NOTES

- NHTSA's mission is to save lives, prevent injuries, and reduce traffic crash costs through education, research, safety standards, and enforcement activities.

What is the National Highway Traffic Safety Administration?
-NHTSA is the agency within the U.S. Department of Transportation focused on occupant safety
-Responsible for setting and enforcing safety standards for motor vehicles and motor vehicie equipment (for example, CRs)

## INSTRUCTOR NOTES:

- Explain to students that providing this curriculum is one example of how NHTSA supports occupant protection and child passenger safety education.


## Functions of NHTSA

-Education
*Enforcement (two kinds)
-Research
-Regulations
-Compliance testing
-Defect investigation

## Education:

- NHTSA provides a variety of traffic safety training programs.
- NHTSA produces brochures, posters, statistics, and fact sheets that you can get from www.nhtsa.gov.
- Ten regional offices work closely with State and local agencies in carrying out safety programs.


## Enforcement:

- There are two types of enforcement:
- NHTSA provides funding to promote occupant protection by working with the law enforcement community and media campaigns such as Click It or Ticket.
o It enforces its standards by selecting certain products on the market to see if they meet Federal standards.


## Research:

- NHTSA conducts and/or funds research to demonstrate and evaluate programs related to traffic safety.


## Regulations:

- NHTSA sets performance and some design standards.
- This class focuses on NHTSA's involvement with seat belts, air bags, CRs, and other occupant protection systems.


## Compliance testing:

- NHTSA does not certify CRs before they go to market.
- Vehicle and CR manufacturers self-certify their products as meeting NHTSA performance standards.
- This means that products are sold on the basis of manufacturer testing and assurances.
- NHTSA requires all manufacturers to label their products in accordance with these regulations and randomly tests these products.


## Defect investigation and recalls:

- NHTSA tests products that have been reported by the public or manufacturer to have a potential problem.
- If a real problem is identified, a recall of the product may follow.
- Manufacturers can issue a recall before involving the Government if a problem is known to them. This information is made available by NHTSA and is referred to in the field as the Recall List.
- A CR that is missing its label may be dangerous to use as recalls cannot be determined.
- This list includes information on every recalled CR and is updated on an as-needed basis (when new recalls are announced).
- For more information go to http://www-odi.nhtsa.dot.gov/cars/problems/recalls/childseat.cfm
- Each CR comes with a product registration form that parents/caregivers should complete and mail back to the manufacturer. Refer to the Appendix for a copy of the form.
- Manufacturers can then let product owners know if there is a recall.
- If a parent/caregiver has not sent in a car seat registration form, he or she can submit the NHTSA CR Registration Form, provided in the Appendix, or can submit a registration form online thru the manufacturer's Web site.
- Not all recalls directly affect performance. For example, an error printed in the Spanish instructions would not concern English readers.
- Some recalls do not impact crash performance (for example, a defect reported about a carrying handle will not affect the CR during a crash.)
- All recommendations provided by the manufacturer should be followed.


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

Make the following points:

- Manufacturers do not send products to NHTSA for testing.
- NHTSA tests randomly.
- Manufacturers self-test their products and then must provide documentation to NHTSA if asked.
- Research: Some examples of NHTSA's research and data collection include FARS (Fatality Analysis Reporting Systems), NOPUS (National Occupant Protection Usage Survey), and MVOSS (Motor Vehicle Occupant System Survey). The results of these activities are on the Agency's Web site.
- Defect investigation: NHTSA will test products after several complaints. Students should encourage parents/caregivers to notify NHTSA of a potential problem so that the Agency can take action if appropriate.

Consumer Information Reporting Defects
*Parent/caregiver reports the problem
*Where to report it:
+Manufacturers

+ wwow-odi.nhtsas dot.gov/cars/problems/ recalls
- DOT Auto Safety Hotine

1-836-DASH-2-DOT

- Consumers need only to report it once through one of the options on the slide.
- It is the responsibility of the CR owner, not the technician, to report the defect to both the manufacturer and NHTSA. However, technician reports are encouraged.
- Technicians should provide the CR owner with NHTSA’s contact information.

NOTE: The reporting form is in the Appendix.

## CLASSROOM NOTES:

$\square$

## INSTRUCTOR NOTES:

Make the following points:

- The instructor should reinforce the role of the technician as an educator.
- It is the consumer's responsibility to report the problem and make sure that our motor vehicles and products like CRs are as safe as possible.
- A copy of the defect reporting form can be found in the Appendix.

FMVSS = Federal Motor Vehicle Safety Standards; see Glossary

LATCH $=$ Lower Anchors and Tethers for CHildren

## FMVSS 208:

- This standard regulates seat belts and frontal air bags.
- Beginning with 1996 vehicle models, all passenger seat belt systems must lock to secure CRs. (Driver belt
 systems do not need to lock because CR will never be installed in this position.)


## FMVSS 213:

- This rule provides CR performance standards for children up to 65 pounds.
- Some of these standards include:
o Crashworthiness (how a CR holds up in a crash)
- Labeling and instructions
- Flammability
- Buckle release pressure
- NHTSA randomly tests CRs on a vehicle bench seat in a 30 mph frontal crash involving crash test dummies.
- LATCH-on CRs have two parts:
- Top tether reduces forward movement (excursion).
o Lower anchors replace seat belts for installation.


## FMVSS 225:

- LATCH-in vehicle has two parts
o Top tether anchorage points (required in three seating positions in vehicles with two or more seating positions except on school buses)
- Lower anchorages in or near seat bight (the base/crack of the seat; required in two seating positions)
- Standard provides requirements for the location and strength of child restraint anchorage systems for light duty passenger vehicles manufactured after September 2002. Additional Information about FMVSS's related to CPS can be found in the Appendix.


## INSTRUCTOR NOTES:

- Explain to students that this is a basic overview of the key CR-related Government regulation of

CLASSROOM NOTES:
$\qquad$
$\qquad$

## CLASSROOM NOTES:

$\qquad$
$\qquad$
manufacturers. This lays the groundwork for what we are going to learn in upcoming chapters.

- For more LATCH information, refer to the fact sheet in the Appendix.
- Point out that additional information about LATCH will be covered in a later chapter.
- CRs are tested as if they were actually in a frontal crash at 30 mph with crash test dummies representing children of average weight for specified ages properly secured in CRs on a vehicle bench seat.
- Tests have limits and can't duplicate every real-life crash situation in the lab.
- Tests are performed on bench seats, but many vehicle seat types exist in the real world.
- It is not possible to test every CR type in every vehicle type.
- Tests are frontal crashes because that is the most common type of crash. (Manufacturers may do more tests such as rollover and side impact).


## INSTRUCTOR NOTES:

CLASSROOM NOTES:
Refer students to the FMVSS-related documents in the Appendix:

- NHTSA Quick Reference Guide to FMVSS's
- SBSUSA Highlights of FMVSS 213
- SBSUSA Highlights of FMVSS 225
- NHTSA Child Crash Test Dummies


## Non-Regulated Products

-No Federal regulations
-Assessment of the product
Examples:

- Belt-tightening tool
- Seat belt adjusters
- Toys attached to CR
- Suction window shades
- Rear-tacing mirrors

Products that are not regulated are sometimes called aftermarket products and are designed to improve the comfort, fit, or installation of CR and/or seat belts. Some examples are infant head-positioning pads and shoulder belt positioning devices.

## However:

- There are no Federal standards for these products. For example, a seat belt adjuster label may say the product "meets all applicable federal standards" when there is no Federal standard.
- Carefully read all manuals and instructions, including vehicle and CR manufacturers' instructions and recommendations. Many warn against using "extras" with their products.
- Some devices can injure if not properly secured during a crash. Suction window shades and mirrors are two examples of objects that can harm vehicle occupants during a crash. Window shades that stick to the windows are better to use.
- Manufacturer-tested and -approved accessories such as toys for their own CRs or shoulder belt adjustable clips are fine.
- There is a difference between seat belt adjusters that come with booster seats (manufacturer-tested and endorsed) versus those that are sold independently.

Remember: Parents/caregivers make the final decision regarding use of these products. As technicians, we advise and educate.

## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## Demonstration:

- Show and discuss with the class a variety of nonregulated items.


## Materials needed:

Variety of non-regulated items, including at least one manufacturer-approved accessory to be used on that manufacturer's product and at least one non-approved item.

## Remind students that:

- Some devices can injure if not properly secured during a crash. Suction window shades and mirrors are two examples of objects that can harm vehicle occupants during a crash. Window shades that stick to the windows are better to use.
- Manufacturer-tested and -approved accessories such as toys for their own CRs or shoulder belt adjustable clips are fine.

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 securting child in CR
+ Ease of instaling CR in velicie
- Clarity of written instructions
- 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.


## CLASSROOM NOTES:



## INSTRUCTOR NOTES:

- Stress to students the importance of not offering personal recommendations.


## Activity 1: Chapter Review

Instructions: Use your workbook to answer the questions.

1. What is NHTSA? $\qquad$

## Chapter Review

-What is NHTSA?
-What are the basic Federal regulations for vehicles and CRs?
-What are non-regulated peoducts?
-Give three examples

- Ust two ways to report a defect
-What is NHTSA's Web site address?

3. What are non-regulated products?

Examples $\qquad$
4. Who do you report a product defect to? $\qquad$
5. What is NHTSA's Web site address? $\qquad$
6. Where can you find the most updated recall list? $\qquad$

- Do I understand NHTSA's role in CPS?
- Do I have any other questions about non-regulated products or reporting defects?

7. What are the basic reasons recalls may be issued? $\qquad$

## INSTRUCTOR NOTES:

## Activity 1: Chapter Review-5 minutes

Instructions: Have students complete this in-class review worksheet or provide as a homework assignment.

## 1. What is NHTSA?

National Highway Traffic Safety Administration
2. What are the three basic Federal regulations for vehicles and CRs?

FMVSS 208, FMVSS 213, FMVSS 225

## 3. What are non-regulated products?

## Examples:

Non-regulated products that are designed to improve the comfort, fit, or installation of CRS and/or seat belts.

## CLASSROOM NOTES:

$+$

- Shoulder belt-positioning devices
- Belt-tightening tools


## 4. Who do you report a product defect to?

- NHTSA
- CR Manufacturer

5. What is NHTSA's Web site address?
http://www.nhtsa.gov
6. Where can you find the most updated recall list?
http://www.nhtsa.gov
OR
http://www-odi.nhtsa.dot.gov/cars/problems/recalls/ childseat.cfm

## 7. What is the basis of a recall?

Product non-compliance is when a product does not conform to safety standards. An example such as flammability standard not met or a seat utilizes an assembly where a variation in the components resulted in the potential for a buckle to release. This does not conform to dynamic testing requirements of FMVSS 213.

- Detected defect is when an error is found with part of a safety seat. An example would be that a base is defective and should not be used with the carrier. The carrier may be used with a seat belt until the base is repaired or replaced according to the manufacturers' corrective action. Emphasize that manufacturer's corrective action needs to be followed. Many seats are crashworthy even when a repair is needed.


## Chapter 4 Seat Belt Systems with Pre-Crash Locking Features

Chapter length of time: Approximately 50 minutes.

## Pre-workshop activities:

- Teach outside in vehicles whenever possible.
- Support what you saw outside with the slides when you return to the classroom.
- Instructor team identifies all vehicle seat belt systems to determine pre-crash locking capacity.
- A cheat sheet identifying pre-crash seat belt locking features in specific vehicles is provided to each member of the instructor team.


## Video: None.

Activity total time: $\mathbf{4 0}$ minutes.

- Activity 1: Workbook Activity: Pre-Crash Locking Latchplates - 5 minutes.
- Activity 2: Workbook Activity: Pre-Crash Locking Retractors - 5 minutes.
- Activity 3: Putting It All Together (inside or outside) - 15 minutes.
- Activity 4: Identifying Retractors and Latchplates-15 minutes.
(Student Manual page 41)


## 果新 $\sin 2$

National Child Passenger Safety Certification Training

Chapter 4: Seat Belt Systems
With Pre-Crash Locking Features

CLASSROOM NOTES:
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\square$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\square$
$\qquad$

## Trainer Tips:

- Cover as much of this chapter outdoors as possible, depending on weather, class size, etc.
- There will be a series of demonstrations in this chapter. Be prepared for each activity.
- If class size exceeds available learning resources, ask students to alternate in hands-on activities.
- Prepare hands-on activity instructions and assign instructors or technician assistants to designated vehicles; rotate student groups through demonstration vehicles. Demonstration is a significant portion of this chapter, so it must be fully organized well before related activities begins.
- Instructors and technician assistants MUST know all vehicle seat belt systems in all available vehicles, in all seating positions, prior to this exercise. Note vehicles that have pre-crash locking features. Remember that the driver seating position does not have pre-crash locking ability in most vehicles. This may be needed for comparison for students having difficulty understanding the concept.
- You may want to combine activities in this and the next chapter.


## Appendix Materials: None.

## Chapter Objectives:

-Explain the connection between precrash locking seat belt systems and $C R$ installation
-Identify seat belt parts
-Describe types of pre-crash locking seat belt systems
*Observe an instructor secure a CR using a pre-crash locking seat belt system

## INSTRUCTOR NOTES:

CLASSROOM NOTES:

- Review chapter objectives.
- Stress that something on the seat belt must lock the CR in the vehicle. That means either the retractor or the latch plate must secure the CR.
- This chapter focuses on seat belts with pre-crash locking features.

The CR and Seat Belt Connection
-All seat belts are designed to lock in a crash
*Correct CR installation requires a precrash locked seat belt system
*Something has to lock the CR in the vehicle

- A technician must reassure the parent/caregiver that all seat belt systems are designed to lock in a crash.
- Once installed the right way, a CR should not move more then 1 inch side-to-side or front-to-back. It will not fall over when the vehicle turns. The seat belt will stay locked in the same position - creating a fixed length of webbing in the LAP part of the seat belt.
- Pre-crash locking seat belts will lock in one of two places: the latchplate or the retractor.
- This chapter looks only at seat belts that have a pre-crash locking feature. You will learn to identify pre-crash locking features.
- A CR needs to be pre-crash locked at all times in a vehicle so that the CR is correctly positioned prior to crash.
- Not all seat belts provide pre-crash locking.
- We will talk about these systems in a later chapter.


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

Review the following information:

- All vehicles have been required to have a pre-crash locking seat belt feature, either at the retractor or the latchplate, since MY 1996.
- You will need to know how to check to see if the seat belt used to install a CR has a pre-crash locking feature.
- Point out that a properly installed CR should not move more then 1 inch side-to-side or front-to-back. It does not have to be so tight it does not move at all. Stress that creating a fixed length of webbing in the LAP part of the seat belt is the key to a secure installation.
- Misuse includes a CR not secured tightly or that fell over during turns and normal driving.
- Seat belts that are always pre-crash locked during a crash or sudden stop are required for a properly installed CR.
- Seat belts that do not provide pre-crash locking features will be discussed in a later chapter.

You must learn the correct names for seat belt parts in order to provide pre-crash locking in vehicles and to see what they look like.

- Buckles accept the latchplate and hold the seat belt in place.
- Retractors gather and store extra webbing in the vehicle. Most lap-shoulder seat belts have one retractor at the shoulder while a few have two - one at the shoulder and one at the floor. Technicians need to help vehicle owners find and correctly use the seat belt retractors in their vehicles.


## Name the Seat Belt Parts

-Buckle
-Retractor
-Anchors
-Webbing
-Latchplate

- Anchors are the places in the vehicle where seat belts or tethers are attached, generally at the factory, to a strong location.
- Webbing is the fabric part of the seat belt that crosses the person or holds the CR.
- Latchplates are the seat belt part that connects the seat belt webbing to a buckle in the vehicle.


## INSTRUCTOR NOTES:

- Explain about parts that may not be easy to see. Use a tether anchor point to show that some anchors are easily seen.
- There are two places where seat belts can pre-crash lock: at the retractor (located at either the shoulder or floor position) or the latchplate (at the hip, if it were used on a person).
- Some vehicles (mostly older vehicles and trucks) use two separate retractors - one at the floor and one at the shoulder - to provide pre-crash locking. Only the retractor at the floor provides a way to lock down the CR.
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$


## CLASSROOM NOTES:

- This type of pre-crash locking latchplate on the seat belt can be found in older vehicles and in the center seat of some newer vehicles.
- This type of seat belt is generally good for a CR installation.
- This latchplate has a locking bar found on the bottom or back.
- If the seat belt and latchplate lie flat, the latchplate will lock.
- If they are tilted, the latchplate will remain unlocked.
 This is important when the seat belt is placed around a CR because the seat belt and latchplate must lay flat at all times to restrain the CR.
- This type of latchplate locks when the seat belt webbing is parallel or side by side to the latchplate.
- This type of latchplate will not lock when the seat belt webbing and the latchplate are perpendicular - up and down to each other.
- Remember that the seat belt should not slide through the latchplate under a moderate tug.


## INSTRUCTOR NOTES:

- Do not cover situations where this type of latchplate does not secure the CR. This is covered in a later chapter.
- Demonstrate how the parallel position of the latchplate prevents the seat belt from lengthening.
- Show the difference between parallel and perpendicular.
- Show the tilt so students see how the seat belt gets longer.
- Ask the students why we want the seat belt to remain flat or straight when it is holding a CR (that is the pre-crash locked position.)
- NOTE: Do not call this type of latchplate a heavy duty or regular latchplate. This type is now to be called a locking latchplate.

- Not all pre-crash locking latchplates look the same. Some have a bar like you saw on the first slide; others have a sliding or rotating metal or plastic piece. Try to find as many different types of locking latchplates as possible.
- The locking piece clamps down on the lap part of the seat belt when buckled. When pulled slightly up and forward, much as if a body were moving in a sudden stop, it locks.
- To test to see if the latchplate locks:
o Buckle the seat belt.
- Give a firm tug on the lap portion of the seat belt while pulling up on it (makes the seat belt and latchplate parallel).
- Remember: The seat belt should not slide through the latchplate with a moderate tug.


## CLASSROOM NOTES:

$\square$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

- Demonstrate to students how the pre-crash locking latchplate creates a fixed length of webbing in the lap portion of the seat belt.
- Have students test whether a seat belt provides precrash locking protection. For a locking latchplate:
o Buckle the seat belt.
- Give a firm tug on the lap portion of the seat belt while pulling up on it (makes the seat belt and latchplate parallel).
- Note that the seat belt should not slide through the latchplate under a moderate tug.
- NOTE: Do not call this type of latchplate a lightweight locking or cinching latchplate. This is a locking latchplate.
- Some vehicles have a switchable latchplate that uses a button to move from the adult pre-crash position to the child pre-crash locking position.
- An adult may need to adjust the button. This keeps children from playing with the button. Look on the back of every latchplate to see if a button is available.



## INSTRUCTOR NOTES:

CLASSROOM NOTES:
Demonstration tips:

- Have an owner's manual for this type of latchplate available. You may not see a vehicle with this type of latchplate in every class.
- Before starting this chapter, identify vehicles that may have this feature or arrange with a local car dealer to have a vehicle with this feature for demonstration.
- Using a CR, show how the lap belt lengthens when set to the adult position and remains secure in the child position. Do this as one of the hands-on activities if you have this type of latchplate available.
- Point out how the button adjusts for pre-crash locking.


## Securing a CR With a PreCrash Locking Latchplate

-Determine latchplate type
-Place belt through correct $C R$ belt path and buckle
*Apply weight in CR and pull webbing at the belt path to tighten lap belt
*Check for tight installation

- Before installing a CR, technicians must know what type of seat belt system they will use in the parent/caregiverselected vehicle seating position.
- Up to five different seat belt systems may appear in one vehicle.
- When helping a parent/caregiver curbside, Technicians must teach parents/caregivers to read the vehicle owner's manual to be sure:
o the desired seating position is approved for CR use
o where to find approved LATCH positions
o that airbags do not interfere with the CR or child occupant
- Show the parent/caregiver where to find child passenger safety information in the manual.
- You will be asked throughout the course to check the owner's manual for many things!
- Check the seat belt latchplate for lockability. Ask yourself, can this latchplate lock the CR at all times? No one knows when a crash might occur.
- Seat belts must stay in a locked position when buckled around the CR. Remember, for a correct CR installation, the seat belt must lock at one of two places. The latchplate is the first place you can easily check.
- To ensure a tight CR fit, pass the seat belt through the CR seat belt path and buckle it. Apply weight into the seat with your hand while tightening the seat belt. Involve the parent/caregiver in the installation at all times.
- We recommend that you learn to talk parents/caregivers through the installation of their CR systems as you stand outside the car and guide them in a step-by-step process.
- To test for a tight installation of the CR:
- Hold the tightened and locked CR at the belt path.
- Push and pull the CR, with a moderate force -front to back, and side to side.
- CR should not move more than 1 inch at the belt path.
- Never use two seat belt systems to secure a CR.

CLASSROOM NOTES:
$\qquad$

## INSTRUCTOR NOTES:

Make the following points:

- Avoid using your knee in the seat. The weight from an adult hand should allow the seat to be tightened enough.
- We recommend using the weaker hand so as not to use more force than is necessary.
- REMEMBER - 1 inch of movement is allowed front to back or side to side at the belt path.
- Teach students the steps needed to decide if they have a pre-crash locking system in the vehicle.
- Explain that each seating position must be tested to be sure that the seat belt can be pre-crash locked.


## Workbook Activity 1: Pre-Crash Locking Latchplates

-Name the two types of pre-crash locking latchplates that can secure a CR -What must you do to put a pre-crash locking latchplate into the locked position?
-What must you do to put a switchable pre-crash locking latchplate into the locked position?
a.
b. $\qquad$
2. Explain how to put a locking latchplate into the pre-crash locking mode.
3. Explain how to put a switchable latchplate into the pre-crash locking mode.

## CLASSROOM NOTES:


$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\square$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

- You have already learned how retractors store seat belt webbing until needed.
- In some vehicles the retractor, and not the latchplate, provides the pre-crash locking part needed to keep a CR in place at all times.
- The two retractors that we study in this chapter can function in a pre-crash locking position.
- Being able to see how each retractor type is different will require you to check the seat belt system to see if it can be used in a pre-crash locked position.


## Automatic Locking Retractors (ALR)

-Can be found in:

- Lap belt only or
- Lap/shoulder belt
-Test if you have an ALR
-Pull the webbing out slowly and gently -See if once you stop, the seat belt can only get shorter
- Remember that Technicians must teach parents/caregivers to read the vehicle owner's manual to be sure the desired seating position is approved for CR use and if it is a LATCH position.
- Automatic locking retractors (ALR) are generally easy to use with CRs. Once the seat belt is passed through the CR belt path and buckled, the seat belt can only get shorter (and hold the CR tighter) once pressure is applied to the CR.
- Once again, check to be sure that you have a pre-crash locking retractor by pulling the seat belt out of the retractor slowly and gently.
- Some seat belts with ALR may appear to have no locking ability if they are tested when the seat belt is extended just a very short distance (less than 12 to 18 inches) from the retractor casing. That 12 - to 18 -inch space is known as the dead zone.
- To check to see if the retractor will lock, pull it out 24 to 36 inches, allow a small amount of webbing ( 3 to 6 inches) to go back on the retractor, and then gently pull on the webbing. If no webbing comes out, then the retractor is an ALR type.
- The true test of seat belt system pre-crash locking is to pull firmly up and out on the lap part of the buckled seat belt. The belt should not lengthen.
- No one can predict when a crash might occur, so a CR must be properly installed and remain tightly secured at all times to prepare for a crash or sudden stop.


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Only talk about only the two retractor types that can provide pre-crash locking.
- The other type is separated out to avoid confusion and is discussed in the next chapter.
- Technicians should be aware that some vehicles have up to five different seat belt systems in one vehicle alone.
- Once outside, remember to demonstrate the dead zone on an ALR retractor.


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

- Read vehicle owner's manual to identify correct seating position.
- When working in the field, coach the parent/caregiver through the installation and then check for a tight installation.
- Grab the CR at the belt path.
- Push and pull the CR with moderate force - front to back and side to side.


## How to Install a CR With an ALR Retractor

-Pull webbing fully out of retractor and HOLD
-Place beit through correct CR belt path and buckle
-Apply weight on seat and let go of extra webbing
-Help put extra webbing back into the retractor
*Check for tight installation

- The CR should not move more than 1 inch.


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Demonstrate this in a step-by-step process when you do the final hands-on activity for this chapter.
- If demonstrating in the classroom, feed the seat belt through the CR belt path and place extra webbing back into the retractor on the demonstration vehicle seat.

```
Seat Belt Systems With Pre-Crash Locking
Features: Switchable Retractors
- Can befound in:
- Ley bet ony
- Sxoviber bet onv - Read labels
- Swiches to
* Swiches to AR with Four help
- Teat niomiry and gently
- Ryl liet al ple may hat to
- Sule Pell se
- Nowe thet seme have,
```



CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Point out labels on seat belt webbing that describes CR use.
- Have vehicles ready to show that have this retractor type.
- A seat belt with a switchable retractor fits the adult comfortably and will lock only in an emergency such as a crash, sudden stop or turn, unless switched to the locking position. This seat belt switches to a tight, pre-crash locked seat belt to install CR. Remember, correctly installation of a CR requires the seat belt to be locked at all times.
- To test for a tight installation of the CR:
- Hold the CR at the belt path with your weaker hand.
- Push and pull the buckled CR with a moderate force-front to back and side to side.
o The CR should not move than 1 inch.
- Talk parents/caregivers through the installation, demonstrating as you go. Take time with them so that they can learn how to best protect their children in a vehicle by using this seat belt system.


## INSTRUCTOR NOTES:

- Remind students that each chapter builds on what was taught previously.
- Demonstrate this in a step-by-step format when you do the final hands-on activity for this chapter.
- Show a vehicle where the pre-crash locking feature is in the lap portion of the seat belt, as well as in the shoulder portion. While rare in new vehicles, the lap belt retractor can still be found in many older vehicles that are still on the road.
- Show how the seat belt fits an adult comfortably and then switches to a fully pre-crash locked seat belt system for a CR. Students were asked about this in a previous slide.

Workbook Activity 2 :
Pre-Crash Locking Retractors

- Explain the two types of retractors that can secure a CR
- Explain how to secure a CR using an ALR retractor
-Explain how to secure a CR with a switchable retractor


## Activity 2: Pre-Crash Locking Retractors

1. Name two types of pre-crash locking retractors
2. Explain what you must do to secure a CR using an ALR.
3. Explain what you must do to secure a CR using a switchable retractor.
$\qquad$

## INSTRUCTOR NOTES:

## Activity 2: Pre-Crash Locking Retractors 5 minutes

Instructions: Students need to feel confident that they can find pre-crash locking retractors in a vehicle. They may use their workbooks to be sure their terminology is correct. Responses should go in their workbook.

## Answers:

1. Two types of pre-crash locking retractors are ALR and switchable.
2. To secure a CR with an ALR, pull webbing fully out of the retractor and hold, place the seat belt through the correct CR belt path and buckle the belt. Put weight in the seat and let go of the webbing so the extra webbing goes back into the retractor. No other steps are needed.
3. A switchable retractor requires the user to pull all the webbing out of the casing slowly and gently. The seat belt is then placed through the CR at the belt path and buckled. Place extra webbing back into the retractor, and give a firm tug to be sure that the webbing does not lengthen.

## Activity 3: Putting It All Together

- Instructions: It is sometimes easier to identify seat belt systems if you can try them on an occupant. If you are in doubt when checking a vehicle, seat yourself in the vehicle and buckle the seat belt.
- In this exercise, you may be asked to sit in vehicles and buckle the seat belts.


## Hands-On Activity 3: Putting It All Together

-Sit in vehicle and buckle seat belt around occupant
-Identify retractor and latchplate type
-Demonstrate forward-facing CR installations:

- CR with AL.R and top tether
+CR with switchable retractor and top tether
- CR with locking latchplate
- Once buckled, try to determine if the retractor can be pre-crash locked.
- You can do that in one of two ways: by pulling the belt out more than 18 inches and then seeing if you can make it longer (ALR), or by pulling all the webbing out of the retractor and seeing if it switches into a locked mode (switchable).
- The goal is to find a seating position in the vehicle where the seat belt can be locked before a crash-in other words, pre-crash locking mode.
- Your Instructors will quickly demonstrate how child restraints are installed with different belt systems that pre-crash lock


## INSTRUCTOR NOTES:

## Activity 3: Putting it All Together (inside or outside) - $\mathbf{1 5}$ minutes

Instructions: Decide which vehicles you will use in this activity. If one of your vehicles has an obvious dead zone, show it to the students by first using no CR and then using a CR.

- To demonstrate the switchable retractor, set a good example and gently and slowly extract webbing from the retractor. Demonstrate the difference between a freely moving and pre-crash locked seat belt.
- Demonstrate how to install a CR with an ALR and a second one with a switchable retractor. Attach the tether to the tether anchor.
- They have already learned how to test for a tight, locked fit.


## Materials:

- Forward-facing CR

Hands-On Activity 4: Occupant Protection Systems

## Activity 4: Occupant Protection Systems

Instructions: When you go outside, the vehicles should be numbered and certain seating locations will be marked.

- Identify the seat belt latchplate and retractor for the assigned vehicle and seating location. You will do this on two vehicles.
- This is not a test right now, but you will be tested on this later in the course.

| Vehicle \# | Latchplate: <br> -Locking <br> -Switchable <br> -Not Locking |
| :---: | :---: |
| Seating position | Retractor: <br> -ALR <br> $\square$ Switchable <br> $\square$ Not Locking - None |


| Vehicle \# | Latchplate: <br> -Locking <br> -Switchable <br> $\square$ Not Locking |
| :---: | :---: |
| Seating position | Retractor: <br> DALR <br> -Switchable <br> -Not Locking aNone |


| Vehicle \# | Latchplate: <br> $\square$ Locking <br> $\square$ Switchable <br> $\square N o t ~ L o c k i n g ~$ |
| :--- | :--- |
| Seating <br> position | Retractor: <br> $\square$ ALR <br> $\square$ Switchable <br> $\square N o t ~ L o c k i n g ~$ <br> $\square N o n e ~$ |

## INSTRUCTOR NOTES:

## Activity 4: Occupant Protection Systems (outside) - $\mathbf{1 5}$ minutes

Instructions: Be sure that vehicles are numbered and that students are given vehicle numbers and seating locations to mark on their worksheet. Have a member of the instructor team stationed at each vehicle to assist students as they check the seat belt system.

- Ask students to identify the seat belt latchplate and retractor for the assigned vehicle and seating location.
- This activity will involve two vehicles.
- Instruct students to place the answers on their worksheet.
- At the conclusion of the exercise, bring students together and ask for answers, vehicle by vehicle.
- This exercise can be done as a group.
- Each vehicle should have different seat belt systems that the student evaluates.

NOTE: This is a practice for the students. They will be tested on this concept later in the week (as part of the CR installation testing).

## Chapter Review

-Connection between pre-crash locking seat belt systems and CR installation -Seat belt parts
-Types of pre-crash locking seat belt systems
-Ways to secure a CR with a pre-crash locking seat belt system

- What is the relationship between pre-crash locking seat belt systems and CR installations?
- How do I test for a tight installation of the CR?
- What does ALR stand for?
- What are the types of pre-crash locking seat belt systems?


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Provide an overview of what was discussed in this chapter.
- Ask for any questions.


## Chapter 5

 Seat Belt Systems Without PreCrash Locking Features
## Chapter length of time: Approximately 75 minutes.

## Pre-chapter activities:

- Identify vehicles available to the class that do not have retractors and latchplates with a pre-crash locking feature on seat belts.
- Work with your instructor team before teaching this chapter to be sure they are confident and competent with belt-shortening skills.
- Set up stations to practice using locking clips on lapshoulder belts and belt-shortening clips on lap-only belts. Assign teaching team members to each.
- Notify teaching team which vehicles will be used in classroom activities; inform teaching team of their chapter responsibilities.
- Complete the vehicle information form for each member of the teaching team, showing which seating positions in which vehicles will be used.


## Video:

Video clips are available for this chapter. Refer to the readme_first_video.txt file on the instructor CD.

## Activities total time: 35 minutes.

- Activity 1: Identifying Latchplates and Retractors (outside) - 10 minutes.
- Demonstration: How to Use a Locking Clip (inside) - 5 minutes.
- Demonstration: Belt-Shortening Clip-5 minutes.
- Activity 2: How to Use a Belt-Shortening Clip (inside) - 5 minutes.
- Activity 3: What Would You Do to Provide a PreCrash Locked Seat belt-10 minutes.


## Materials needed for chapter:

- Sample owner's manual sections.
- Lengths of seat belt webbing (one 24- to 36 -inch piece per student).
- Locking clips (one per student).
- Belt-shortening clips (one per student team).
- CR with short belt path (for belt-shortening CR installation demonstration).
- Seat belt simulator or vehicle seat with lap-only and lap-shoulder belt options.
- Vehicle with lap-shoulder seat belts with ELR and sliding latchplate.
- Vehicle with lap-only seat belt with sewn-on latchplate and ELR. If such equipment is not available, learn by doing the following: Fully extend a manual lap-only belt with latchplate at the end or ALR with clip, keeping the fully extended webbing from going back into the retractor.


## Teaching Tips:

- While all seat belts are designed to lock in a crash, this chapter looks at seat belt systems that require the user to use an approved additional step to secure a CR to provide the pre-crash locking feature. This chapter is best taught in the vehicles. Before teaching this chapter, be sure to complete the prechapter activities.
- In the skills test on using a belt-shortening clip, the instructor can demonstrate the clip application to the first student. The instructor can then ask each student to teach the next in line with instructor supervision (and sign-off on the skill evaluation sheet). This accomplishes a measure of the Learn, Practice, Explain philosophy for this chapter.

Note: Stay away from using the term heavy duty locking clip, use only the term belt shortening clip.

## Appendix Materials:

- IMMI Child Restraint, September 1998 study on twisting seat belt webbing.
- Retractor - Latchplate table.
- Installation of CRs with Different Types of Belts.


## Chapter Objectives

-Identify seat belt systems without a pre-crash locking feature
-Identify four approved additional precrash locking steps
-Identify how to secure a CR when the seat belt system requires an approved additional step for pre-crash locking

- This chapter looks at seat belts that do not provide that pre-crash locking feature unless an approved additional step is used.

CLASSROOM NOTES:

## INSTRUCTOR NOTES:

Review chapter objectives.

- You have already learned that seat belts must remain locked at all times when they are used to secure a CR.
- While all vehicle seat belts will lock in a crash, not all vehicles have seat belts that provide a pre-crash locking feature needed to secure a CR.
- The sliding latchplate in this picture has no locking feature and no moving parts. It looks like some of the pre-crash locking latchplates you have already seen.

- To test to see if this latchplate has a pre-crash locking feature, buckle the seat belt and pull up on the lap portion of the seat belt. The seat belt should not lengthen if the latchplate has pre-crash locking features.


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Review how to find out whether a latchplate has a pre-crash locking feature (see slide).
o First, look for moving parts on the latchplate (if there are moving parts on the latchplate, then the latchplate probably has a locking feature).
o Buckle the seat belt and pull up on the lap portion of the seat belt. By pulling up on the lap portion of the seat belt, the two parts of the seat belt (the lap belt and the shoulder belt) are now parallel at the buckle. This position makes certain that the seat belt is pre-crash locked.
o Look at the slide carefully: There are no moving parts on this type latchplate. If the retractor does not lock, then an approved additional step must be used to secure a CR in a vehicle.
- Stress use of the vehicle owner's manual to learn about unusual seat belt locking features you may find in a variety of vehicles where you cannot find a way to pre-crash lock the seat belt. You may need a special part to pre-crash lock a seat belt
- Point out that not all seat belts lock just by buckling them for the pre-crash protection necessary for CR installation.


## CLASSROOM NOTES:

- Stress that an approved additional step will most likely be needed to provide pre-crash locking if there is no locking mechanism in either the retractor or latchplate.
- Explain how students can test whether latchplates stay locked.
- The sewn-on latchplate shown in this picture has no locking feature and no moving parts.
- These can often be found in the center seating position of cars, on school buses, or in many older vans.
- How would you show a parent to test whether this latchplate has a pre-crash locking feature? You learned about this test in the previous slide.



## INSTRUCTOR NOTES:

- Use the vehicle owner's manual in each vehicle to learn about pre-crash locking features on seat belts needed to secure a child restraint.
- Remind students that seat belts may not lock for the pre-crash protection needed for CR installation.
- Remind students that an approved additional step will most likely be needed to provide a pre-crash locking feature if none exists.
- Explain how students will test to see if this type latchplate can stay locked.

TESTING THE BELT: In the case of the sewn-on latchplate, test the seat belt - not the latchplate. Buckle the seat belt and test to see if it is locked by firmly pulling up on the lap portion of the seat belt. The seat belt webbing will not lengthen if some type of locking mechanism has been engaged.

## Emergency Locking Retractor (ELR)

-Looks like a switchable retractor but does not have the ability to swisch
-Locks in a sudden stop, turn, or crash

- is comfortable and sate for adults
-When webbing is pulled all the way out, it still moves in and out freely
-Cannot be used to install CR without an approved additional step or locking latchplate
- As the name implies, this type of retractor locks only in a sudden stop, turn or crash. This retractor type, along with one of the two non-locking latchplates discussed in this chapter (sliding or sewn-on), cannot secure a CR pre-crash without an extra approved step.
- Seat belts with emergency locking retractors (ELR) can be found in lap-only, shoulder-only, or lap-shoulder belts.
- You cannot identify an ELR just by looking at the seat belt. There is a test to see if the seat belt you are using has an ELR:
- Pull 24 to 36 inches of webbing slowly and gently out of the casing where the extra webbing is stored.
- Allow some of the webbing to go back into the casing.
o Try to pull the webbing out again very slowly.
- If the webbing goes freely in and out of the casing, you might have an ELR. You could also have a switchable retractor like the one you learned about in the chapter before this one.
o Now, slowly pull the webbing all the way out of the casing. If the webbing does not switch to a locked position, you have an ELR.
o You did this activity in the last chapter.
- Beginning with 1996 model year vehicles (MY 1996), if the retractor is an ELR, then you must have a locking latchplate.
- If the vehicle is older than 1996, you might have a locking latchplate, but it is more likely that the seat belt retractor is an ELR with a sliding latchplate and without locking ability. In that case, you will have to use an approved step to lock the seat belt into a locked pre-crash mode.


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

- Tell students how to check the type of retractor in each vehicle.
- Tell students that there is an approved additional step for most vehicles in cases where the belt system will not pre-crash lock.
- Remind students that beginning with MY 1996 vehicles, if the retractor is an ELR, then you must have a locking latchplate.


## Activity 1: Identifying Latchplates and Retractors

Instructions: By this time, you have learned all the different types of retractors and latchplates in the classroom. Now you will have a chance to see them in vehicles.

- Your instructor team will demonstrate how each latchplate or retractor without pre-crash locking features works.

Activity 1: Identifying Latchplates and Retractors


- You will inspect two or three vehicles and figure out the latchplate and retractor type for a certain seating position in a specific vehicle.
- Write the vehicle number and seating location to the left of the box for each vehicle.
- This is not a test right now, but you will be tested on this later in the course.

| Vehicle \# $\qquad$ | Latchplate: <br> -Locking <br> -Switchable <br> -Sliding <br> USewn-on |
| :---: | :---: |
| Seating position | Retractor: <br> -ALR <br> -Switchable <br> DELR <br> aNone |


| Vehicle \# $\qquad$ | Latchplate: <br> -Locking <br> -Switchable <br> USliding <br> QSewn-on |
| :---: | :---: |
| Seating position | Retractor: <br> -ALR <br> -Switchable <br> DELR <br> aNone |


| Vehicle \# $\qquad$ | Latchplate: <br> -Locking <br> -Switchable <br> aSliding <br> QSewn-on |
| :---: | :---: |
| Seating position | Retractor: <br> DALR <br> -Switchable <br> DELR <br> anone |

## Activity 1: Identifying Latchplates and Retractors - 10 minutes

Instructions: Demonstrate ELR features when students are in vehicles.

- Before this chapter began, you or a member of the instructor team should have identified vehicles with the specific latchplates and retractors you want students to inspect.
- Assign a member of the instructor team to each vehicle with an ELR and a non-locking latchplate.
- Remember that the driver seat belt is almost always an ELR with a sliding latchplate.
- Have students watch the instructor gently and slowly pull the seat belt in and out of the casing.
- Instructors should demonstrate how the seat belt retractor has no locking feature.
- Should the vehicle have a belt sensitive retractor - one that, when pulled rapidly, gives the wrong impression that it is locked-use this demonstration to pull gently when testing.
- Point out to students any labels on seat belts that show the CR user how to put the seat belt properly into a pre-crash locked position.
- Identify latchplates in all designated seating positions.
- Identify retractors in all designated positions.
- Have each student work in teams of two or three to visit the assigned vehicles and identify the seat belt system in a particular seating position.
- Have students write down the vehicle number and seating position before leaving the classroom. They can use their notebooks as a reference.
- Remember that this chapter teaches about seat belts that do not have pre-crash locking features.
- This chart shows all the latchplates and retractor types because students have now learned about them.
- Students will have to decide the various combinations to be successful in this activity.
- Do not confuse students by showing them locking seat belt systems at the same time. This chapter focuses on seat belts that do not lock pre-crash.
- At the conclusion of the exercise, bring the students together and ask for their answers, vehicle by vehicle.
- This is not a test. They will be tested on this concept later in the week (as part of the CR installation testing).
- Each student should visit two or three cars. Each vehicle should have different seat belt systems that the student evaluates.

Activity objective: Students will be able to identify latchplates and retractors.

## When Neither Latchplate Nor Retractor Stays Pre-crash Locked

-Use one of the four approved additional steps to installation a CR:

- Locking clip/lockaff
-Belt shortening clip
- Flip latchplate
-Twist buckle stalk
- In vehicles made before 1996, seat belts were not federally required to provide the pre-crash locking feature you learned about earlier in the course. Some did, but it was purely voluntary on the part of the manufacturer.
- You may find pre-crash locking features in older cars even though they weren't required.
- You must always check each vehicle and each seating position to look for pre-crash locking features.
- Vehicle manufacturers provided approved additional steps for that pre-crash locking feature in vehicles where neither the retractor nor the latchplate stayed locked at all times.
- There are four approved additional steps for you to use if you are educating parents/caregivers who have an older vehicle that has no pre-crash locking features in the seat belt system.
- The last two steps are used on seat belts that would normally stay locked except for when the latchplate is positioned right at the CR belt path and stays in an unlocked, non-parallel position.
- There is nothing wrong with the seat belt. The locking latchplate and webbing must lay flat to lock. The position is the problem - not the seat belt.


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\square$

## INSTRUCTOR NOTES:

## Demonstration tips:

- Have a regular locking clip/lock-off and a beltshortening clip available.
- Use a vehicle seat demonstration to show the twist and flip steps.
- Be prepared to explain and demonstrate use of all CR installation steps.

Be brief-details to follow.

Locking clips are used only on seat belts as recommended by the vehicle manufacturer

- A locking clip clamps the tightened vehicle lap and shoulder belt together at the latchplate to make the lap belt a fixed length.
- It is the fixed length lap belt that locks a CR in place.
- Locking clips or lock-offs are used on lap and shoulder belts that have a sliding latchplate (no pre-crash
 lockability) and an ELR (no pre-crash lockability).
- Locking clips come on the CR from the factory.
- They can be permanently attached to the CR (lock-off) or can be separately stored on the CR for removal and use by the consumer. Either a lock-off or locking clip is safe to use. They perform the same function.
- A locking clip makes the seat belt lock pre-crash, so the CR does not move more than 1 inch side-to-side or front-to-back at the belt path.
- Locking clips should be placed according to the manufacturer instructions. Unless instructed otherwise, place the locking clip about 1 inch from the buckle
- Properly installed locking clips may bend or come off in a crash—that is OK because the ELR will take over for it at that point.
- Incorrect placement of the locking clip can lead to too much slack in the seat belt in a crash and can result in serious injury to child.


## INSTRUCTOR NOTES:

- Show locking clip locations on CR. Show built-in lock-off on a newer seat.
- Explain the need to place the locking clip about 1 inch from the buckle.
- Explain about the required fixed length of webbing needed to secure a CR.
- Explain that students will test to see that the lap belt is at a fixed length by giving a firm pull on the lap portion of the seat belt once the locking clip has been added and the seat belt is re-buckled.
- If showing the locking clip installed on the lapshoulder belt without a CR, give a firm pull upward on the lap portion of the belt to show how it does not change in length.

CLASSROOM NOTES:
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## CLASSROOM NOTES:

- Remind students that in vehicles made before 1996, seat belts were not federally required to provide the pre-crash locking feature you learned about earlier in the course.
- They may find pre-crash locking features in older cars even though they weren't required.
- Students should check each vehicle and seating position to look for pre-crash locking features.
- Lock-offs clamp the tightened vehicle seat belt together.
- The lap belt holds the CR in place.
- Lock-offs are used on lap-and-shoulder seat belts that have a sliding latchplate (no pre-crash lockability) and an ELR (no pre-crash lockability).
- Most CRs with built-in lock-offs have them on both sides of the CR.
- Read the CR instruction manual to know which lock-off
 to use and to know whether the lap belt alone or the lap-and-shoulder belt is threaded through the lock-off.
- Some manufacturers may recommend using both lock-offs; others may select one or the other. Follow the instructions for that particular CR.
- Lock-offs are provided by the CR manufacturer and are recommended and approved for use with the vehicle seat belt.
- Lock-offs and locking clips are equally safe to use. They do the same thing.
- A lock-off ensures that the seat belt is locked pre-crash, so the CR does not move more than 1 inch side-to-side or front-to-back.
- Lock-offs are used according to CR manufacturer instructions. They may even be used on seat belts that have pre-crash locking features.
- Teach parents to use the lock off as directed by their CR manufacturer.


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Remind students that a lock-off and locking clip are both safe to use and work in the same way.
- Teach students to follow the CR manufacturer's instructions for the lock-off provided on their CR.

When to Use a Locking Clip
ALL three conditions must be present: -Lap-shoulder belt is all one piece of webbing
-ELR is in place
-Sliding latchplate does not lock precrash

Read the owner's manual or look for a label on the seat belt webbing to see if a locking clip is needed.

## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

- Do not suggest use of a locking clip on every installation.
- There are only a few times when you might use a locking clip instead of the vehicle's locking mechanism.


## How to Use a Locking Clip

Instructions: Show a locking clip to the class.

- Demonstrate how to place the locking clip on the webbing in the classroom.
- Have students place a locking clip on their piece of webbing. Teach students to remove the locking clip by pinching the webbing in half so the locking clip falls off.
- Tell students that when this is done in a vehicle, the seat belt is unbuckled at the time when they put the clip on. Trying to add or remove the locking clip while the seat belt is fastened can hurt or pinch the students.

Activity objective: Students will learn when and how to apply a locking clip to a lap-shoulder seat belt.

## Lap-Shoulder Belt Only - How to Use a Locking Clip

## Instructions:

- Watch as your instructor demonstrates how to put a locking clip on a lap-shoulder seat belt on the demonstration seat.
- When you go outside, your instructor will show you how the locking clip works in vehicles where the lap-shoulder seat belt needs an additional step to lock pre-crash.

- Installing the locking clip is easier if two people are involved, but remember that it is possible to do this alone.
- While one person applies weight on the seat, the other person buckles and tightens the lapshoulder seat belt.
- Pinch and hold the two tightened seat belt parts together, unbuckle the belt and place the locking clip near the latchplate.
- It does not matter how the locking clip is attached. There is no up or down for the prongs, as long as all four locking clip prongs are visible.
- Apply pressure on the seat and re-buckle the seat belt. It may be hard to re-buckle because now the lap part of the seat belt, the part that goes through the CR , is locked tight at a fixed length.
- Test the pre-crash locking mode by firmly pulling up on the lap portion of the seat belt.
- You will learn how to test the CR to be sure it moves no more than 1 inch side-to-side or front-to-back later in the course.
- With practice, placing the locking clip on the lap-shoulder seat belt can be done in a few minutes.


## INSTRUCTOR NOTES:

## Demonstration: Lap-Shoulder Belt Only-How to Use a Locking Clip

Instructions: Remember that this chapter is looking at vehicle hardware and equipment only. CR installation is covered later and in greater detail in the individual CR chapters. This is a demonstration opportunity.

- Using a real vehicle if possible or a demonstration seat belt system, show students how the locking clip creates a fixed length of webbing in the lap portion of the seat belt.
- You will show locking clip use in a vehicle with a CR when you go outside at the end of the chapter.
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

- This type of seat belt combination has no pre-crash locking feature.
- Never use the locking clip found on the CR to complete this task. A belt-shortening clip is stronger than a locking clip.


## ELR and Sewn-On Latchplate

-Lap beit only or lap portion only of lapshoulder with semn-on latchplate
-The belt-shortening clip "takes the retractor out of the picture ${ }^{-1}$ and serves as the locking part

- Pre-crash locking is not possible without the belt-shortening clip
-The belt-shortening cip clamps off all excess webbing to create a fixed length of webbing in the lap portion of the seat belt


## INSTRUCTOR NOTES:

## Demonstration: Practice Using Belt-Shortening Clip on Lap Belt - 5 minutes

- Work with you instructor team before teaching this chapter to be sure they are confident and competent with their belt-shortening skills.
- Stress to students that a locking clip is never used on a lap only seat belt.


## The Belt-Shortening Clip

- Hust be purchased where vehicles are soid or made
-Firmir ties off and locks fully extended seat belt mebbing to provide a fixed lap belt length
- Takes the place of the retractor
-Placed near the retractor (on the door side) -Should be tested for tightness -Can increase injury risk if used incorrectly -Used as a last resort
- The belt-shortening clip takes the place of the retractor, as all the webbing is pulled out of the casing and shortened with the belt-shortening clip.
- Belt-shortening clips can be purchased from auto dealers (approximate cost is $\$ 7$ to $\$ 14$ ).
- Use belt-shortening clips as a last resort. Carefully assess all other alternatives before using this clip.
- Frequently, this type of seat belt is found in the front seat of an older car with a motorized shoulder belt and a separate lap belt.
- Often you can move a CR to a back seat location, but in some vans and school buses there will be no other seating position.
- There are times when only a belt-shortening clip will provide pre-crash locking lap belts because neither the lap belt nor the latchplate locks.


## Demonstration: Belt-Shortening Clip

Your instructor will demonstrate how you should use a belt-shortening clip, as follows:

- Pull the lap belt (on an ELR) fully out of the casing, fit the seat belt to the CR size, then pinch and lock off the extra webbing with the belt shortening clip. This clip is strong and durable and actually takes the place of the retractor in a crash.
- While the stronger belt-shortening clip could be used in place of a regular locking clip (that comes free with a CR), the regular locking clip never takes the place of the belt- shortening clip to lock off webbing.
- The belt shortening clip also has one extra doubling of webbing to ensure that the seat belt never slips.
- Incorrect use of the belt-shortening clip can result in serious injury or death.

CLASSROOM NOTES:

## INSTRUCTOR NOTES:

## Demonstration: Belt-Shortening Clip

- Pass around a belt-shortening clip and a regular locking clip so students can see how similar both clips look.
- Stress the difference between the two clips frequently.
- Explain when you would use a belt-shortening clip.
- Again, make sure that the instructor team is comfortable with this application.


## Activity 2: How to Use a Belt-Shortening Clip

Instructions: The belt-shortening clip is not difficult to use if you take your time and work carefully. Go through these steps below:

- You will work in a team to place the fully extended lap belt through the CR and pinch off the extra webbing so the CR does not move more than 1 inch side-to-side or front-to-back. All the excess webbing will be tied off
 with the belt-shortening clip.
- Once the excess webbing has been pinched off, an extra step of doubling back one piece of the webbing through the prongs (making the loop visible in the bottom picture on the slide) ensures that the belt-shortening clip will hold the webbing tight even in a crash.
- Doing this to the seat belt actually takes the place of the retractor that would not lock into the pre-crash locked position. It shortens the lap belt to a fixed length.
- If another seating option is available, use it! You will want to be sure the parent/caregiver can repeat on their own what you have shown them. Pay extra attention to this!
- As a new technician you should never work alone until you have built more skills and decisionmaking ability in this field.
- Even after years of experience, you should always try to work with another technician to help you make good decisions and then recommendations to the parents.
- Knowing when you must use a belt-shortening clip can be a challenge, so do not hesitate to call on others with more experience to help with this.


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

## Activity 2: How to Use a Belt-Shortening Clip-5 minutes

Instructions: Review the following instructions with the understanding that as the Instructor, you are fully comfortable with belt-shortening clip use so that you can explain it clearly and accurately to your students.

- Give each student team a piece of long webbing and a belt shortening clip.
- You must provide a belt-shortening clip for actual practice.
- Guide the students through placement of the beltshortening clip step by step.


## CLASSROOM NOTES:

- 

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
Activity objective: Students will understand how to use and explain use of the belt-shortening clip.

## Play Video

Video demonstrates how to install a child restraint in the front seat of vehicle equipped with a door-mounted automatic shoulder belt and separate ELR lap belt. Note that this vehicle does not have a passenger-side front air bag.

Video courtesy of NHTSA.

- Do not use a locking clip to shorten a seat belt. It is not strong enough by itself to keep a belt shortened during a crash.
- It will release the belt and allow slack into the webbing.
- This allows the CR to move significantly more than it should, and can result in serious injury or death to a child.
- Refer to Types of Seat Belt Systems, Latch Plates, and Use of a Locking Clip or a Belt-Shortening Clip


## Locking Clip or BeltShortening Clip

 - eny

## INSTRUCTOR NOTES:

- Be sure students have a clear understanding of the difference in use of a locking clip and beltshortening clip.
- Show one person out of the group how to use product.
- Then observe as that person teaches the next one and so on until everyone has installed a CR with a belt-shortening clip and locking clip and has taught another how to do it.


## Activity 3:

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

## 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: $\qquad$
Scenario 2: ELR lap belt with sewn-on latchplate on school bus: $\qquad$
Scenario 3: ELR with locking latchplate: $\qquad$
Scenario 4: ALR with sewn-on latchplate: $\qquad$
Scenario 5: ELR with sliding latchplate: $\qquad$
Scenario 6: ELR lap belt with sewn-on latchplate and regular locking clip: $\qquad$
Scenario 7: switchable retractor with sliding latchplate:

## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
-
$\qquad$
$\qquad$
$\qquad$
$\square$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

## Activity 3: What Would You Do to Provide A Pre-Crash Locked Seat belt? - 10 minutes

Instructions: Talk students through the thought process of deciding which solution works best.

Scenario 1: ELR with sewn latchplate in front seat.
Answer: Back seat has lap-only manual seat belt with locking latchplate in center seating position. Move to a back seat. If you must use the front seat position, you will need a belt shortening clip to secure the restraint

Scenario 2: ELR lap belt with sewn-on latchplate on school bus.
Answer: Belt-shortening clip

Answer: Use no additional tool (use latchplate).
Scenario 4: ALR with sewn-on latchplate.
Answer: Use no additional tool (use retractor).
Scenario 5: ELR with sliding latchplate.
Answer: Use regular locking clip or belt shortening clip in place of a locking clip.

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

Answer: Wrong locking clip — use belt shortening clip ONLY.

Scenario 7: Switchable retractor with sliding latchplate.
Answer: Use no additional tool (use retractor).

Activity objective: Students will understand when to use belt-shortening clip under different circumstances.

## 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 beit as a last resort
*Check for tightness
- 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:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

- Explain and then demonstrate the position that some latchplates take when they are placed at the belt path.
- Explain how this causes some seat belts to slip. By flipping the latchplate one time, it re-positions the seat belt so it and the latchplate can lie flat together or parallel. This now enables the seat belt to remain locked pre-crash.
- Show and remind students to check that the seat belt always remains locked by pulling up firmly on the lap belt.
- Sometimes you need to twist the buckle stalk if it is flexible to shorten it and allow the latchplate to come
through the belt path before buckling it. In doing that, the latchplate lies flat and locked.
- Remind students to always check the owner's manual instructions first for clarification. Most manuals will not mention or prohibit twisting buckle stalks or flipping latchplates.
- Remind students that a locking clip is used 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.


CLASSROOM NOTES:
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

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.

When Do You Twist the Buckle Stalk? does not lie flat, is in the beit path, or does not bet pach, or does not
allow the lockoll to be allow the
secured

- Twisting the buckle will make the webbing shorter
*This will make the - Tha wil make



## INSTRUCTOR NOTES:

- Emphasize the need to check the vehicle owner's manual.
- The maximum number of twists being three was agreed upon by the SAE Child Restraint subcommittee, based on IMMI data.


## Locking CLips and Belt-Shortening Clips Instructor Demonstration

- Demonstrate:
- Laceng ciphiock of
- Bell-wortening dip
+ Fipping e seat belt intchpiste
- Twasing a seat bet bucke
-Install a CR using:
- Lookng cipfock-off
- Belt-whortening olp
- Flpped seat bet lefcholate
+ Twissed seat belt buckle


## 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 on a lap belt that has no locking feature in either the retractor or latchplate.
- You will practice this with a CR when you learn about CR installation.


## CLASSROOM NOTES:

$\qquad$

## Demonstration of Locking Clips and BeltShortening Clips (outside)

Demonstrate the technique for each step.

## Instructions:

- Break the class into teams and have a member of the instructor team demonstrate how the steps provide for pre-crash locking of a CR into the vehicle.
- Be sure your instructor team is comfortable with showing the locking clip/lock-off and beltshortening clip, twisting the seat belt buckle, and flipping the latchplate.


## Materials Needed:

- CR with short belt path (for belt-shortening clip).
- CR (any size for locking clip).
- Vehicle with ELR and sliding latchplate or vehicle with ELR and sewn-on latchplate.
- Belt-shortening clip (do not substitute a regular locking clip for this demonstration)

Activity objective: To demonstrate locking clips and belt-shortening clips.

## Review: The Four Accepted and Approved Additional Steps

-Lap/shoulder belt has ELR + free sliding Latchplate: Use a locking cilp
-Lap-only belt has ELR and sewn-on
Latchplate: Use another seating position to Latchplate: Use another seating position
secure CR or use a beit shortening clip
-Locking latchplate slips: Option 1) filp
latchplate, Option 2) twist buckle stak, or Option 3) use a locking dip

- Buckle on a long stalk: Twist buckde stalk (if permitted by vehicle manufacturer) to shorten

INSTRUCTOR NOTES:

- Review the four approved additional steps.


CLASSROOM NOTES:
$\square$ $\square$
$\qquad$
$\square$

## INSTRUCTOR NOTES:

## Answers:

Name two latchplates that do not lock pre-crash.
Sliding and sewn-on.
Which retractor has no pre-crash locking feature?
ELR
What tool would you use with an ELR lap belt and sewnon latchplate?
Belt shortening clip
What retractor is always pre-crash locked?
ALR
What retractor changes from one position to another?
Switchable


## INSTRUCTOR NOTES:

CLASSROOM NOTES:
Review the answer to the question on the slide.

- Locking clips hold the CR in place until the retractor kicks in. They can deform and release in a crash if not properly placed.
- Point out that the locking clip is too far from the buckle.
- The locking clip should be close to the latchplate so that in the event of a crash, very little slack would appear in the seat belt as the ELR retractor takes over. The locking clip may fall off or bend or damage the webbing at that point in time



## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

You can now identify any vehicle retractor-latchplate combination as long as you take your time and follow the steps you have learned:

There are four ways to lock a belt system:

1. At the latch plate
2. At the retractor
3. Locking clip (for lap and shoulder combination belts that do not lock at either the latch plate or retractor. This is a fairly common "fix" with cars made before 1996)
4. Belt shortening clip (for lap only belts that do not lock at either the latch plate or retractor. This "fix" is rarely needed because this type of lap seat belt is not often seen in back seats of today's vehicles.)

You have the tools to be able to pre-crash lock virtually any seat belt.

## INSTRUCTOR NOTES:

You can now identify any vehicle retractor-latchplate combination as long as you take your time and follow the steps you have learned:

There are four ways to lock a belt system:

1. At the latch plate

## 2.At the retractor

3.Locking clip (for lap and shoulder combination belts that do not lock at either the latch plate or retractor. This is a fairly common "fix" with cars made before 1996)
4.Belt shortening clip (for lap only belts that do not lock at either the latch plate or retractor. This "fix" is rarely needed because this type of lap seat belt is not often seen in back seats of today's vehicles.)
You have the tools to be able to pre-crash lock virtually any seat belt.

## Chapter Review

* How cen I secure a CR men the seat bet sybiem fecuares an approved addoona step for pre cranh loceng?
* When do I fip the istch piate?
* What does tid atiand for?
* What are the four mays bo pre-eranh lock a sast beit eyatem?
- How can I secure a CR when the seat belt system requires an approved additional step for pre-crash locking?
- When do I flip the latch plate?
- What does ELR stand for?
- What are the four ways to pre-crash lock a seat belt system?

Types of Seat Belt Systems and Approved Additional Steps* Needed to Pre-Crash Lock the Lap Belt

| Type of Seat Belt <br> and Retractor | Type of Retractor |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
|  | Emergency <br> locking <br> retractor | Automatic <br> locking <br> retractor | Switchable <br> retractor | No <br> retractor |
| Lap-shoulder belt with <br> switchable latchplate | Switch latchplate to <br> "car seat" position | N/A | N/A | N/A |
| Lap-shoulder belt with <br> sliding latchplate | Locking clip | None | None | N/A |
| Lap-shoulder belt with <br> locking latchplate | None** | None | None | N/A |
| Lap belt only with <br> sewn latchplate | Belt shortening clip | None | None | N/A |
| Lap belt portion of <br> Lap-shoulder belt with <br> sewn latchplate | Belt shortening clip | None | None | N/A |
| Lap belt with <br> locking latchplate | N/A | N/A | N/A | None |

This is a general guide and does not apply to ALL latchplate-belt systems. Carefully read the vehicle owner's manual for more information.

* N/A = Not applicable. Vehicles are not equipped with this combination of belt type, latchplate, and retractor. None = Lap belt can be pre-crash locked with no additional steps.
** Some locking latchplates, when used to install child restraints, may fail to lock belts in place. Try flipping latchplate $180^{\circ}$ or twisting the buckle stalk. If that doesn't work, in some cases, a locking clip may be used.

CLASSROOM NOTES:
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

- Review the content covered in this chapter.
- Refer students to the "Installation of Child Restraints with Different Types of Seat Belts" as an additional installation reference.


## Chapter 6 Vehicle LATCH— Lower Anchors and Tethers for Children

Chapter length of time: $\mathbf{4 5}$ minutes.
Activity total time: 35 minutes.

- Activity 1: Finding LATCH in Owner's Manual (inside) - 10 minutes.
- Activity 2: Finding LATCH in Vehicles (outside)—15 minutes.
- Activity 3: Discussion - 10 minutes.


## Video: None.

Materials needed for chapter:

- Vehicle owner's manuals.
- Several vehicles with LATCH (truck, SUV, passenger car, van).
- One CR with flexible LATCH.
- Sample LATCH page (p. 132) for Activity \#3 from the Appendix if no owner's manuals are available for vehicles used in class.


## Appendix Materials:

- Sample LATCH page from LATCH Manual
- Frequently Asked Questions about LATCH and Tethers
(Student Manual page 79)

National Child Passenger Safety Certification Training

Chapter 6: Vehicle LATCH -
Lower Anchors and Tethers for Children

## Chapter Objectives

- Define Latch
-Identify LATCH symbols/locations
- Identify top tether anchors
- Identify lower anchors
-Describe what action is needed if vehicle does not have factory-installed top tether anchors
- Explain to caregivers the importance of top tether use
- This chapter looks at Lower Anchors and Tethers for Children - LATCH - a system used to make it easier to install child restraints in vehicles.

CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Review the objectives.
- Lower Anchors and Tethers for Children (LATCH) is a system used to make CR installation easier in vehicles.
- In LATCH use, both the CR and the vehicle must have LATCH parts that work together.
- Look in the owner's manual to know if a vehicle has LATCH and where each LATCH seating position is found.
- LATCH attaches the CR to the vehicle through anchor
 points installed in the vehicle and through anchor hooks attached to the CR.
- 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 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.


## CLASSROOM NOTES:

$\qquad$

## INSTRUCTOR NOTES:

Make the following points:

- Some vehicles like convertibles, sports cars, and some very large/heavy vehicles will have different requirements. Refer to vehicle owner's manuals to identify how to safely transport children in these vehicles.
- The lower anchor bars are spaced 280 mm (11 inches) apart.
- The number and seating positions of top tether anchors are described in FMVSS 225 and depend on how many seating rows the vehicle has.
- Refer students to LATCH Manual
- Refer students to "Frequently Asked Questions About LATCH and Tethers" in the Appendix.
- 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.


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Point out to students the universal tether symbol located on the slide.
- Encourage top tether anchor use when appropriate for the age and weight of the child. Be aware that top tether anchors have an upper weight limit set by the vehicle manufacturer. 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.
- Encourage students to contact the vehicle manufacturer customer service help line to find out

CLASSROOM NOTES:
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
the actual top tether weight limit approved for that particular vehicle. This information might also be found in the LATCH Manual (http://www.saferidenews.com).

- Although car seat manufacturers were required to meet a more strict head excursion safety limit by September 1, 1999, a tether was not required to meet this standard. By September 2002, when LATCH was available in both vehicles and on CRs, most car seats used a top tether strap to meet the tougher standard and top tether straps were attached to the CR at the factory.
- There is a top tether strap on almost all forwardfacing CRs with a harness and some rear-facing CRs manufactured after September 2002.
- 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.


## Lower Anchors

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


CLASSROOM NOTES:

- Help students recognize LATCH symbols and locations.
- Remind students that they will spend significant time looking for LATCH information in the owner's manuals in the field.
- Help students understand that the purpose of LATCH is to help make CR installation easier.
- Remember that parents often question the safety of lower anchors versus a seat belt. Both systems if properly used, provide protection.



## Activity 1: Finding LATCH in Owner's Manuals

Instructions: This activity will help you become more familiar with vehicle owner's manuals.

- Using the owner's manual section provided by your instructor, find all the information you can about LATCH in the owner's manual on this worksheet.
- Locate lower anchor (LA) and tether information in two different vehicle owner's manuals:

| Vehicle 1 | Vehicle 2 |
| :--- | :--- |
|  | LA symbol found? <br> Y N symbol found? |
| LA locations found? <br> Y N | LA locations found <br> Y N |
| Top tether anchor <br> found? Y N | Top tether anchor <br> found? Y N |
| Top tether anchor <br> symbol found? Y N | Top tether anchor <br> symbol found? Y N |
| Page No. | Page No. |

## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

## Activity 1: Finding LATCH in Owner's Manuals (inside)- $\mathbf{1 0}$ minutes

Instructions: This activity is done in the classroom.

- Have selected manuals (suggest using one pre2001 and one post-2002 model year vehicle manual) available so students can look for and locate lower anchor and top tether anchor information.
- Make sure that you mention top tether anchor retrofit capabilities for older vehicles.
- Mention that most vehicles do not allow for retrofitting lower anchor bars, only tethers.
- Remember that many vehicles before 2003 did not have lower anchors.
- This activity may be combined with Chapter 7,


## Materials needed:

- Owner's manuals from older and newer vehicles, including pickup trucks with webbed anchors if possible.
- Sample page from LATCH manual (in the Appendix).


## Activity 2:

Finding LATCH in Vehicles

| LATCH | Vehicle 1 | Vehicle 2 |
| :--- | :--- | :--- |
| No. of seat belts in <br> back seat |  |  |
| No. of LA seating <br> positions |  |  |
| No. of top tether <br> anchors |  |  |

## Activity 2: Finding LATCH in Vehicles

## Instructions:

- Remember, some LATCH parts are easy to use and find. Others are not so obvious.
- After you are placed on a team, you will have a member of the teaching team to help you.
- You will rotate through at least two cars to see some differences in the placement of LATCH systems and the words/symbols to describe them.
- Keep in mind that LATCH equals two lower anchors and one top tether anchor.
- At the end of this activity, your instructor will install a CR using LATCH.
- You will have time to practice this later in the course.

| LATCH | Vehicle 1 | Vehicle 2 | Vehicle 3 |
| :--- | :--- | :--- | :--- |
| No. of seat belts <br> in back seat |  |  |  |
| No. of LA <br> seating positions |  |  |  |
| No. of top tether <br> anchors |  |  |  |

## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

## Activity 2: Finding LATCH in Vehicles (outside) - $\mathbf{1 5}$ minutes

Be sure to use a variety of vehicles in this exercise.

## Instructions:

- Group students in teams, and assign a member of the teaching team to each vehicle.
- Have students rotate through at least two cars to see different placements and technical terms of LATCH systems.
- At the last vehicle, have each team watch the instructor or teaching team member install a CR using LATCH.
- Students will not install a LATCH seat at this time. This is just to pull the lecture and activities together. Do this quickly to show how the system works with a correctly used LATCH system. Students will practice this later individually.
- When group members return to the classroom, ask about their experience. Ask if they had noticed LATCH parts in their vehicles before the class.


## Material: Workbook Sheet

Activity objective: Find LATCH in cars. Once students complete this activity, they will be able to answer the following questions:

- Number of seat belts in back seat?
- Location of LATCH parts (lower anchors, top tether anchor) in vehicle?
- Actual number of LATCH seating locations in vehicle?
- Actual number of tether anchors in vehicle?
- Actual number of LATCH-equipped seating locations in vehicle (owner's manual)?
- Actual number of top tether anchors as indicated by the vehicle owner's manual or symbols?


## Special Considerations:

-Weight limits

* Tep tether anchors
- Lower Anchors
- Higher weghe CRs
- Parent deslre to use seat beit and lower anchor together
- Use of assigned hardware
+ Top bether anchor not avslable in cenber ponition
+ Lower anchors not avalable in center sostion
- Always follow CR and vehicle manufacturer instructions, including weight limits, for lower anchors and top tether anchors. Remember, limits can vary from manufacturer to manufacturer.
- If parents have any concerns about LATCH, they can always use the seat belt as an equally good alternative.
- In some situations LATCH provides a better fit, and in others, the seat belt may be preferable. It is generally not permitted to use more than one top tether hook per top tether anchor, but that rule, like many, can change over time. The same is true for lower anchors.
- Do not use the lower anchors and the vehicle seat belt at the same time unless indicated by both vehicle and CR manufacturers.
- Many families will want to use the center seating position with LATCH. This is OK as long as the vehicle manufacturer designates this position for LATCH use, but this is not common.
- Parents cannot use the inner lower anchors from both side seating positions unless both the CR manufacturer and vehicle manufacturer give approval in their manuals.


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

Make the following points:

- LATCH is a system people are not famliar with. Stress how important it is to read instruction manuals fully.
- Remind students to follow your example by often referring to instructions and vehicle owner's manuals. This is a good time to prepare students to tell parents/caregivers that some questions do not have clear answers.
- Technicians should guide parents to contact manufacturers of both CRs and vehicles to obtain answers to unresolved questions. If manufacturers do not hear about problems, they cannot provide solutions.
- A list of vehicle manufacturers and CR manufacturers is in the Appendix. Keep this list handy at events.
- Some CRs with higher weight limits or specialneeds products like vests require stronger hardware than that supplied by vehicle manufacturers.

CR manufacturers of these special products will address this issue in their instructions. The use of two separate top tether anchors may also be recommended.

- Insist that students read all instructions before advising parents.
- Top tether anchors should be used only for their designated seating positions.
- Top tether anchors may be made of seat belt webbing, not steel, in pickup trucks. They can be found under or behind the back seats in the passenger cab. Be sure to point these out if you use pickup trucks in your class.


## Activity 3: Talking With Parents

-How to find top tether anchors and lower anchors
-What to do if the vehicle does not have a top tether anchor or lower anchors and parents want them in their vehicle
-Wity a CR with a higher weight harness might require a vehicle seat beit instead of LATCH for heavier children

## Activity 3: Role Play - How to Talk With Parents

## Instructions:

- You will be given guidance by your instructor about this role play activity.
- Using what you have already learned in the course up until now, you will explain to parents when they should use a seat belt instead of LATCH, where to find lower anchors and top tether anchors, and what to do if they do not have top tether anchors (or lower anchors) in their vehicle.

1. How can you tell parents where to find all the tether anchors and lower anchors in their car, van, SUV, or truck?
2. Role play No. 2: What can you tell the parent who has a 1998 Chrysler four-door Sebring with no top tether anchor and who wants to have one installed?
3. Role play No. 3: What should you tell the parent who has a car seat with harness rated up to 65 pounds, a child who weighs 58 pounds, and LATCH in both the car and on the CR?
Remember:

- Parents need to understand that they have two safe choices for securing their child's CR.
- Always use the vehicle owner's manual to learn about the car.
- Always use the car seat manual to learn about the car seat.


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

## Activity 3: How to Talk with Parents (inside) - $\mathbf{1 0}$ minutes

## Instructions:

- Use of the owner's manual is critical in this exercise. Students must become comfortable using manuals as they teach parents about installation choices. Use the LATCH Manual pages found in the Appendix for this exercise as an additional resource.
- Select two to four students and one member of the instructor team to serve as a parent while the team answers the three challenges on the slide.


## Number 1 Answer:

- Look in the owner's manual first. Although some manuals may make it obvious and the terms are
easily found in the index under "Top Tether or Top Strap," other tasks may take more work.
- Always look in the Child Passenger Safety Section for more specific details.


## Number 2 Answer:

- The 1998 Chrysler four-door Sebring is listed in the LATCH Manual. Have several copies of that page, or refer students to the sample LATCH Manual page in the Appendix, to point out how to find the part number.
- Advise the family to take the part number to the Chrysler dealer and have the tether anchor installed there. Generally, U.S. car manufacturer will provide one tether free to their customers.
- The part number is specific to the model and year of manufacture. Lower anchors are generally not retrofitted.
- One foreign manufacturer does allow for this, but students will have to learn about this through reading owner's manuals.


## Number 3 Answer:

- If the CR harness serves children up to 65 pounds but the vehicle owner's manual says to use the lower anchors and top tether for up to 48 pounds only, then the parent must use the seat belt to comply with the vehicle manufacturer's instructions.
- Both LATCH and the seat belt system are safe if used according to manufacturer's instructions. If the parent chooses to use the seat belt, it is also the parent who makes the decision about whether to attach the top tether.
- Technicians should always encourage top tether use with forward-facing car seats that are attached to the vehicle with the seat belt.

Activity Objective: For students to become comfortable with using the owner's manual and talking with parents.

## Common LATCH Misuse

- Lower Anchors
- Not fiemly attached bo bers
* Uleing nan-approved position
- Uxing seet belt and lower anchors at same time (unless allowed by manyfactarer) + Securing two cer sests on one anchor bar
*Top Tether Anchors - Not uting top tether when avalable
- Not attaching top selher vil most direct nointer
- Connected to wiong
top techer anchor
- Top heiher strop too loose
- Any product can be misused if instructions are not followed.
- Misuse rates increase when instructions are not read.
- Your job is to help people use their vehicles according to the maufacturer's recommendations.
- Encourage parents/caregivers to use the vehicle owner's manual whenever they transport children.
- It is helpful to show parents how you use instructions and manuals at every event.
- The only way to know for sure that LATCH is being used correctly is to use the vehicle and CR owner's manuals for guidance.


## CLASSROOM NOTES:

$\square$
$\qquad$

## INSTRUCTOR NOTES:

Point out the following key points:

- Students should be very familiar with examples of correct LATCH use. They should be taught that anything different from what they have learned in this class is probably a misuse not directly approved by the manufacturer of the product.
- Removing and adjusting head restraints may make it hard to use tethers the right way.
- New regulations for head restraints sometimes push the CR forward on the vehicle seat.
- Some head restraints cannot be removed to allow for a simple top tether strap installation.
- Top tether straps generally go straight back from the CR to the top tether anchor and go through adjustable head restraints or over non-adjustable head restraints.

Trainer Tip: There is no way in this course to teach students every possible misuse of the lower anchors and top tether anchors. Therefore, it is critical to role-model what correct use looks like and how to use LATCH properly at every opportunity.

- What does LATCH stand for?
- What is the importance of top tethers?
- Where can I find a lower anchor in a vehicle?
- What might indicate lower anchors in the vehicle?


## Chapter Review

- What does LATCH stand for?
- What is the importance of top tethers?
- Where can I find a lower anchor in a vehicle?
- What might indicate lower anchors in the vehicie?


## INSTRUCTOR NOTES:

Review chapter content.
Q: What dows LATCH stand for?
A: Lower Anchors and Tethers for Children

Q: What is the importance of top tether use?
A: Tether holds the back of the CR firmly against vehicle seat to make it more secure and reduce head excursion.

## CLASSROOM NOTES:

## Chapter 7 Other Vehicle Occupant Protection Systems

## Chapter length of time: Approximately 30 minutes.

## Activity total time: 25 minutes.

- Activity 1: Explaining Air Bags-5 minutes.
- Activity 2: Finding Air Bag Information (outside) - 20 minutes.


## Video:

Video clips are available for this chapter. Refer to the readme_first_video.txt file on the instructor CD.

## Materials needed for chapter:

- Sample owner's manuals: Ask that student's bring their vehicle owner's manuals to class. (Instructors should label the manuals to encourage their return.) This request should be included in the pre-class letter so that students come prepared.
- Worksheet (in workbook).
- Instructors should make arrangements in advance to have as many vehicles with different types of air bag systems in them.


## Appendix:

- NHTSA Air Bag On-Off Switch Application.
- NHTSA FAQs About Side-Impact Air Bags.
(Student Manual page 91)


## 

National Child Passenger Safety Certification Training

Chapter 7: Other Vehicle
Occupant Protection Systems

## CLASSROOM NOTES:

## Chapter Objectives

-Identify common vehicle occupant protection systems
-Describe different types and locations of air bags

- Review air bag information in owner's manual - Describe alr bag suppression system
-ldentify presence of an on-off switch


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- This section provides an overview; see Appendix and NHTSA Web site for more in depth materials and information.
- Active protection requires people in the car to do something to increase safety. Buckling a seat belt or using a CR is active protection because, while the seat belts are in the car already, the occupants must choose to put them on and use them correctly.
- Many safety features are built into the vehicle so that occupants do not have to do anything to be protected (automatic protection).
- Laminated windshields have a plastic layer between the


## Active and Automatic Occupant Protection

-Active protection

- Festures require action by be occupart
-Automatic protection
- features are buit into pre welicle
+ Protects whout any metion by the scoupent. glass to keep them from shattering. Air bags open when the vehicle determines there has been a crash.
- Air bags can be found in most vehicles on the road today. Parents need to understand how air bags can protect them and understand how CRs work when they are used near air bags.
- Every vehicle should be checked for air bags.
- Owner's manuals have information about and instructions for air bags for specific vehicles. For example, some newer vehicles can sense when a child is in the front seat and will turn off the front air bag and sometimes the side air bag. In other newer vehicles, this feature is not available.
- Technicians need to think about where children can safely sit in a vehicle so that the air bags do not get in the way of their protection.
- Follow both vehicle and CR manufacturer instructions.
- Vehicle makers suggest that children are safer in the rear seat. It is strongly recommended that all children under age 13 should travel in the rear seat.


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Explain the difference between active and automatic protection.
- Ask students for other examples of automatic protection (collapsible steering column, recessed knobs, padded dash, etc.) and other examples of active protection (adjust vehicle seat for proper belt fit; lock doors, etc).


CLASSROOM NOTES:
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

Make the following points:

- Do not discourage use of an available seat belt. Provide most current list of CRs available for larger children.
- If a child must ride in a position with a lap-only belt, the CPS technician should stress how important it is for the belt to ride low on the hips, across the top of the thighs.

Unbuckle the shoulder belt. Fasten manual lap belt. See owner's manual to see if CR can be used in this position. If ALR or switchable retractor, CR use is possible but not recommended in the front seat. If ELR, use belt-shortening clip.

Automatic Seat Belts
Door or Treck-mounted shoulder belt with manusl lap bet


## INSTRUCTOR NOTES:

Recommendations: Determine if you have any vehicles with this type of seat belt system. Contact a used-car dealer prior to class to see if you may borrow a vehicle to demonstrate this type of system to your students.


CLASSROOM NOTES:
$\qquad$

Obtain required extra lap belt (attaching belt) from the vehicle manufacturer to use when securing a CR in this seating position.

## INSTRUCTOR NOTES:

Recommendations: Determine if you have access to any vehicles with this type of seat belt system. Contact a used car dealer prior to class to see if you may borrow a vehicle to demonstrate these to your students.

- Air bags can be almost anywhere in a vehicle, so proper positioning and use of restraints are needed to prevent injury when a crash happens and an air bag opens suddenly. Child occupants are at great risk for injury if they are not properly positioned to benefit from the air bags.
- Read the owner's manual very carefully and assume all air bags are fully active unless the owner's manual says something different. If there are any questions, advise the vehicle owner to contact the vehicle maker.

- Avoid having your body or other objects blocking the air bag. Occupants should always sit in an upright position, buckled into the seat belt.

Driver air bag:

- Generally opens in frontal crashes
- Found in the steering wheel

Front seat passenger air bags:

- Generally open in crashes that occur in the front of the car
- Some cover middle and right front passenger seating positions, some only the right front seating position.
- Found in instrument panel

Side air bags:

- Generally open in crashes that occur on the side of the car
- Found in the door or the vehicle seat

Inflatable curtains:

- Generally open in crashes that occur on the side of the car or when the car rolls over
- Cover one or more rows of seats
- Found above doors at the edge of the roof

Knee air bags:

- Generally open in crashes that occur in the front of the car
- Found under steering columns or lower instrument panel
$\longrightarrow \longrightarrow$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$ INSTRUCTOR NOTES:
- Remind students that they will be helping families find air bags in their vehicles.
- Encourage student to use owner's manuals and labels to find all air bags that could affect a CR. Properly positioned according to manufacturer's instructions, some CRs can be used near air bags (usually side curtain air bags and air bags in the front of the car under some special conditions).
- Remind students that a rear-facing CR must never be placed in a seating position with an active front air bag, although there are some systems coming out that may deactivate the air bag in the presence of a rear-facing CR.
- The ability to place a CR near a side impact air bag varies. Vehicle manufacturers that believe this is a problem have stated so in their owner's manual.
- Remind students to stay informed about new changes in air bags.
- Inform students that some vehicle manufacturers are working on an air bag contained in the seat belt webbing, most likely to be found in rear seating positions. Students should check the vehicle owner's manual and child restraint manual for location and correct use of seat belts with child restraints.
- Air bags offer powerful protection to people in the vehicle who are correctly seated and restrained. The air bag adds extra protection to the adult head and chest in a crash.
- Children who are seated in front of air bags are generally much shorter than adults and therefore must be securely restrained by shoulder belts to keep the head and shoulders back and away from the air bag.
- It is recommended that all children under 13 ride in a back seat to avoid contact with the front seat air bag

How Do Air Bags Protect People?
-Spread the crash forces over a large part of the body
*Are used one time only; must be replaced after a crash

- Must be used with seat belt system. They are almost always safer in the back seat.
- Using the air bag with a seat belt system allows the impact from the crash to spread over a very large part of the occupant's body. This helps occupants take less impact on a smaller part of the body.
- Air bags are released once and must be replaced after a crash.
- Air bags are released at different impact forces, which vary by model year of the vehicle and many other factors.
- Older vehicles may have more powerful air bags.
- All occupants must be properly positioned in front of the air bag and wearing their seat belt correctly to gain the best benefit from the air bag.
- Occupants must be prepared at all times for a crash.


## Key Point:

- If there is no owner's manual present in the vehicle, a parent should contact the vehicle maker to obtain correct information about the vehicle's air bags. If this is not possible, then the best practice is to not put a CR near an active air bag.


## INSTRUCTOR NOTES:

- Stress the need for students to understand that seat belts and air bags work together to provide protection to vehicle occupants. $\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$


CLASSROOM NOTES:

- You will help families learn where their air bags are. Many people are unaware of all the air bags located in their vehicle.
- Check warning labels. Look around the vehicle and be sure to check the vehicle owner's manual.


## INSTRUCTOR NOTES:

- Be sure to point out labels in vehicles and instructions in owner's manuals that show air bag information, location, and warnings during the upcoming exercises.
- Each vehicle manufacturer places labels in different positions and may call their air bags something different. A properly used seat belt should always be used when there is an airbag.
- Look in each vehicle, even ones you rent, to know where all the air bags are and how they work. They may work differently from the ones you are used to.

Spell out the words for each abbreviation below:


- SRS: $\qquad$
- SIR: $\qquad$
- SIPS: $\qquad$
- SIAB: $\qquad$
- IC: $\qquad$


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Ask the class: Do you think the average person knows the meaning of these markings?
- When teaching this slide, ask the students to tell you the name of each abbreviated air bag label, then help them answer.
- Have students complete this in-class review worksheet:
o SRS = Supplemental Restraint System
- SIR = Supplemental Inflatable Restraint
- SIPS = Side Impact Protection System
- SIAB = Side Impact Air Bag
- IC = Inflatable Curtain
- Always use the owner's manual as the guide.


## Activity 1: <br> Explaining Air Bags

Answer the following items in your workbook, then discuss:

1. Why you need to Identify air bags?
2. How air bags protect you in a crash?
3. What do you do with air bags after a crash?

## Activity 1: Explaining Air Bags

Instructions: Complete the worksheet. Be able to explain information about air bags as if you were talking to parents.

Why you need to identify air bags?
How do air bags protect you in a crash?
What do you do with air bags after a crash?

## CLASSROOM NOTES:

$\rightarrow-$

## INSTRUCTOR NOTES:

## Activity 1: Explaining Air Bags - 5 Minutes

Instructions: Have students fill in answers to the questions in their workbooks. Call on different students to answer each question as if answering a parent's question.

Question 1:
Answer: You never know when a crash will occur, so you must always be prepared. Air bags can be anywhere in the vehicle. A rear facing child restraint must never be placed in a seating position with an active airbag. Child occupants are at great risk for injury if they are not properly secured in a CR or seat belt.

Question 2:
Answer: Air bags, like seatbelts, spread crash forces over a larger part of the body and help minimize injury. Air bags work with seat belts.

## Question 3:

Answer: Air bags that have opened must be replaced after a crash.

Rear-facing infants must never ride in front of an active air bag. In this section, you will learn that some air bags:

- Can be shut off by the owner
- Can be disabled by a mechanic with written permission from the NHTSA. Vehicle owners who have permission to shut them off may have a hard time finding a garage or dealership to do it.
- May have a vehicle sensor that can tell when a CR is in

Air Bag Active Suppression: On-Off Switches
*Check owner's manual to see $\frac{1}{}$ on-oll swich is to see
present

* Mry be installed if swich has been asprowed by NETTSA
 the front seat.
- The owner's manual can tell you if an air bag was present at the time the vehicle was made. Used vehicles may show a label when in fact the previous owner may have had the air bag shut off.
A vehicle owner may have an air bag on-off switch installed if:
- A rear-facing infant must be transported in the front seat.
- Children under 13 must be transported in the front seat.
- Drivers cannot change their driving position (10 inches from the air bag).
- There is an existing medical condition that would warrant deactivation.

To apply for an air bag on-off switch, the vehicle owner:

- Must read an informational brochure.
- Send a written request to NHTSA (visit http://www.safercar.gov and click on air bags under Equipment and Safety).

See Appendix for more information about the on/off switch application.

## INSTRUCTOR NOTES:

Help students understand how important it is to know what the markings mean.
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

Air Bag Automatic Suppression

- May suppress passenger side air bag for smaller occupant or if seat is empty
-Check owner's manual to see if passive
suppression is present
- Identify location of indicator light
- Identify how syntem works

- Automatic suppression is available in the front passenger seat of many vehicles. It turns the frontal and/or side passenger air bag off under specific conditions.
- Automatic suppression is available in the front seat of many vehicles. You must read the owner's manual to see if it is present and how to install a CR, if recommended, in the front seat.


## Key Point:

- Always use the back seat, if possible, even if there is an air bag suppression system in the vehicle.


## INSTRUCTOR NOTES:

- Show students where the "Suppression" section is in an owner's manual.


## STUDENT NOTES

## Hands-On Activity 2: Finding Air Bag Information

Instructions: You have learned how and where to find air bag information. Outside you will visit two vehicles and complete this form.

| Question/Instruction | Vehicle 1 | Vehicle 2 |
| :--- | :--- | :--- |
| What is the vehicle make and <br> model? |  |  |
| Describe the location of all <br> labels/markings for frontal air <br> bags. |  |  |
| What pages in the owner's <br> manual discuss the frontal air <br> bag system? |  |  |
| Describe the location of all <br> labels/markings for side impact <br> air bags. |  |  |
| What pages in the owner's <br> manual discuss the side air <br> bag system? |  |  |

## Hands-On Activity 2: Finding Air Bag Information

| Qutaism/inatrectes | vehariel | Mebieie 3 |
| :---: | :---: | :---: |
|  wet man |  |  |
|  |  |  |
|  <br>  metemety |  |  |
|  <br>  firn ens |  |  |
|  <br>  Diti |  |  |

## INSTRUCTOR NOTES:

If available, demonstrate the suppression system by turning on a vehicle and showing students how the indicator turns on and off as a person sits on the vehicle seat.

## Hands-On Activity 2: Finding Air Bag Information (outside) - 25 minutes

Instructions: Set up the activity by having cars numbered and students assigned to specific vehicles.

- Have owner's manual in vehicle on front seat. (Do not allow students to open glove box).
- Regroup at each car and have a student spokesperson talk about that particular vehicle and what each group saw.

CLASSROOM NOTES:
$\qquad$ $\longrightarrow$ $+$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## Chapter Review

-Where can you find the air bag warnings?
-What is the difference between active and automatic protection?

- Where can you find the air bag warnings?
- What is the difference between active and automatic protection?


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Review the content covered in this chapter.


# Chapter 8 Introduction to Child Restraints 

(Student Manual page 103)

National Child Passenger Safety Certification Training

Chapter 8: Introduction to Child Restraints

Chapter length of time: Approximately 70 minutes.

Pre-workshop activities: none.
Activity total time: 20 minutes.

- Activity 1: Utilize the CR Manual (indoor) - 20 minutes.

Video: none.
Materials needed for chapter:

- A variety of CRs for student teams.
- CR manuals.
- NHTSA recall list.
- Role play questions.


## Appendix Materials:

National CPS Resource of CR and Vehicle Manufacturer
Contacts, Sample Checklist Forms, 4 Steps for Kids
Flyer, and CR Registration form

## Trainer Tip:

- Remember to define terms and concepts, check for understanding, and encourage questions from students.


## Chapter Objectives

- Ust the types of child restraints (CRs)
- Ifentify how to select appropriate CRs
- Identify CRs parts and functions
- Discuss care of CRs
- Review the importance of not modifying CRs
- CR is a child restraint
- This section will discuss the various CRs and introduce the parts of a CR along with its functions.


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Review chapter objectives.
- A car seat checklist will help you find answers.
- This tool is helpful at many places and times, including a checkup event or when giving information over the telephone. Sample Checklist forms can be found in the Appendix.
- Most checklists do not have information about the child's growth or body limitations, but this information


## Before You Can Help, You Need to Know...

-Child's weight, height, and age

- Physical, developmental, and behavioral considerations
- Type of CRS
- Type of vehicle
- Who else will ride in this vehicle?
-It is important to have all the correct information! is helpful for you to know.


## INSTRUCTOR NOTES:

- Provide a checklist form to each student as a sample assessment tool.
- Hand out the checklist that you will be using at the class event. This checklist can be used with the outside hand-on activities such as identifying misuse.


## Materials needed:

Sample Checklist form(s) are provided in the Appendix.

## Types of Child Restraints

-Infant only
-Convertible (tear facing, forward facing)

- Forward lacing only with
harness/Combination FF
- Booster (belt positioning)
-Special needs seats
-Vehicie seat belts
- Integrated seats
- Begin to become familiar with the names of the different types of CRs (child restraints).


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Do not go into detail, as each type of restraint will be covered in later chapters.
- CRs work with the vehicle's seat belt system or LATCH.
- CRs protect children the same way that seat belts protect adults.


## CRs Offer Protection in Five Ways

1. Keep the child in the vehicle
2. Contact the strongest parts of the body
3. Spread the crash forces over a wide area of the body
4. Help the body to slow down
5. Protect the head, neck, and spinal cord

## INSTRUCTOR NOTES:

- Refer students back to page 26 in the 'Basics of Injury Prevention and Crash Dynamics' chapter for a more detailed reminder of how restraints provide protection in crashes.



## CLASSROOM NOTES:

$\qquad$

- Growing up safe is a four step process. You will learn about each step later in the course.
- Look for this 'Four Step' information in NHTSA’s "Child Passenger Safety, A Parent's Primer" in the Appendix.


## INSTRUCTOR NOTES:

- Instruct the students to refer to this chart, as it is a good reminder. It is found on NHTSA's Web site and in the Appendix.
- Refer students back to page 26 in the 'Basics of Injury Prevention and Crash Dynamics' chapter for a more detailed reminder of how restraints provide protection in crashes.
- It's important to buckle up on every trip!
- Children test limits, and safety must never be compromised.
- Most crashes happen close to home, a fact that can be mentioned when technicians advise parents/caregivers.


## Buckle for Life

-Everyone must buckle up, every time, on every trip!
*Bucking up must become a lifelong habit

## INSTRUCTOR NOTES:

CLASSROOM NOTES:

- It's important to buckle up on every trip!
- Children test limits, and safety must never be compromised.
- Most crashes happen close to home, a fact that can be mentioned when technicians advise parents/caregivers.


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Review the steps for this preview slide of what's to come:
- Selection—Right CR.
- Direction - Face the right way.
- Location-Install in the right spot in the vehicle.
- Installation-Secure CR to the vehicle in the right way, with the child secured in the CR.


## STUDENT NOTES

- The best CR is the one that's best for you! "You" means the one who's going to use it - parents, caregivers, and especially the child!
- Avoid finding fault with what's important to others. Some people are cost conscious, while others want the most expensive model. For some children, they'll use a booster seat only if it has a cup holder and a place for their video game.


Make the following points:

- As has been mentioned before, instructors and technicians should leave personal preferences out of discussions about the best car seat.
- Instructors and technicians should not recommend specific brands and seats.

- Physical development includes respiratory problems and positioning needs. Children with special health care needs require a medical team approach for restraint selection. These children may be able to use a conventional child restraint.
- Behaviorally immature children may need to stay in a more restrictive restraint for a longer period of time than they might need based on size.
- As a technician, you can teach a parent/caregiver how to install the child restraint.


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Be sure to stress that choosing a restraint based on a child's maturity level is just as important as considering his age, weight, and height.
- Point out that choosing the 'best restraint' will be discussed in more detail later in the course.
- All CR manufacturers must provide a label on the seat with their contact information.
- All CR owners are encouraged to register the CR with the manufacturer either online or by mailing in the registration card.
- 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.


## INSTRUCTOR NOTES:

- Point out the importance of registering the seat.
- If a CR has not been registered, the owner should contact the CR manufacturer by phone or via their Web site.
- The owner can use NHTSA's registration form, which is found on the their Web site http://www.nhtsa.gov.
- A current copy of the registration form is also in the Appendix.
- Remind students that a recall may be initiated through compliance testing or through defect monitoring. A CR that has a recall may be crashworthyand useable until the repair has been made. Follow the manufacturer's recall instructions.


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 (lapshoulder) 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:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$


- 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


## INSTRUCTOR NOTES:

CLASSROOM NOTES:

- Be sure students have access to a CR to follow along as you explain the different parts of the CR.
- This is a show and tell part of the class. Students should work in pairs/teams with a car seat on hand as you explain the parts and pieces.
- Do not go into full detail.
- Be brief. Stay simple.

- 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:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

- As you do this review, have students identify the parts on their CRs, so that they are hearing and touching at the same time.
- As you show students parts of the seat, guide them to check for obvious defects such as frayed harnesses. Make note that when CPSTs are assisting parents and other caregivers and defects are seen, they should encourage the parent/caregiver to contact the manufacturer and report the possible defect to the NHTSA hotline.


## STUDENT 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.

INSTRUCTOR NOTES:
CLASSROOM NOTES:

- Review the slide.


## CR Parts and Functions



CLASSROOM NOTES:
$\qquad$

- 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.


## INSTRUCTOR NOTES:

Make the following points:

- The locking clip goes next to (within 1 inch of) a latch plate that doesn't lock firmly enough on continuous loop lap/shoulder belts. (This will make sense later during the discussion of seat belts and installation.)
- Have students identify the locking clip storage area on the CR.
- LATCH: Lower anchors and tethers for children.
- Tether: A piece of belt webbing that anchors the top of the CR to the vehicle. It keeps the restraint from tipping forward on impact and can provide extra protection. Tether straps are most frequently used on forward-facing seats. There are only a few rear-facing models that permit tethers. As always, check the manufacturer's instructions.
- Lower anchor attachments: A piece of belt webbing that anchors to the lower anchor on the vehicle structure. It secures the CR to the vehicle. These attachments are used in place of the vehicle seat belt to secure CR .


## INSTRUCTOR NOTES:

CLASSROOM NOTES:

- Explain to students that LATCH hardware in cars was discussed in greater detail in Chapter 6.
- The present section is just identifying the system on the car seat.

- Adjustment foot: Part of the detachable base that raises or lowers to allow a rear facing CR to be installed with the correct recline angle.
- Detachable Base: A separate base for a child restraint system that can be installed in the vehicle. The restraint (car seat) portion can be removed from the base, and used as an infant carrier.
- Level Indicator: The part of a rear-facing CR that helps identify correct angle.


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Show different bases, belt paths, and recline adjusters/feet.
- Carry handle: Plastic handle attached to the rear facing only child restraint that can be used to carry the restraint with the child in it when removed from the vehicle.

CR Parts and Functions


## INSTRUCTOR NOTES:

CLASSROOM NOTES:
Make the following points:

- Always refer to the CR manufacturer's instructions regarding handle placement.
- Some CR instructions allow the handle to be placed up while in the vehicle, and other CR manufacturers do not allow the handle to be up.
- Show seats with padding by the manufacturer.


CLASSROOM NOTES:
$\qquad$

## INSTRUCTOR NOTES:

- Instructions are very important because students must think about so many parts and functions that can vary from seat to seat.
- Even minor changes can alter performance in a crash.


## Modifying Restraints

- Never change a CR to make it ft
- Minor modifications can change the way a $C R$ performs in a crash
- Place rolled receiving blankets/lowels along the child's side for support
- Place rolled cloth between the crotch strap and crotch area to prevent child slouching

INSTRUCTOR NOTES:
CLASSROOM NOTES:

- Remind students not to place any thick padding under baby, unless provided by manufacturer.


## Activity 1: Use the CR Manual Hands On

-Use the CR manual
-Complete the worksheet

## Activity 1: Use the CR Manual Hands On

Instructions: You will be placed in groups of two to examine at least one CR. Respond to the following questions:

- Reading labels
o Weight/height range: $\qquad$
o Manufacturer name: $\qquad$
o Model name: $\qquad$
o Model number: $\qquad$
o Manufacturer phone number: $\qquad$
o Manufacture date: $\qquad$
o Expiration date (if included): $\qquad$
- How many belt paths? $\qquad$
o Is this seat on NHTSA's recall list? $\qquad$
- Finding the problem and solution (if CR was recalled, what are the identified problem and solution?):
- The pages with lower anchor information are $\qquad$
- The pages with top tether information are $\qquad$


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

## Activity 1: Utilize the CR Manual-Hands On20 minutes

## Instructions:

- Place students in groups of two to examine at least one child restraint. Respond to workbook questions.

Materials: one CR manual for each 2-person team
Activity Objective: Become familiar with a CR manual

## STUDENT NOTES

- The technician should get a complete history of the CR:
- Was the CR involved in a crash?
- Was the seat exposed to extreme heat or cold by being stored in a basement, garage, or attic?
- It is the technician's responsibility to work with the owner of the CR to review the seat, not to "certify" a seat as safe.
- It is the CR owner's responsibility to be sure all parts are

Used Seats: Things to Consider
aComplete history avalable
DNI labels and inatructions present
aNeeta Federal standards
avis recalla/recels fowd (make, model E dele)
QNil perts present and it working order
Ilree of cracks, loose nivets, etce
QNo more than 5 years old-may very by
mandacture
ghexponshbity of caregiver, not technician, to research present and in good working condition. It's important for the seat owner to know/learn the CR history.

- The Juvenile Products Manufacturer Association (JPMA) suggests replacing seats after 6 years.
- Expiration dates vary by manufacturer.


## INSTRUCTOR NOTES:

Ask students: Why are these things important to know?

## Answer:

- Need labels to be able to check for recalls.
- Need instructions to be able to use seat correctly.
- One time use - one moderate/severe crash.


## INSTRUCTOR NOTES:

- What did students find in the CR manuals regarding crash replacement?
- Always recommend that the manufacturer's instructions be followed.
- NHTSA recommends that a CR be replaced after a moderate to severe crash. The above criteria should be used as a guide to decide if a crash is minor and therefore, not necessary to replace the CR.
- Full policy is available at http://www.nhtsa.gov.
- Always refer to manufacturer's instructions.

NHTSA Criteria: What is a Minor Crash Not Requiring CR Replacement?
-No cracks or deformities (dented or buiging surfaces) can be seen by looking at the CR
-Vehicle with CR installed can be driven from the scene
-Vehicle door nearest CR is undamaged
-There were no occupant infuries

- Air bags did not open


## INSTRUCTOR NOTES:

- Point out that all of the above criteria must be met before a crash is considered minor and according to NHTSA, not requiring a CR to be replaced.


## CRS Cleaning and Maintenance

-Always follow the CRS manutacturer's instructions
*Use only mild soap and water and rinse with clean water

- Never use any chemicals such as starch,
bleach, or spray-on fabric care/wrinkle guard products
- Never iron the harness
- Never lubricate the buckje
- Follow the manufacturer's instructions for cleaning. If necessary, harnesses must be air dried.
- Machine drying is too hot for the harness straps and will decrease their effectiveness.

CLASSROOM NOTES: INSTRUCTOR NOTES:

Things to consider:
Can I use my car seat after a crash?

- What is NHTSA's policy?
- What does the CR manufacturer say?

I bought this seat at a garage sale. Is it safe to use?

- Does parent/caregiver know crash history? If so, how

Think about how you would answer these questions:

- Can I use my car inat atier a crimht
-1 bought this seat at a garage sale. la it sale to voe?
-1 don't know why my kide have to ride on car aeata.
Why should thry use them?
* Can I use this heed padding? It ceme with the seat.
*I have soys on the carrying handle. Are they OK to use?
*My ohld has malism. Can I put twpe over the relaner clop se he doent't pet out? has it been stored?
- Are all the parts in good working order?

I don't know why my kids have to ride on car seats. Why should they use them?

- How do CRs provide protection?
- How effective are CRs?


## Can I use this head padding?

- Did it come with the CR?
- If it is approved by the CR manufacturer, yes.

I have toys on the carrying handle. Are they OK to use?

- Did they come with the seat?
- If not, has the CR manufacturer provided or expressly approved the toys as "matching"?

My child has autism. Can I put tape over the retainer clip so he doesn't get out?

- Are you following CR manufacturer instructions?
- What are some other options that would provide the most protection?


## INSTRUCTOR NOTES:

## Chapter Review

-How do child restraints offer protection?
-What are the types of child restraints?

- How do you select an appropriate CR for a child?
-What is the best child restraint?
-When is it OK to modify a CR?
$\qquad$


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

- How do child restraints offer protection?
- What are the types of child restraints?
- How do you select an appropriate CR for a child?
- What is the best child restraint?
- When is it OK to modify a CR?
- Review the care and cleaning of CRs
- Review CSS parts and functions


## INSTRUCTOR NOTES:

- Review chapter content.
- Ask for any questions to make sure students understand the content of this chapter.


## How do child restraints offer protection?

Answer: Keep the child in the vehicle; contact the strongest parts of the body; spread crash forces over a wide area of the body, help the body slow down in a crash and protect the head, neck and spinal cord.

## What are the types of child restraints?

Answer: Infant-only; Convertible; Forward-facing only with harness/combination seat; booster; integrated; special needs and seat belts.

## How do you select an appropriate CR for a child?

Answer: An appropriate CR is one that is correct for the child's age, size, and physical development. It also must fit the vehicle(s), be easy to use, and be comfortable for the child.

## What is the best child restraint?

Answer: The one that fits your child, your vehicle and one that you will use every time you travel.

## When is it OK to modify a CR?

Answer: Only when the modification is approved by the CR manufacturer. Generally approved modifications are to place rolled receiving blankets/towels along the child's side for support and to place a rolled cloth between the crotch strap and crotch area to prevent the child from slouching.

Review the care and cleaning of CRs.
Answer: Follow the CRS manufacturer's instructions, use only mild soap and water and rinse with clean water, never use any chemicals such as starch, bleach, or spray-on fabric care/wrinkle guard products, never iron the harness, never lubricate the buckle.
Revierw CSS parts and functions.
Refer students to pages 108-114.

## Chapter 9 Rear-Facing Child Restraints

(Student Manual page 121)

National Child Passenger Safety Certification Training

Chapter 9: Rear-Facing Child Restraints

## Chapter length of time: Approx 40 minutes Activity total time: 55 minutes.

- Activity 1: Identifying Rear Facing CR—10 minutes.
- Activity 2: Selection and Installation (outside) - 30 minutes.
- Activity 3: Communicating Best Practice and Tough Choices Role Play - 15 minutes.


## Video:

Video clips are available for this chapter. Refer to the readme_first_video.txt file on the instructor CD.

## Chapter materials:

- CR instructions - (if unavailable, download from manufacturer website)
- Infant dolls.
- Infant-only CR with three-point and five-point harness/removable base.
- Infant-only CR with five-point harness/removable base.
- Convertible CR.
- Harness adjusters: metal slide, strap adjuster, A-lock, automatic lock, metal rod, etc.
- Rear Facing CR with rigid lower anchors.
- Rear Facing CR with flexible lower anchors.

CLASSROOM NOTES:

## CLASSROOM NOTES:

- Rear Facing CR with tether (if possible).
- Non-regulated products (i.e. additional padding, etc.).
- NHTSA recall list.
- Seat belt simulation/Demo Seat.
- Checklist form.
- Lightweight object (i.e., rolled towel or foam pool noodle).


## Appendix Materials:

- Rear Facing Quotables: Guiding Parents to Keep Children Rear-facing Longer
- AAP "Selecting and Using the Most Appropriate Car Safety Seats for Growing Children: Guidelines for Counseling Parents"
- AAP "Safe Transportation of Newborns at Hospital Discharge"
- AAP "Safe Transportation of Premature and Low Birth Weight Infants"
- James Whitcomb Riley Hospital For Children
"Hospital Discharge Protocol Essentials"
- AAP "Transporting Children with Special Health Care Needs"
- AAP "Car Safety Seats: A Guide for Families 2007"


## Chapter Objectives

* Doplain why chldren should trweel facing the reer of vehicie
- Loplein why reer-feong CRis should not be used ath frontal er bage
- Teach parentw/ caregivers abost selection, direction, location, and inataliation of rat-Aacing CR
- Identify best practice and tough choices that
perventis/ carwgivers face
* Discuas medical cond tions regeining specal attenton - Idert/y misuse

INSTRUCTOR NOTES:

- Review chapter objectives.

NHTSA's Four Steps For Kids Consumer Information

Designed to clarify transitions between restraint types:

1. Rear-facing $C R$
2. Forward-facing $C \Omega$
3. Booster seat
4. Seat belt

- Each type of CR has advantages and disadvantages to consider. Many parents/ caregivers choose CRs by looks, brand, or rating system.
- The best CR should be chosen on the basis of three factors: (1) Will the CR fit the child? (2) Will the CR fit the vehicle? (3) Will the CR be used every time and correctly?
- It is recommended that the CR be tested for an appropriate fit in the vehicle before it is purchased.


## INSTRUCTOR NOTES:

- Inform students they will learn that children ride more safely facing the rear of a vehicle.
- It is important to place children in a CR that is based on their age, weight, height, physical development, and behavioral needs.
- By following the CR manufacturer's instructions and best practice recommendations, parents will be providing the child with the safest way to travel.
- 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.

Why Children Should Travel Rear-Facing

- Phrsical
- Development

Development

- Babies heve by
${ }^{+}$hatien h
- Batson iendors,
and mevies are
not Nity
develipped
- 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.


## INSTRUCTOR NOTES:

- Point out that there are many resource materials in the Appendix showing the need to transport children in a rear-facing position.

- 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.


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

- 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

Activity 1: Identifying Rear-
Facing CR Facing CR
-Infant-only 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.

## INSTRUCTOR NOTES:

## Activity 1: Identifying Rear Facing CR-10 minutes

## Instructions:

1. With assistance from a member of the teaching team show rear-facing infant-only CRs with 3 -point and 5 -point harness systems. Show rear-facing CR with/ without base. Show rearfacing convertible CRs with 5-point, T-shield (if available) and Tray shield.
2. Divide class into small groups. Provide each group with a CR. Instruct small groups to answer the questions related to CR assigned.
3. Have one person from each group identify the type of CR he or she has.

Activity \#1 Objective: Students will identify different features found on rear-facing CRs.

Activity \#1 Wrap-up: Quickly have one person from each group identify the type of CR they have, describe the harness system and show the label, stating the minimum/ maximum weight/ height limits.

Rear-Facing Infant-Only CR

- This CR is rear facing only
. ble rem-doong of le the
Anghert meight or height allowed by the manifacturer' mernuas
- Nine haaf ahowef he I inch Below the tip of the thell
- Lne it servivectined pasken
- Une Maness stows at or owe ehaiter lyrel
* CRes should be used anly for travel, not sleeping
- 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"

## INSTRUCTOR NOTES:

Point out the labels, including air bag label and weight/ height limits on the CRs.

- Point out that students should encourage parents/caregivers to use the rear-facing CR to the highest weight or height allowed by the CR manufacturer. This applies even if the child has reached 1 year of age and 20 pounds.
- Provide students with suggestions on ways to ease parents' need to see the baby during driving. For example, babies sleep through the night without being under the parents' watchful eye. If the CR is installed correctly, the baby should be fine.
- Refer students to the AAP Guidelines for Selecting Child Safety Seats.
- Refer to and discuss the "CRs should be used only for transporting children" Instructor Notes on the following page.
- 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.


## [Instructor Notes continued from page 184]

- Stress to students that CRs should only be used for transporting children.
o When caregivers, new parents or parents-to-be attend a checkup event, technicians are in a great position to talk to them about safe sleep practices for their baby. While car seats are designed to hold sleeping babies during travel, many children are kept in their car seats long after travel is complete.
o Since parents may feel comfortable with baby in the car seat, they may be tempted to leave the child harnessed but unattended. They may even loosen the harness (making it easy for baby to slouch or "submarine" into the webbing.) This can be dangerous.
o Parents should break the "never wake a sleeping baby" rule. As recommended in the May 2009 American Academy of Pediatrics' Clinical Report, "Safe Transportation of Preterm and Low Birth Weight Infants at Hospital Discharge," parents/caregivers are "advised that 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."
o 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.
- Car seats should be used for car travel - not for sleep in the home or daycare! Each child deserves his or her own sleeping space that offers a safe environment.
o Refer students to www.cribsforkids.com for additional information


## INSTRUCTOR NOTES:

- Stress the importance of following the CR manufacturer's instructions.
- Refer students to the AAP Clinical Report, "Safe Transportation of Preterm and Low Birth Weight Infants at Hospital Discharge" in the Appendix for additional information.


## Selection - Fits The Child



- Select the CR that is right for the child's weight, height, physical development and behavioral needs.
- Select a CR with multiple harness slots and a short crotch strap to offer many options for a small but rapidly growing infant.

Securing the infant in the CR:

- Place the infant in the CR.
- Put harness straps over shoulders and buckle at the crotch. The harness holds the infant down low in the CR so he/she does not slide up and out of the CR in a crash. The crotch strap keeps the infant from moving forward.
- Tighten harness straps snugly. NHTSA requires CR manufacturers to state in the instructions: "A snug strap should not allow any slack. It lies in a relatively straight line without sagging. It does not press on the child's flesh or push the child's body into an un-natural position." You should not be able to pinch excess webbing at the shoulder once the harness is buckled. This is called the "pinch" test.
- Place the harness retainer clip at armpit level.
- Place blankets around baby after harness is snug and secure. Thick padding placed behind/ under the child or under harnesses can compress in a crash and create slack in the harness.
- Use only the harness comfort covers or head padding that the CR manufacturer has included with the CR , or that the CR manufacturer sells separately for the specific CR .


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

Reinforce the following selection points about aftermarket or non-regulated CR features:

- Choose the proper CR. Parents should select the CR that fits their vehicle, their child, and their budget.
- Remind students that all CRs meet the same Federal standard.
- Place blankets around baby after harness is snug and secure. Concern about padding placed behind/under the child or under harnesses including thick compressible foam, quilting, bunched materials, and soft blankets can compress in a crash and create slack in the harness.
- On some CRs, the harness retainer clip is designed to slide down the harness straps in a crash. It should be positioned at armpit level on the child.
- Use only the harness comfort covers that the that the CR manufacturer sells separately for the specific CR.


## INSTRUCTOR NOTES:

At child's shoulder, try to pinch webbing up and down, your


## CLASSROOM NOTES:

## Pinch Test:

 fingers should slide off.- Not every CR will fit in to every vehicle.

Make the following points:

- Many retail outlets will allow parents to try out a CR in their vehicle in the store parking lot.
- Don't provide personal recommendations on CR choice. That is something that the parent must do.


## Pinch Test

- Test at child's shoulder
-Try to pinch webbing up and down
-Your fingers should slide off


INSTRUCTOR NOTES:
CLASSROOM NOTES:


- Selection based on age, weight, height, physical development, and behavioral needs of the child.
Convenience factors:
- Number and position of harness strap slots-Is there "room to grow"?
- Automatic or one-step harness adjustment mechanisms: Is it easy to tighten and loosen the harness straps?
- Infant-only CR versus rear-facing convertible CR? It may be more economical for a family to purchase a convertible CR.
- Detachable base options on infant-only seats: These may be more convenient for families. Extra bases can be purchased for every person transporting the infant.


## CLASSROOM NOTES:

$\qquad$

## INSTRUCTOR NOTES:

## Factors That Influence CR Selection:

- NHTSA's Ease-of-use Rating
- Caregivers physical limitations
- Word-of-Mouth
- Fabric Design
- Illusion of Comfort
- Harness hardware can include manual adjusters, "A-lock" (adjuster device on front of many seats), metal harness adjuster, or rod/slot systems (a rod is inserted in appropriate fabric loops at the end of the harness).
- Air bag warning label: A permanent label must be visibly affixed on rear-facing or convertible CRs.

Rear-Facing Harness Adjusters


## INSTRUCTOR NOTES:

- Illustrate a variety of CRs showing the airbag warning and different types of harness adjustments: front harness adjuster, metal harness adjuster (back adjustment), rod/slot systems, etc.

- The rear-facing position is generally safest, children should ride rear facing as long as possible but should never exceed the manufacturer's weight or height limits.
- Most newer convertible seats are approved for rear-facing use up to 30-35 pounds and should be considered for infants whose height or weight have exceeded the limits of the rear-facing infant-only seat (Check manufacturer's instructions for weight limits).
- NOTE: Regarding comfort, practical experience has shown that active infants can tolerate riding with their legs folded. Parents with children whose feet touch the vehicle seat should be told about the possible trade-offs, ie. head and spine injuries vs. possible injury to lower extremities.
- For rear-facing, the shell of the CR absorbs the forces of the crash across the entire head, neck and back, while forward-facing, the harness, across a smaller proportion of the body, absorbs the forces of a crash.


## CLASSROOM NOTES:

$\qquad$

## INSTRUCTOR NOTES:

Make the following points:

- It is very important to refer to CR manufacturer's instructions.
- AAP policy statements are included in the Appendix and CR manufacturer's instructions should be available in class.
- Always consider the needs of each passenger.
- Although there may be many seating positions in a vehicle, not all may be suitable for installing a CR. For example, the center rear seating position may not be good for installing a CR. The CR manufacturer's instructions and/ or the vehicle owner's manual may not allow certain vehicle seating positions to be used.
- As long as the CR fits, the center rear seating position may be safer because it is furthest from impact and intrusion from any direction. However, some center-rear positions are not usable, and many families transport more than one child.
- Always ask, "Who rides in this vehicle? Where will each person sit?"


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

Discuss reasons why children ride in the front seat-for example, so parents can provide care, such as a pacifier, bottle, or comforting touch.

- Many new parents place children where they can observe them when no other caregiver is in the vehicle. Even with older children, the driver often wants to talk with or entertain the active child.
- In some cases, riding in the front seat has been used as a reward for good behavior.
- Discuss the pros and cons for selecting the rearcenter seating position.

Pros: Position is furthest from impact and intrusion from any direction.

Cons: Some vehicles do not have a rear-center seating position. Some rear-center seating positions are not usable for CRs (that is, the position is too narrow or has a hump). Parents may need to transport more than one child and may not know which child to place in the rearcenter seating position. CR manufacturer's instructions or vehicle owner's manual may not permit it.

- Point out that parents and caregivers should not feel guilty if a rear-center seating position cannot be used. The back seat is safest. Consider all options to ensure the safety of all who are traveling.


## Location

-The back seat is the safest location - Consider air bag effects -Consider needs of other passengers -Choose seat belt or lower anchor system


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## Play Video

Video demonstrates a vehicle crashing into a fixed barrier at 35 mph . with a rear-facing only child restraint in the front seat in front of an air bag. Note that the deploying air bag strikes the shell of the restraint directly behind the infant's head leading to excessive loading of forces on the infant's head.

Video courtesy of Insurance Institute for Highway Safety.

- Look on the CR for belt path arrow or label.
- Read the CR manufacturer's instructions to identify the correct belt path.
- To install a rear-facing CR correctly, an individual must secure the CR with an appropriate recline angle using the correct belt path.
- The seat belt or lower anchors must remain tight and locked around the CR.
- Consider seating positions that have seat belts or lower anchors that will stay tight.


## Installation - Rear Facing

 Basics-Correct belt path
-Appropriate recline angle
-Tight and locked in plack * Uling seat bet
${ }^{\infty}$

+ Using lower anchors

INSTRUCTOR NOTES:
CLASSROOM NOTES:

- This is an introductory slide for the next sets of slides.


Correct recline angle:

- Do not recline more than 45 degrees from vertical.
- Follow CR manufacturer's instruction for acceptable rearfacing recline angle.
- Not all manufacturers recommend the same angle.
- As baby ages and obtains better head control, he/she may sit more upright. This can actually provide for improved crash protection.
CR recline indicator:
- The recline angle indicator is part of the CR and should be used as indicated by the manufacturer.


## Seat slope

- Steep angle may cause infant to ride too upright. Maintain correct recline angle.


## CLASSROOM NOTES:

-2
$\qquad$

## INSTRUCTOR NOTES:

- Show a variety of CRs with different recline indicators, including one that states this is level to ground. Inform students to also look to be sure angle is correct as some indicators may not give a true reading.
- Tell students that the vehicle should be on level ground to get a more accurate angle read.
- Remember that young infants' heads are heavy and that babies have limited neck muscle control. If the CR is installed too upright, the infants' heads may flop forward and cut off their air supply.
- Many rear-facing CRs have an adjustable base (foot) that is used to correct the angle.
- For CRs that do not have an adjustable base, a firm lightweight object (i.e., a tightly rolled towel or pool noodle) can be placed at the vehicle seat crack or bight.
- Use as few as possible.
- Then the CR can rest on the firm lightweight object to maintain the correct angle. This is helpful when CRs are
 used on vehicle seats that are not flat like those used in the testing laboratory.
- Always consult CR manufacturer's instructions for how to obtain proper angle.
- Unless the CR manufacturer indicates otherwise, a rule of thumb is to use either the adjustable base (foot) or firm lightweight object - but not both. The CR is not tested this way.
- Remember that the vehicle must be on a level surface.


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- If at all possible, teach this section in the vehicles. If not feasible, use a demonstration seat for this demonstration.
- 

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\square$

## Installation - <br> Seat Belt or Lower Anchors

- Tightly securing the CR: * Install tighty using seat belt or lower anchors
- Grip CR at belt path to check - Make sure CR does not move forwand or side-to-side more than 1 inch
- Remember that parent or caregrer must be able to repeal insto lation
- 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.
o Place the seat belt through the belt path as directed by the manufacturer.
o Place hand in the CR to compress the vehicle seat cushion.
o Buckle, tighten, and lock the seat belt or lower anchorage system.
o 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.
o 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 beacuse 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.


## INSTRUCTOR NOTES:

- Using a vehicle seat or a dial-a-belt seat, demonstrate to the class how to attach a CR tightly to a vehicle seat.
- Inform students that 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. Many vehicle and child restraint manufacturers provide guidance in their owner's manuals. As always, follow the child restraint and vehicle manufacturer instructions. This includes seating positions when LATCH is used, shoulder belts on booster seated children, as well as unused belts next to the CR.
- 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 -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


## INSTRUCTOR NOTES:

- Remind students that this approach is unusual and that they should carefully review CR manuals.
- Inform students that the LATCH and Tether manual contains a lot of information on these topics.


## Installation - <br> Situation to Consider

- Space Requirements
- Seat slope


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?

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.


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

- Explain some special factors to consider for rearfacing CRs: width of CR, vehicle seat shape, seat belt anchor points that may be too close together or have buckles forward of the seat bight or crack, size of vehicle, two-door vehicles, small interiors, etc.
- Remind students to check the CR instructions if the CR base hangs over the edge of the vehicle seat. Many manufacturers say that no more than $20 \%$ of the CR can hang over the front edge of the seat - put another way, at least $80 \%$ of the CR base (footprint) must fit on the vehicle seat. At least one manufacturer requires that $100 \%$ of the footprint fit on the vehicle seat.


## STUDENT NOTES

- 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.


## Installation Situation to Consider

CR base that tilts with a switchable retractor:

- Tension in ahoulder portion may if up Ci
- Kees in till mode

Use leciing ello er ITy wive locking cilo or Iry


## INSTRUCTOR NOTES:

- If possible, demonstrate to class how this can happen.

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

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).


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

- All CRs serve children of limited weights and heights.
- A CR is outgrown when the child reaches either the height or weight limit. Infants in rear-facing, infantonly CRs should move to a larger CR if the infant's head is closer than 1 inch to the top of the CR.
- Rear-facing infants and children should use only a CR that was manufactured to be used in the rearfacing position. Never use a forward-facing CR, like a convertible seat in the forward-facing position or a booster seat for infants. Remember: Students have not yet learned about forward-facing-only or booster seats at this point.
- Some caregivers who may have been given household carriers resembling a CR may not know the difference.
- Students should know that CRs have labels that say they meet Federal safety standards.
- CR manufacturers generally recommend a lifespan for the product of about 6 years. Check instructions for specifics.
- A used CR lacking a known history/original owner may be fine, but there is no guarantee that it was not involved in a crash, has been recalled, may lack parts, or have other damage.
- See NHTSA recommendations for CR replacement after a crash.
- CR manufacturers may issue a recall and a correction kit if a problem is found with a CR. Many times the consumer can correct the recall at home. Although a recalled CR may have been corrected and is now safe to use, CR owners need to confirm that the identified problem has been fixed.


## 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
- When inspecting a CR, it is important to take the CR out of the vehicle and look it over thoroughly inside and out. It may look and feel correct, but without taking the CR out to check it, you could make a dangerous error.
- Harnessing errors can be hidden behind padding or under the seat, etc.
- Some common problems:
- Child not using harness (just sitting in the CR).
o Harness too loose.
- Retainer clip not at armpit level.
- Harness routed through the wrong slots (Note: A harness may look as though it is properly routed through the pad, but it may not be routed correctly through the shell.)
- Harness not doubled-back through the metal adjuster, if needed.
- Harness knotted or pinned or incorrectly routed.
o Harness not placed on the child correctly.
- Harness frayed or damaged.
- Metal adjuster not flush with slot or out of position.
- Crotch strap adjusted too long, or not through slot closest to the child.


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

Discuss the harnessing errors.

- Always use the harness. The infant may be ejected if no harness is used.
- Point out the need for the technician always to show parents/caregivers how to loosen and tighten harness.
- Use the harness slots that are at or below the infant's shoulders. The harness holds the infant snugly in the CR to reduce motion.
- Some infant harness adjusters require the caregiver to double the harness strap back through the adjuster. This is sometimes forgotten.
- Sometimes caregivers forget to use the splitter plate or other harness adjustment part and may just tie the harness or pin it behind the CR. That tie or pin would not hold in a crash.
- Many caregivers may improperly position the harness straps under the arms instead of over the shoulders as a shortcut. Or they may remove harnesses to wash them and then re-thread them improperly so a five-point harness is now a threepoint harness.
- Teach students to examine the harness placement on every child carefully.
- Harnesses should be intact; fraying, cut, or damaged harnesses may not perform well in a crash.


## Installation Errors

- Salety belt or lower anchor strase boo loose or not locked
*CA facing the wrong direction
- Use of wrong belt path
- Incorrect recline engle
*Ct installed using both seet belt and lower anchors
anlese allowsd by manifscturer
- Incorrect lower anchor lether ube
* Carrying handie not uned as specifed in the inatructions

There are a variety of ways CRs are installed incorrectly:

- Seat belt or lower anchor straps too loose or not locked.
- Rear-facing-only CR that is facing forward.
- Seat belt or lower anchors routed incorrectly.
- Incorrect recline angle (especially for a young infant).
- Using two seat belts, or using a seat belt and lower anchors together (unless allowed by the CR and the vehicle manufacturers).
- Incorrect use of lower anchor or tether anchors. Not using the appropriate lower anchors. Attaching them upside down
- Not using the appropriate tether anchor.
- Carrying handle not used as specified. (Check with CR manufacturer's instructions).

CLASSROOM NOTES:
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

- Demonstrate or discuss the various types of installation errors students will see in the real world. Remind them not to be judgmental. Parents and caregivers want to do the right thing.
- Seat belt or lower anchors must be used as directed and remain locked and tight.
- Install the CR using the correct seat belt or lower anchor belt path. The lower anchor attachment in the CR may be in the forward-facing, toddler position. Check instructions to use the correct belt path.
- An improper angle can result in breathing complications for the infant.
- Use either the seat belt or lower anchors but do not use both at once. The CR has not been crash tested using this combination.
- Place the infant CR handle in the position required by the manufacturer


## STUDENT NOTES

- Using carrying handle position as an example (above), there are a number of acceptable positions. Always look in the owner's manuals

Always look in the manuals


INSTRUCTOR NOTES:
CLASSROOM NOTES:

- Continue to refer to owner's manuals and emphasize how there is variation between models and manufacturers.


## Activity 2: Selection and Installation Hands-On




- Silert an ajorsprane cx for you chile
a Alfuat herrienser to 院 pour this.


ias ont noler let.




## Activity 2: Selection and Installation

Instructions: In small groups, you will select and install
CRs by children's age/weight/height. A child (card with age, weight/height) will be assigned to your team.

Each group should:

- Select an appropriate CR for your child.
- Adjust harnesses to fit your child.
- Install a rear-facing infant only CR (with or without a base) or a rear-facing convertible CR in a vehicle using:
- Lap belt only
- Lap and shoulder belt
- Lower anchors
- Repeat the CR selection, harness adjustment, and 3 installations for the type of CR (rear-facing infant only or rear-facing convertible) not chosen the first time.

Table for worksheet installation exercise - RF

| Seat to Install | How does the belt lock? | Instructor <br> Initials |
| :--- | :--- | :--- |
| Infant only without a base | Retractor: <br> Latchplate: <br> How does it pre-crash lock? |  |
| Infant only with a base | Retractor: <br> Latchplate: <br> How does it pre-crash lock? |  |
| RF convertible | Retractor: <br> Latchplate: <br> How does it pre-crash lock? |  |

## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

## Activity 2: Selection and installation - 30 min

## Instructions:

- "Refer to instructions in Student Notes above.


## Materials:

- "Child cards."
- Rear-facing infant and convertible CRs for each team.
- Doll for each team and vehicles for installation. Be prepared to discuss and know which CR serves each "child's" weight and height. Have the following "child cards" available:
- 18 months/28 pounds/29 inches.
- 7 days/10 pounds/21 inches.
- 14 months/ 19 pounds/ 25 inches.
- 3 days/ 4 pounds/ 19 inches.
- 7 months/24 pounds/27 inches.
- 2 years / 26 pounds/29 inches.
- 10 months/26 pounds/27 inches.
- 3 months/ 18 pounds/ 23 inches.



## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## Special Consideration - Small and Premature Infants

-Use rear-facing CR with small internal harness dimensions -Use CR designed for child's low weight

- Center infant in CR with
rolled receiving blankets and crotch roll, if necessary -Use CR only for transportation


INSTRUCTOR NOTES:
CLASSROOM NOTES:

- Instruct students always to follow the CR manufacturer's instructions.
- Remind students to check all labels.



## CLASSROOM NOTES:

$\qquad$

Securing medical equipment during travel:

- Certain medical conditions may require special equipment, such as apnea monitors, ventilators, and oxygen tanks, which must be safely secured during transport.


## INSTRUCTOR NOTES:

Make the following points:

- To date, no product is available that is designed to secure medical equipment in a vehicle.
- NHTSA recommends securing medical equipment by placing it on the vehicle floor and wedging it with pillows or foam; equipment can also be held in place by seat belts not in use.
- Monitors and oxygen tanks may be stored under the front seat of the vehicle.
- Special CRs may be needed for infants who are very small or have special physical or developmental needs. For example, breathing problems or other medical conditions may require the child to lie flat or use an adaptive CR.
- Car beds are used for small, premature, or medically fragile infants who need to ride as directed by a doctor.
o Secure the infant in the car bed with the internal harness or bunting.

- Place infant's head toward the center of the vehicle, not next to the door.
o Use seat belt to anchor the car bed lengthwise on the vehicle seat.
- CRs for children with special needs are generally more expensive and may be more difficult to find and use. Use instructions to see if there are specific requirements for installation and use with the child.
- Technicians can help caregivers choose and learn to install CRs for children with special needs.


## INSTRUCTOR NOTES:

- Refer participants to Automotive Safety Program, Riley Hospital for Children, at http://www.preventinjury.org.

Special Considerations - Small and Premature Infants and Children With
Breathing Problems

- Follow AMP discharge recommendations
-Test in a CR
positioned at same
angle as in vehicle
- Results may show need for car bed use
- The American Academy of Pediatrics (AAP) recommends that all infants born before 37 weeks (more than 3 weeks early) be monitored before they leave the hospital for possible breathing problems or slowing of the heart rate when sitting in a semi-reclined position. The physician will determine if the infant can use a rear-facing CR or should ride lying face downward or face upward in a car bed.
- Contact the Automotive Safety Program, Riley Hospital for Children, for information about a 2-day special needs restraint systems course for CPS technicians.
- The National Center for the Safe Transportation of Children With Special Healthcare Needs has a database of CPS technicians who have taken the course. For information, contact the center at 1-800-755-0912 or go to http://www.preventinjury.org
- Other resources:
- Transporting Children with Special Health Care Needs Listserv: Subscribe to SPECIALNEEDSTRANSPORT-L through http://www.listserv.iupui.edu
o "CPS in Healthcare" Email: CPSforHealthcare-subscribe@yahoogroups.com
o Safe Ride News Fact Sheets; http://www.saferidenews.com or 1-800-403-1424
o AAP Policy Statements and Brochures; http://www.aap.org


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\square$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

- Refer students to the AAP Policy Statement "Safe Transportation of Premature and Low Birth Weight Infants" and "Hospital Discharge Protocol Essentials" in the Appendix.
- Encourage students to learn more about this topic.
- Some very small infants do not have respiratory problems but may require special consideration.
- Photos here show the proper fit of three-point and fivepoint harnesses with a small infant.
-The padding in this picture is part of the child restraint.



## INSTRUCTOR NOTES:

- Point out the use of the receiving blanket for positioning as shown in the slides
- Note the padding around the baby to close the gap in the three-point harness, but stress that nothing should be placed under the baby or under the harness straps.


CLASSROOM NOTES:
Why would these CRs not be appropriate for a small infant?
T-shields/Tray shields may not work for small or premature infants because the baby's face would be too close to the Tshield or Tray shield, which could result in the child's face hitting the shield in a crash.

## INSTRUCTOR NOTES:

Ask students why these CRs would not be appropriate for a small infant.

## Activity 3 - Communicating Best Practice and Tough Choices

-1 have two children. Which one should go in the middle?

- It is easier if I leave the handie up. Is that OK?
-Should I use lower anchors or the seat belt? Which is safer?
-Should I use a tether on my rear-facing corvertible seat?
-I want to see my baby: Mary I turn him around?


## INSTRUCTOR NOTES:

## Activity 3: Communicating Best Practice and Tough Choices-15 minutes

Instructions: head class discussion.

## Materials:

I have two children. Which one should go in the middle of the back seat?

Answer: The parent/caregiver must decide. The parent may not want either child sitting too close together and may place both children in the outboard positions, with no one in the middle. The vehicle may not handle two child safety seats next to each other.

Is it OK if I leave the handle up and dangle toys from it to keep my baby happy?

Answer: Check with the CR instructions. Many CR manufacturers may require keeping the handle in the "down" position. Check CR instructions about adding aftermarket products to the CR.

Should I use lower anchors or the seat belt? Which is safer?
Answer: Both installation systems can provide safety. The choice of either one should depend on the particular CRs available for installation and the design of the seat belt system in the vehicle. Which CR system does the parent feel more comfortable using? Installing the CR with more than one system might
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
put different stress on the CR in a crash and may hurt CR performance.

## Should I use a tether on my rear-facing convertible seat?

Answer: A rear-facing child restraint should never be tethered unless recommended by the CR manufacturer.

## I want to see my baby. May I turn bim around?

Answer: AAP and NHTSA recommendation:

## AAP:

Children should face the rear of the vehicle until they are at least 1 year of age and weigh at least 20 lb to decrease the risk of cervical spine injury in the event of a crash. Infants who weigh 20 lb 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 safety 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.

## NHTSA's Step 1:

For the best possible protection keep babies 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 babies rear-facing until an age 1 and at least 20 pounds.

Activity objective: For students to understand how to explain tough choices and best practices.

## STUDENT NOTES

Use the "classroom notes" area to write in what is wrong with these pictures.

## Misuse - What's Wrong With This Picture?

- Determine what is correct or incorrect with the CR installation - How would you explain your answer to a parent or caregiver?



## INSTRUCTOR NOTES:

CLASSROOM NOTES:
Give students the opportunity to identify the misuse first, then share the correct response below with them.

## Answer:

- Child too upright.
- Handle not approved for upright position in this CR.
- Child too big for CR.
- No harness.

This is the first of a series of slides that address misuse. This is the practice slide.


CLASSROOM NOTES:
-

## INSTRUCTOR NOTES:

Give students the opportunity to identify the misuse first, then share the correct response below with them.

## Answer:

- CR shell is broken.
- Webbing not snug against vehicle seat back.
- Webbing routed incorrectly.



## INSTRUCTOR NOTES:

CLASSROOM NOTES:
Give students the opportunity to identify the misuse first, then share the correct response below with them.

## Answer:

- Rear-facing-only seat installed forward facing.
- Correct belt path not used.


CLASSROOM NOTES:

## INSTRUCTOR NOTES:

Give students the opportunity to identify the misuse first, then share the correct response below with them.

## Answer:

- Belt tightener use on lower anchor strap.



## INSTRUCTOR NOTES:

CLASSROOM NOTES:
Give students the opportunity to identify the misuse first, then share the correct response below with them.

## Answer:

- Harness straps too loose.
- Harness retainer clip too low.
- Child bundled up, adding bulk under harness.


## Chapter Review

- Describe an intant's physical troits that require speoial attention during travel
- Describe ways that rear-facing CRs provide additional protection during travel
-Identify all parts on a:
+ Rew-focing infent Cr (with and mithout is bese) - hew-flacing corvertible Cl.
-Identify correct CR installation techniques
- Describe correct placement of harness straps, harness retainer clip, carrying handle, etc.

On the basis of this chapter, please answer the following questions:

1. How do you determine which harness slots to use for a rear-facing child?
2. What is the correct way to secure a child in a rear-facing infant or convertible seat?
3. What steps must be taken to install a rear-facing CR?
4. What do you need to teach parents/caregivers about installing CRs near air bags?
5. How do you find the correct belt path?
6. How tightly should a rear-facing CR be installed?
7. What is the lowest weight and youngest age for turning a child forward facing?
8. What type of CR may be considered for a small or premature infant who cannot travel in a standard CR?

CLASSROOM NOTES:
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

On the basis of the content covered in this chapter, please have students answer the questions in their workbook. Then go over the answers below:

1. How do you determine which harness slots to use for a rear-facing child?
Answer: Harness straps must be at or below the rear-facing child's shoulders.
2. What is the correct way to secure a child in a rear-facing infant or convertible $C R$ ?
Answer: The child must meet the weight/height requirements of the CR . The CR must be reclined according to the CR manufacturer's instructions. Harness straps must be at or below the child's shoulders with the retainer clip at armpit level. Harness straps should be snug and comfortable.
3. What are the four things to remember when installing a rear-facing infant or convertible $C R$ correctly?

Answer: Selection, Direction, Location, Installation
4. What do you need to teach parents/caregivers about installing a rear-facing $C R$ in vehicle positions that have air bags?
Answer: Never place a rear-facing CR in front of an active passenger air bag. Consult both your CR manufacturer's instructions and vehicle owner's manual.
5. How do you find the correct belt path?

Answer: Locate the belt path arrow or label on the CR for correct belt path use. Follow the CR manufacturer's instructions.
6. How tightly should a rear-facing CR be installed?

Answer: To test for tightness, grip the CR at 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.
7. What is the youngest age and lowest weight to turn a child forward facing?
Answer: AAP recommendation: "Children should face the rear of the vehicle until they are at least one year of age and weigh at least 20 pounds to decrease risk of head and cervical spine injury in the event of a crash. Infants who weigh 20 pounds before one year of age should ride rear-facing in a convertible CR or infant CR approved for higher weights until at least one year of age." For the best protection, an infant should ride rear facing to the highest weight or height allowed by the CR manufacturer.
8. What type of CR may be considered for a small or premature infant?
Answer: The first option is to use a standard CR. A special needs CR may be needed; it may be ordered by the physician.

## CLASSROOM NOTES:

# Chapter 10 Children in Forward-Facing Child Restraints 

(Student Manual page 151)
粠的 3 ins
National Child Passenger
Safety Certification Training

Chapter 10: Children in ForwardFacing Child Restraints

## CLASSROOM NOTES:

## Chapter length of time: $\mathbf{2}$ hours, $\mathbf{1 5}$ mins.

## Pre-workshop activities: See materials below.

## Video:

Video clips are available for this chapter. Refer to the readme_first_video.txt file on the instructor CD.

## Activity total time: $\mathbf{1}$ hour, 15 minutes.

- Activity 1: Harness Adjustment With Doll Height and Weight Limits - 10 minutes.
- Activity 2: Belt Paths - 5 minutes.
- Discussion: Selection Criteria - 5 minutes.
- Activity 3: Communicating Best Practice With Parents - 10 minutes.
- Activity 4: Selection and Installation - 30 minutes.
- Activity 5: Identifying Misuse in the Classroom - 15 minutes.


## Materials needed:

- Manufacturers instructions for each CR.
- Forward-facing CRs with harness (combination, convertible, forward facing only).
- CR with harness adjuster: bar.


## CLASSROOM NOTES:

$\longrightarrow$

- CR with harness adjuster: metal slide.
- CR with harness adjuster: front adjustment.
- Forward-facing convertible—Sit N' Stroll—photo.
- Forward-facing convertible - combo and forward facing only with rigid LATCH.
- Forward-facing convertible - combo and forward facing only with flexible LATCH.
- Forward-facing convertible - combo and forward facing only with tether.
- Forward-facing convertible - combo and forward facing only to higher weight limits.
- Aftermarket or non-regulated products/ other - padding, etc.
- NHTSA recall list.
- Child passenger checklist (Checkup Form to be used at checkup event associated with class).
- Vehicle with integrated seat.
- Safety vests.
- LATCH/Tether Manual.
- Child cards.
- Role play cards for Optional Activity 3.
- Seat belt simulation or belt Demonstration Seat.


## Appendix Materials:

- Transporting Children with Special Health Care Needs


## Chapter Objectives

- Explain the requirements for placing a child in a forward-facing CR
- Describe correct CR selection, direction, location, and installation for a child in a forward-facing CR
-Describe the benefits of top tethers
- Discuss types of medical conditions that require special consideration for transportation
- Identify and correct misuse

INSTRUCTOR NOTES:
CLASSROOM NOTES:

- Review chapter objectives. Do not go into detail.


## NHTSA's 4 Steps

1. Rear-facing $C R$
2. Forward-facing CR
3. Booster seat
4. Seat belt

- Each type of restraint system has advantages and disadvantages that should be considered during selection of a CR.

As noted earlier, CRs should be chosen on the basis of three major criteria:

- The CR fits the child.
- The CR fits the vehicle.
- The CR will be used correctly and the same way each time.


## INSTRUCTOR NOTES:

Remind students that CRs should be chosen on the basis of three major criteria:

- The CR that fits the child.
- The CR that fits the vehicle.
- The CR that will be used correctly and the same way each time.
- A conventional seat is a CR that is readily available to the public-usually from a retailer. The manufacturer's instruction manual should be read and followed carefully. Conventional CRs are different from special needs CRs.
- Many children with special needs can use a conventional CR (not a special CR).
- Correct CR selection should be made by the child's medical team (therapist, doctor, parent/caregiver, and CPST)
- It is best if the medical teams have received transportation-specific special needs training.


## Conventional CRs

*Meets child's needs *Cheaper
-Easier to find, use, and install
*Appropriate for children with special health care needs

## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Describe a conventional seat: A conventional seat is a CR available to the general public from a retailer.
- Make sure students understand which conditions may require specialized adaptive CR , as well as conventional systems.
- Emphasize that transportation of children with adaptive restraints and special equipment is becoming more common. Selecting the "best restraint" remains the same as with any child.
- It is important for technicians to be able to recognize the general areas where children may require specially adapted restraint systems, as well as the community, regional, and national resources available to meet their needs.
- Restate that manufacturer's instruction manual should be read and followed carefully.
- For more information about the availability of specialized restraints and resources, go to the Web site of the National Center for Safe Transportation of Children with Special Needs: http://www.preventinjury.org or go to the AAP's website: http://www.aap.org.
- Remind students to refer to Transporting Children with Special Health Care Needs in the Appendix.


CLASSROOM NOTES:
$\qquad$

## INSTRUCTOR NOTES:

Be sure students understand the importance of keeping children rear facing as long as possible.

## Play Video

This is an accelerator sled test showing a rear- and forward-facing convertible child seat attached using a lap belt and tether.

Video courtesy of MGA Research Corporation

- Many internal harnesses for CRs are rated at the weight limit of 40 pounds. This is because the harnesses have been crash tested by the manufacturers only to the weight of 40 pounds.
- Manufacturers are aware of how these harnesses will react in a collision because of these crash tests. If a child


## Selection: Types of Harnessed Forward-Facing CRs

-Forward-facing convertible CR
-Combination seat with harness
-Forward-facing-only $C R$
-Large medical seats/vests
-Integrated seats weighing more than 40 pounds is involved in a collision in a harness with a weight limit of 40 pounds, it is unknown how the harness will perform.

- There are CRs available that allow a higher weight limit for the harnesses. The manufacturer's instruction manuals should be read and followed carefully.


## INSTRUCTOR NOTES:

- Restate the types of forward-facing CRs.
- Explain to the class that most CRs with harnesses have an upper weight limit of 40 pounds.
- Generally, CRs with harnesses are crash tested to that upper weight limit specified by the manufacturer. If a child is over that weight limit, CR performance is unknown.
- Explain that there are CRs available at higher weight limits.
- Restate that the manufacturer's instruction manual should be read and followed carefully.


## Forward-Facing Convertible Seat

Forward-facing:
*CR in upright position

- Some manufacturers allow a semi-reclined position

- The manufacturer's instructions for many CRs recommend that they be in the upright position when forward facing.
- Some manufacturers meet testing standards with their seat in a forward-facing, semi-reclined position, as well as fully upright. Consider this position if child has special needs (discussed later in this chapter) or if seat belts cannot be made tight when the CR is upright.
- Always follow the manufacturer's instructions.


## INSTRUCTOR NOTES:

- Explain that many harness systems are rated only to 40 pounds, but the marketplace is changing and new products are appearing.
- Remind students to stay aware of these new products.
- This CR does not have air bag warning labels because combination CRs are forward facing only, and most have a lower weight limit of 20 pounds.
- The combination CR is used with a harness until a certain weight specified by the manufacturer is reached.
- Always check the manufacturer's instructions for the highest weight allowed by the harness.
- After a certain weight specified by the manufacturer is
 reached, the harness must be removed.
- Then the seat can be used as a belt-positioning booster (NHTSA's Step 3). Belt-positioning booster seats will be covered in the next section.
- The back of all combination seats is reinforced. Any harness slot can be used as long as it is at or above the child's shoulders.
- When determining correct fit, make sure that the mid-point of the back of the head is not above the top of the shell.


## INSTRUCTOR NOTES:

- Ask students why the seat in the slide doesn't have an air bag warning label. See below for answer.
- Demonstrate the difference between a forwardfacing convertible seat and a combination seat.
- Show a convertible CR with only the top slot reinforced. Also display a combination CR with what looks like a reinforcement bar (this is not the case, as all slots are reinforced).
- Tell students that a common error is to assume that the top slot only is used on a combination seat.
- Interactive learning: Have all students look at their CRs to learn about CR weight/height limits and harness slots.
- Do not discuss BOOSTERS in this chapter.

Why wouldn't this seat have air bag warning labels?
Answer: This seat should never be used rear-facing. Best practice would be to make sure a child is not placed in a seat position in front of an air bag. Sometimes in real world situations, the parent may need to make the tough

CLASSROOM NOTES:
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## CLASSROOM NOTES:

$\qquad$
choice of placing a child in front of an air bag. Parents should be instructed never to place a rear-facing CR in front of an air bag. If a child in a forward-facing CR must be placed in front of an air bag, the vehicle seat needs to be moved back as far as possible.

- These seats are sometimes used for children with special health care needs or for those heavier than 40 pounds who are not yet behaviorally mature enough for a booster seat.
- The harnesses on these CRs serve children to higher weight limits.
- Always follow the manufacturer's installation instructions.



## INSTRUCTOR NOTES:

- Point out the need to research and remain aware of currently available seats with higher weight harnesses. If additional seats are available, show to class.

Source: National Center for the Safe Transportation of Children With Special Heath Care Needs:
http://www.preventinjury.org

Upright Vests and Harnesses


- Vests or harnesses may help children with behavioral issues, weak muscles, excess weight, or other situations when a conventional restraint cannot be used.
- Heavy duty tethers are required.
- They may also provide a good restraint when the vehicle has lap belts only. There are different vests available for use as CRs. Always follow the manufacturer's instructions.


## INSTRUCTOR NOTES:

Make the following points:

- There are a variety of vests available for use as CRs. They meet the same crash requirements as conventional CRs.
- Always follow the manufacturer's instructions.
- Vests may be available in different sizes.
- If available, show different kinds of vests.
- Some vehicles have seats/restraints that are integrated into (built into) the vehicle. Check your vehicle owner's manual for instructions.
- These restraints face forward. Some can be used as a belt-positioning booster. They are not portable.


## Integrated Seat

- Built into the vehicle -Forward-facing ONLY -Some have 5 -point harness
-Some can be used as a belt-positioning booster
-Check instructions for weight limits



## INSTRUCTOR NOTES:

CLASSROOM NOTES:

- Show seat if available in vehicles. Remind students to check labels for limits and recalls. Some seats go to the weight limit over 40 pounds.
- Explain to students that integrated seats, as with other CRs, may need to be replaced after a motor vehicle collision, if webbing is frayed or parts are missing or broken. Check the vehicle owner's manual for instructions.
- Point out that parents should call the service department of the vehicle dealership and ask to be given information in the repair section of the service manual about replacing CR parts.


CLASSROOM NOTES:

- Some CRs have unusual or even unique belt paths or routing instructions. Always follow the manufacturer's installation instructions.
- It is important for technicians to notice the correct belt path for installation.
- As always, it is important to follow the manufacturer's installation instructions


## INSTRUCTOR NOTES:

- Point out unusual belt path.
- Remind students that just because a seat is unfamiliar, does not mean it is unsafe. If it meets federal standards and is used correctly, it is a good seat. Take the opportunity to learn about the seat by reading the manual and labels.


## STUDENT NOTES

- Reinforcement may not be visable and structures that look like reinforcement may not be.
- The only way to know for sure is to read the manufacturer instructions.


## Identify Reinforced Harness

## Slots

Harness:

- Can be five-point or Tray Shield
- In reinforced slots at
or above shoulders
-Some CRs must use
top siots when
turned to face
forward
- Reinforcement is not always visible



## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

Stress to students that reinforcement may not be visable and structures that look like reinforcement may not be. The only way to know for sure is to read the manufacturer instructions.

Activity 1: Harness Adjustments


- Bulky clothing can interfere with proper harness fit. Avoid bulky clothing or padding behind child's head or back or under buttocks. Bulky jackets can be put on backwards (over child's arms and torso) after harness is secured. Place blankets over and around child after harness is snug.
- Children should sit with:
- Back and bottom flat against CR seat back.
- Harness placed through proper slots.
o Harness straps placed over shoulders and buckled at the crotch.
- A snug harness lies flat and passes the pinch test. Tighten harness straps snugly.


## Activity 1: Harness Adjustments Height and Weight Limits

## Instructions:

Part 1: Harness adjustment for height.

- You will be placed in a small group.
- Your group will work with a forward-facing CR and doll and will move the harness to a different, higher harness slot. Adjust the harness to loosen and tighten.
- Adjust the seat's harness so it fits the doll.
- Look at the location of the harness adjustments. Is it in the front or on the back of the CR? Is it easy to use (width of CR, comfort/color, easy to install in vehicle)?
- Always use the manufacturer's instruction manual.


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

## Activity 1: Harness Adjustments - 10 minutes

Instructions: Students will work in small groups.
Activities: Harness adjustment for height; Identify maximum height and weight limits. Identify Reinforced slots.

- Students will review labels to indentify height and weight limits.
- Each group will work with a forward-facing CR and doll and will move the harness to a different, higher harness slot. Adjust the harness to loosen and tighten.
- Students should look at the location of the harness adjuster, and identify reinforced slots.
- Is it in the front or on the back of the CR? Is it easy to use (width of CR, comfort/color, easy to install in vehicle)?
- Always rely on the manufacturer's instruction manual to find the harness adjuster part and see if there are instructions that tell you which specific harness slot to use. Adjust the seat's harness so it fits the doll.


## Instructions:

At the conclusion, have each group explain which CR its members selected and why. Ask if there were any instructions in the CR manual directing them to use a specific harness slot with that particular CR. Assign each group a "child" from the list below:

- 2 years old, 24 pounds, 34 "
- 4 years old, 38 pounds, 42 "
- 18 months old, 26 pounds, 32 "
- 5 years old, 63 pounds, $48^{\prime \prime}$
- 2 years old, 32 pounds, 36 "
- 3 years old, 33 pounds, 37 "

- The seat should be correct for the child's age, size, physical development, and behavioral needs. Try before you buy is always a good plan.
- Fits the child:
o Appropriate for weight and height of child.
- Harness straps at or above the shoulders.
- Once parents have selected a CR that fits their child, they should try it in their vehicle to make sure they can install it securely. Check:
- Vehicle seat type and size (contoured, bench, captain).
o Whether it works with seat belt or LATCH system.
- The seat should be easy to use with respect to:
o Front versus back harness adjustment.
o Ease of use with seat belt or LATCH system.
- Consider the needs of each child and how they relate to the needs of other children or adult occupants.
- Although there may be many seating positions in a vehicle, not all will necessarily be suitable for installation of a CR.
- Most crashes are frontal, and the back seat is furthest from the point of impact.
- The center rear seating position may be safer because it is


## Location, Other Factors in

 Vehicle-Back seat as safest Iocation

- Position of other occupants
-Width of vehicle seat
- Size of CR
- Air bags
- Seat belt or LATCH system furthest from impact and intrusion from any direction as long as the CR fits. Unfortunately, the rear center position may not work well for installing the CR because of space and vehicle seat shape (e.g. humps)
- The CR manufacturer's instructions may not allow certain vehicle seating positions. The vehicle owner's manual may not allow CR installation in certain seating positions.
- Weight limits on lower anchors and tether anchors can affect the seating position choice. Each vehicle manufacturer sets their own weight limits. Check the vehicle owner's manual or most current LATCH manual for individual vehicle limits.
- A parent may tell you what they want. Listen.
- Consider how many are usually transported to determine the safest seating positions for all occupants.
- For multiple children, width of CR, width of vehicle seat, and number of seating positions must be considered.
- Refer to Safe Ride News LATCH Manual for information about LATCH systems.


## INSTRUCTOR NOTES:

- Discuss the benefits of listening to parents to find out the transportation needs of the family
- Remind students to note unused seat belts that may be within reach of a child when a CR is installed with lower attachments. Technicians should educate the caregiver to evaluate the risk of entanglement from unused seat belts and if possible, switch the retractor to ALR mode to lock the unused seat belt against the seat back in order to reduce this risk.

Activity 2 -Belt Paths

- Read CR
manufacturer's
instructions
-Read vehicle manual -Use upright position or semi-reclined position -Find correct belt path

Bentallef wish Lancs


## Activity 2: Belt Paths

Instructions: You will be placed in a small group to identify the correct seat belt or lower anchor path for a forward-facing convertible seat.

- Identify the forward-facing seat belt, lower anchor belt path, and tether strap on the CR. Where is the tether stored when not in use?
- Adjust the CR to either the upright or forward recline position (if allowed by manufacturer).
- Look on the CR for belt path arrow or label.
- Read the manufacturer's instructions to identify the correct belt path for both seat belt and lower anchors.


## CLASSROOM NOTES:

$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

## Activity 2: Belt Paths - 5 minutes

Instructions: Each group should identify the CRs forward-facing, lower anchor belt path and tether strap.

- Instruct students to look on the CR to identify seat belt and lower anchor belt path.
- Identify the correct belt path on a forward-facing convertible.

Materials needed: Forward-facing CR with lower anchors.

- A tether reduces the forward movement and rotation of the CR.
- Correctly using the recommended tether strap can improve how any CR performs.


## INSTRUCTOR NOTES:

CLASSROOM NOTES:

- Show class the tether and demonstrate how to tightly secure a CR with a tether (use a demo seat or demonstration vehicle) by using first the seat belt and then with lower anchors.
- Remind students that caregivers decide whether to use the seat belt or the lower anchors
- Confirm that seat belts and lower anchors offer the same protection.


When installing the CR in a vehicle:

- Consider seating positions that have pre-crash locking seat belts or lower anchors for CR use.
- Place the CR on the selected vehicle seat in the proper direction and at the correct recline angle.
- Place the seat belt or lower anchors through the CR belt path as directed by the manufacturer.
- Buckle the seat belt or secure lower anchors.
- Place hand in the CR and use leverage to compress the vehicle seat cushion while tightening the seat belt or lower anchors.
- Tighten as much as possible to allow for secure placement without causing damage to the vehicle or CR. How tight is tight enough? Use information from the last chapter to answer this.
- Identify the vehicle tether anchor. Attach and tighten the tether strap.
- Test the installation, grip the CR at or near the belt path, and pull on the seat. There should be no more than 1 inch of side-to-side or forward movement at the belt path.
- CR must be installed with one seat belt or with lower anchors. A CR is designed to be installed with one seat belt or with lower anchors. The effect of installing the CR with more than one system is unknown at this time.
- Never place noodles or towels behind a forward facing CR.


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

Identify storage for lower anchors:

- Explain the purpose of storing LATCH (a loose LATCH harness attachment may cause injury).
- Demonstrate placing lower anchors through a forward-facing belt path (making sure that the belt is not twisted).
- Select a variety of vehicles to demonstrate a variety of lower anchors and tether anchors.
- Have students look to see some LATCH instructions found in owner's manuals. Discuss what students should look for in an owner's manual to be sure they give caregivers good information.
- In some ways, the approach for selecting the best restraint for a child with special needs is the same as for any child.
- Sometimes a specially adapted CR is needed when a conventional CR does not meet all needs.
o A special-needs CR is usually physician prescribed and may need to be ordered from a medical supply company. Often, all or part of the cost is paid for by the child's health insurance.
o These seats may have higher weight limits for the internal harness or other special features to help the child in a certain way, such as an adjustable head pillow for children who need assistance with head control or an internal harness system for a child without other behavioral problems.
o Manufacturer's instructions should be read and followed carefully.
- For information about a 2-day training course designed to enhance CPS Technicians' knowledge base and experience with special needs restraint systems, contact the National Center for the Safe Transportation of Children With Special Healthcare Needs at 1-800-7550912, http://www.preventinjury.org, or Automotive Safety for Children, Riley Hospital for Children, at 1-800-543-6227.


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Provide a brief overview of special need CRs. The purpose is for the student to know they exist and may be used.
- A special need CR is usually physician prescribed and may need to be ordered from a medical supply company.
- These seats often have higher weight limits for the internal harness or other special features adapted to provide specific assistance to the child, such as adjustable head pillows for children who need help with head control.
- It is important to explain the need for understanding conditions that may require specialized adaptive CR.
- Children with special needs do not necessarily have long-term conditions. Children may have shortterm conditions such as a biking or roller blade

CLASSROOM NOTES:

$\qquad$
injuries. Often these children do attend car seat checkup events.

- It is important for technicians to be able to recognize the general areas where children may require specially adapted restraint systems, as well as the community, regional, or national resources that are available to help meet their needs.
- Hip casts can affect children's ability to sit up. Other restraints may be necessary.
- Never transport a child with special needs on a reclined vehicle seat.
- Some children may require professional transport.
- Other conditions such as cerebral palsy may make selecting a conventional CR difficult because breathing or another life-threatening factor may be involved.


## Special Considerations: Casts and Other Conditions

- Follow weight limits using casted weight - Specialized CRs for chlidren
- Go to aap.org or preventinjury.org for specific product recommendations

- Use the resources found in this course to help the caregiver make an informed decision about using a special needs CR.


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Show a conventional CR with high sides and a conventional seat with lower sides to demonstrate that conventional seats may fit some children in casts.
- Point out that the old special seat on the left in the slide (no longer manufactured but still used by many hospitals) was a convertible rear-facing CR for children 10-20 pounds casted weight or facing forward for children 20-40 pounds casted weight. A newer CR on the right is now available for higher weights.
- Remind students to obtain the latest and best information by contacting experts in transportation with special needs through the resources provided in this course.

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$


## Special Consideration: Modified Vest

*For children 2-12 years old who muat lie dome:


- Fillow mivin linis ning cated netive
- If not catsed, thi child mold nde focing formed



## CLASSROOM NOTES:

- Vests allow older children to ride semi-reclined or lying flat when medically required.
- Full-body casts or larger children in hip spica casts might need these modified vests. Larger children in full or partial body casts can be taken care of if they fit lengthwise on a bench seat.
- The head, feet, and floor space should be padded.


## INSTRUCTOR NOTES:

Tell students to follow the manufacturer's instruction manual carefully.

The approach and criteria for selecting the "best restraint" remain the same as for any child.

## Discussion: Selection Criteria

Instructions: What questions should you ask before giving caregivers their options for selecting the right CR?

Discussion: Selection Criteria

## INSTRUCTOR NOTES:

## Discussion: Selection Criteria - 5 minutes

Instructions: Discuss with students what questions should be asked parents to help them make a good choice of CR for their child.

- How many other occupants will be traveling in the vehicle?
- Does the child have any other medical conditions that need to be considered (for example, breathing problems)?
- Does the cast push the child's legs far apart?


## Possible options:

- Vest that meets crash standard
- CR that has a wide seat
- Professional transport


## Selection Errors

*CR not appropriate for child
*CR that child has outgrown
-CR that is more than 6 years old
-CR with unknown history
-CR under current recall

These common errors are a problem for children's safety:

- CR is not appropriate for the child.
- Sometimes caregivers do not know to look for weight and height requirements; they may use a booster seat for a toddler or even an infant.
- Parents may use a car seat that is too old. Consumers may not always be aware of the 6-year suggested lifespan of a CR. Some manufacturers place a stamped expiration date on their CRs.
- The CR may have no known history. Perhaps it was obtained through a yard sale, flea market, or other method.
- The CR could be under current recall. The caregiver may not have received information about a current recall.


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

Go through each scenario to be sure students understand these common mistakes caregivers make.

- CR is not appropriate for the child.
- Sometimes caregivers do not know to look for weight and height requirements or they will use a booster seat for a toddler or even an infant.
- CR that child has outgrown. In some communities and families, the CR is used even after the child has outgrown it and is ready for a different CR.
- CR is more than 6 years old. The 6-year suggested lifespan of a CR is not always followed by consumers. Some manufacturers place a stamped expiration date on their CRs.
- CR has no known history. CR was obtained through a yard sale, flea market or other method.
- CR is under current recall. The caregiver may not have received information about a current recall.
- Parents will often request your support regarding a child's behavior. The behavior may be caused by a child's medical condition, such as autism or attention deficit hyperactivity disorder (ADHD).
- Sometimes children's behavior may be related to their stage of growth. They may not only resist a CR but also won't go to bed at night or eat their green beans.
- Parents can also be referred to the child's school or doctor to help with these behavioral issues.


## Special Considerations: Child Attitudes and Behavior

-Child may not want to use restraints consistently

- Behavior may distract the driver
-Parents may need technician's support to manage behavior


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Discuss with class how parents may need help in managing a child's behavior.
- This behavior may be due to a child's medical condition or a need that the parent should address. When the child's medical condition places him/her or others at risk because of CR issues during travel, parents should be referred to the child's physician to discuss the problem and possible options.
- Parents need to be supported so that they can respond to a child's behavior when that behavior is due to growth stage issues and places that child as well as others at risk.
- Caution should be taken when discussing these matters with parents, who may feel that their parenting abilities are being questioned.
- Parents can also be referred to the child's school and doctor for help with behavior problems.

Activity 3: Practice - Best Practice
Role Pay:

- My child is 2 years old and weighs 39 pounds

What seat should I buy?

- May I use this seat with a side air bag in a bock seat?
- My child still fits in the harness but weighs 43 pounds. May I keep using it?
- Should I use LATCH or the seat belt?
-Do I have to use a tether?
- My child climbs out of the car seat

Activity 3: Communicating Best Practice With Parents

## Instructions:

- You will be asked some questions and answers as a group exercise.
- Then you will be asked to volunteer for a role play.

CLASSROOM NOTES:
$\qquad$

## INSTRUCTOR NOTES:

Best practice may conflict with real world situation (for example, graduating to booster seat too early).

## Activity 3: Communicating Best Practice With Parents-10 minutes

## Instructions:

- Use the questions below to start a group exercise. Chose 1 or 2 questions.
- Break into smaller groups to practice answering caregiver questions. Then pick one group to use as a role play exercise for the class.


## Materials: None

## Group Discussion Questions:

My child is 2 years old and weighs 39 pounds. What $C R$ should I buy?

Answer: Check the CR manufacturer's instructions. Child may be too immature for CR without harness. A CR with a higher weight limit may be necessary.

May I use this seat with a side airbag in a back seat?
Answer: Check the CR manufacturer's instructions and vehicle owner's manual.

Answer: Check the CR manufacturer's instructions for weight limitations. A CR with a harness higher weight limit may need to be purchased.

## Should I use LATCH or the seat belt?

Answer: Use the system that provides correct installation of the CR. Do not use both systems together. Check the CR manufacturer's instructions and vehicle owner's manual.

Do I have to use a tether?
Answer: Tethering a forward-facing CR will reduce forward and side-to-side motion in a crash.

My child climbs out of the car seat.
Answer: Check to be sure the harness is tight. Stop vehicle until all are buckled. Child may be testing limits.

## Harnessing Errors

- Harness not used
-Routed through wrong slots
* Knotted or pinned or incorrectly secured
- Harness straps too loose
- Harness not placed on child correctly
- Harness straps frayed or damaged
- Retainer clip not at ampit level
- Crotch strap too long or wrong position
-Using "add-ons" not approved by the CR manufacturer
- At this point in the class, you should feel comfortable explaining how to correct these common harness errors.
- Go through each one and see if you feel you can clearly explain why each of these errors could be dangerous to a child.


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

Call on students to address each bullet point.
Ask the class:
Which part of this installation is a misuse?
A 30 pound child is in a combo seat with a snug harness. The latchplate is sliding and the retractor is switchable in ELR mode.

Answer: Retractor must be switched to ALR.

## Activity 4: Selection and Installation

## Instructions:

- Team members will select a CR, adjust it properly, and then install it in a vehicle correctly.
- Then, working in student teams, you will become caregivers of a child with a specific age, weight, height, or special need.
- You will select the correct CR for the child, adjust the harness straps and angle, and determine the belt path.
- Then your team will work together to install your CR.

Table for worksheet installation exercise - FF

| Seat to Install | How does the belt lock? | Instructor <br> Initials |
| :--- | :--- | :--- |
| FF convertible | Retractor: <br> Latchplate: <br> How does it pre-crash lock? |  |
| FF with harness | Retractor: <br> Latchplate: <br> How does it pre-crash lock? |  |
| Students choice - | Retractor: <br> Latchplate: <br> How does it pre-crash lock? |  |

- One misuse scenario will be setup by the instructors. Use the basic checklist below to record any misuses found.

| CR HARNESSING: | Circle | CR INSTALLATION: | Circle |
| :---: | :---: | :---: | :---: |
| Type harness/shield best for age/size of child | Y N na | CR installed in active front/side air bag position | Y N na |
| All parts present \& good condition | Y N na | Overall, best seating position being used | Y N na |
| Straps around frame/shell \& thru slots correctly . | Y N na | Correct front/rear-facing position | Y N na |
| Straps \& harness/shield fit correctly .. | Y N na | Correct recline angle used | Y N na |
| Retainer clip positioned correctly | Y N na | Seat belt routed correctly | Y N na |
| Harness adjustment mechanism locked | Y N na | Seat belt locked | Y N na |
| Harness snug enoug | Y N na | Lower LATCH attached correctly Tether installed and used correctly | $\begin{aligned} & \text { Y N na } \\ & \text { Y N na } \end{aligned}$ |

## Activity 4: Selection and Installation - 30 minutes

## Instructions:

- Teams of two or three will select one or two CRs, adjust properly, and then install in a vehicle correctly.
- Students will work with their assigned teams.
- Students should use the basic checkup form in their workbooks to record the misuses they find in this activity.
- Each team is assigned a "child" with age, weight, height, and perhaps a special need situation provided.
- Students pick a forward-facing convertible or forward-facing-only CR for their child.
- Students then set up the CR correctly for child.
- Install CR with a locking clip.
- Students will install a forward-facing convertible and forward-facing-only CR using a lap-only seat belt, lap and shoulder seat belt, flexible and rigid lower anchors, and a tether in the vehicle.
- Instructors will also set up a misuse of a child in a forward-facing CR with:
- Harness straps coming from lowest set of slots in a convertible CR.
- Lower anchors routed through the rear-facing belt path.


## Age and Weight Cards

| CHILD | BEST PRACTICE SELECTION |
| :--- | :--- |
| • 7 -year-old, 62 pounds, 48 ", unable to sit alone ........... Child needs high weight harness CR to provide trunk control |  |
| $\bullet$ • 3 -year old, 37 pounds, 39 "................................ Choose combination or " 3 in 1" CR since child will soon |  |
|  | outgrow 40 Ib. limit harness. |

Materials: "child," forward-facing convertible or combination CR for each team, a doll for each team, vehicles for installation, manufacturer's instruction booklets, and checkup form that is to be used in course checkup activity.

- At this point in the class, you should now feel comfortable explaining how to correct these common installation errors.


## Installation Errors

*Wrong belt path used to install CR -Incorrect recline angle

- Both seat beit and lower anchor systems used
in CR installation (uniess allowed by manufacturer)
-CR not secured by seat belt or LATCH system - Seat belt or LATCH system too loose
- Incorrect lower anchor and/or tether use - Tether non-use
*Locking dip installed incorrectly
- Check manufacturer's instructions.
- CR must be installed with one seat belt or with lower anchors
- Some forward-facing-only seats may allow for connecting the CR to the vehicle through LATCH when being used as a belt-positioning booster seat. Check the manufacturer's instruction manual for the CR.


## INSTRUCTOR NOTES:

Call on students to address each bullet point.
Ask the class: Which part of this installation is a misuse?
Question: A 30 pound child is in a combo seat with a snug harness. The latchplate is sliding and the retractor is a switchable in ELR mode.

Answer: Retractor must be switched to ALR.


CLASSROOM NOTES:
-

## INSTRUCTOR NOTES:

Ask students to identify what is wrong with this picture; then share the response below.

Answer: Child has reached the upper weight limit for a forward-facing seat with internal harness.
Have students discuss upper weight limit for most harness. Are there CRs available with higher weight limits? Many harnesses have a weight limit of 40 lbs . There are CRs available with higher weight limits. CR manufacturers' instruction manuals need to be read and followed carefully.

## What's wrong with this picture?

## What's Wrong With This Picture?



## INSTRUCTOR NOTES:

CLASSROOM NOTES:
Ask student to identify what is wrong with this picture; then share the response below.

Answer: Forward-facing seat has been installed using lower anchors through a rear-facing belt path.

Have students discuss how the correct belt path should be determined. Use the manufacturer's instruction manual for the CR and labels on the CR.


CLASSROOM NOTES:
-

## INSTRUCTOR NOTES:

Ask student to identify what is wrong with this picture; then share the response below.

Answer: CR has been installed in center rear using the wrong lower anchors.

Have students discuss way to determine the correct installation of the CR with LATCH. Check vehicle owner's manual.

What's wrong with this picture?
What's Wrong With This Picture?


## INSTRUCTOR NOTES:

CLASSROOM NOTES:
Ask student to identify what is wrong with this picture; then share the response below.

Answer: CR has been installed with a locking clip on the retractor side with a towel placed under the forwardfacing seat.

Have students discuss correct installation of locking clip and placement of noodle for forward-facing seat. The locking clip should be placed on the buckle side no more than 1 inch from the latchplate. Noodles or rolled towels should never be placed under or behind a forward-facing CR .


CLASSROOM NOTES:
-

## INSTRUCTOR NOTES:

Ask students to identify what is wrong with this picture; then share the response below.

## Answer:

- Only one harness strap is in use. Harness strap that is used is twisted. No retainer clip is used.
- Have students discuss correct harness fit and correct placement of retainer clip. Harness should be snug with no slack and positioned comfortably. Harness passes "pinch" test. Place the retainer clip at armpit level.


## Misuse Activity (in the classroom) - 25 minutes

In this activity, you will examine scenarios in the classroom. For each scenario, work in teams of 2-3 to identify any misuse.

Carefully look at the provided information regarding child's age and weight and check CR labels.

Teams will take notes about what they find in their workbooks and then class will review the scenarios as a group.

Activity 5: Identifying Misuse in the Classroom
-Work in teams of 2-3
-Go to each scenario
-Identify any misuse

## What did you find?

1. $\qquad$ 5. $\qquad$
2. $\qquad$ 6. $\qquad$
3. $\qquad$ 7. $\qquad$
4. $\qquad$ 8. $\qquad$

Use the sample checklist below to record your answers for at least one of the scenarios.
Scenario \# $\qquad$

| CR SELECTION: | Circle | CR USE: | Circle |
| :---: | :---: | :---: | :---: |
| RESTRAINT USED: |  | Type harness/shield best for age/size of child .... | Y N na |
| $\square$ Rear-facing only $\square$ Convertible |  | All parts present \& good condition | Y N na |
| $\square$ FF w/ harness $\quad$ Harness/Vest |  | Straps around frame/shell \& thru slots correctly | Y N na |
| $\square$ Shield booster $\square$ Belt position booster |  | Straps \& harness/shield fit correctly .... | Y N na |
| Type of restraint best for age/size of child .... | Y N na | Retainer clip positioned correctly | Y N na |
| CR Mfg Info: |  | Harness adjustment mechanism locked | Y N na |
| Mod Name: |  | Harness snug enough | Y N na |
| Mod \#: |  | Correct frontrear-facing position ..... | Y N na |
| Mfg Date: |  | Correct recline angle used ............................ | Y N na |
| Under Recall: | N na |  |  |

## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

## Team time: 15-20 minutes

## Review time: 8-10 minutes

- Set up 5-8 scenarios in the classroom for students to identify misuse in small teams.
- Use cards to show students the age and weight of the child. Include CR information so they can check for recalls, time permitting.
- Modifications can be made depending on seats available.
$\square$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$


## CLASSROOM NOTES:

- Each scenario should only have two or three errors. If time permits have students check recall list for each seat, and have at least one seat be on the recall list.
- It is suggested that students use sample CR checklist for one of the scenarios.
- After 15-20 minutes, have teams quickly share what they found. Be sure they provide accurate and complete information.
- If all teams do not finish, that is okay provided students listen to the review carefully.


## Scenario One

Use infant seat, rear facing
Child's weight below limit on seat
Aftermarket insert
Harnesses loose

## Scenario Two

Convertible seat, forward facing Child less than one year and 25 pounds
Retainer clip too low

## Scenario Three

Infant seat, rear facing
Child too heavy/tall for upper limits on seat

## Scenario Four

Convertible seat, forward facing
Harnesses straps below shoulders
Seat in full recline position

## Scenario Five

Combination Seat (20-40 pounds with harness)
Child too big for harness
Harness straps twisted
Retainer clip too low

## Scenario Six

Convertible seat with higher harness weight 4 year old child, 48 pounds
Harness straps below shoulders
Harness straps loose

Chapter Review-Please answer these questions on the worksheet by using the information that you learned in this chapter:

1. How do you determine which harness slots to use for a forward-facing child?
2. What is the correct way to secure a child in a forwardfacing CR?
3. What steps must be taken to install a forward-facing

## Chapter Review

- Describe those physical characteristics of children that require travel special considerations
-Identify all CR parts an forward-facing CRs
-Identify correct CR installation methods -Describe correct placement of harness straps, harness retainer clip, and beit path. CR correctly?

4. How do you determine the correct belt path?
5. How tightly should a CR be installed?
6. What type of CR may be considered for a child who weighs more than 65 pounds and who has a behavior problem that makes a booster seat a bad choice?
7. What is the benefit for using a tether?

## INSTRUCTOR NOTES:

- Instruct students to answer the questions on their worksheet; then go over the answers.


## Questions and Answers

1. How do you determine which harness slots to use for a forward-facing child?
Answer: Harness straps must be at or above the child's shoulders. Check the manufacturer's instruction manual for the CR.
2. What is the correct way to secure a child in a forwardfacing $C R$ ?
Answer: The child must meet the height/weight requirements of the CR . The CR should be in an upright position according to the CR manufacturer's instructions. Harness straps must be at or above the child's shoulders. The retainer clip should be at armpit level. Make harness straps snug and comfortable.

## 3. What steps must be taken to install a front-facing $C R$ correctly?

CLASSROOM NOTES:
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## Chapter 11 Children in Booster Seats

Chapter length of time: $\mathbf{3 0}$ minutes.
CLASSROOM NOTES:

## Video:

Video clips are available for this chapter. Refer to the readme_first_video.txt file on the instructor CD.

- Installing a Booster-10 minutes.
(may be done in classroom)
Trainer Tip: You may notice that this chapter has fewer instructor notes than other chapters. Booster seats do not
require installation and normally require few adjustments instructor notes than other chapters. Booster seats do not
require installation and normally require few adjustments when being placed in the vehicle. The most important thing is for the belt to fit properly.
(Student Manual page 177)


## 

National Child Passenger Safety Certification Training

Chapter 11: Children in Booster Seats

## Activity total time: 10 minutes.

Appendix Materials: None.

## Chapter Objectives

-Identify purpose of booster seats

- Examine types of booster seats
-Review the dangers of using seat belts
without boosters
-Review how to use booster seats
-Describe best practice/tough choices
related to booster seats


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

Review objectives.

## Third Step—Booster Seats

- Once children outgrow their forward-facing seat (usually around age 4 and 40 pounds), they should ride in booster seats in the back seat until the vehicle seat belts fit properly (lap belt should lie across the upper thighs, and the shoulder belt across the chest).


## INSTRUCTOR NOTES:

## NHTSA's Third Step - Booster

 Seats1. Rear-facing $C R$
2. Forward-facing $C R$
3. Booster seat
4. Seat belt

Become familiar with a vaiety of booster seats.

## Why a Booster Seat?



- Children who outgrow CRs with harnesses, either in weight or height, should use a belt-positioning booster seat with the vehicle's lap and shoulder belts.
- Booster seats serve as an important middle step between a restraint with harness (usually for up to a 40 -pound child) and a vehicle's lap and shoulder belt without booster seat (for youth and adults).
- Many booster seats have a weight range starting at 30-40 pounds, with a maximum weight of $80-100$ pounds.
- Both NHTSA and the AAP recommend the use of a booster seat until a child reaches the manufacturer's upper size limit.
- Skipping the booster seat step is common but dangerous.
- Children's Hospital of Philadelphia (CHOP) has a video about these seats on its Web site at http://www.chop.edu.
- According to CHOP data, belt positioning booster seats are more than twice as effective in reducing risk of injury when compared with seat belts alone.


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

Make the following points:

- Children's Hospital of Philadelphia (CHOP) conducted a study entitled "Belt-Positioning Booster Seats and Reduction of Injury Risk Among Children in Vehicle Crashes" (Durbin, D.R., Elliott, M., et al. JAMA, June 4, 2003). This study found that belt-positioning booster seats are 59 percent more effective in reducing risk of injury when compared with seat belts alone.
- Booster seats serve as a middle step between a restraint with harness (usually for children up to 40 pounds) and the vehicle's lap and shoulder belt without booster seat (for youth and adults). Many booster seats handle weight ranges starting at 30 to 40 pounds, with a maximum weight range between 80 and 100 pounds.
- The AAP recommends that children use a car seat with a full harness until they reach the manufacturer's recommended upper size limit.



## INSTRUCTOR NOTES:

CLASSROOM NOTES:

## Play Videos

"Lap belt vs. Booster" video demonstrates a 6 year old restrained by a belt-positioning booster seat vs. being restrained by a lap-belt-only seat belt. The yellow line traces the movement of the child's head during the crash. Note the exaggerated movement of the child's head when restrained by just a lap belt and note how much further forward it moves that for the child restrained by the beltpositioning booster.
"Lap \& shoulder belt vs. Booster" video demonstrates a 6 year old restrained by a belt-positioning booster seat vs. being restrained by a lap and shoulder belt. The yellow line traces the movement of the child's head during the crash. Note how much further forward the child's head moves when restrained by the lap and shoulder belt in comparison to the child restrained by the belt-positioning booster.

Videos courtesy of Children's Hospital of Philadelphia.


- High-back booster seats must be used when vehicle seat backs are low or do not have head restraints. This type of seat provides head, neck, and back support for the child.
- Booster seats are not tightly installed in the vehicle as other child restraints are. Booster seats are held in place by the child's weight and vehicle's lap and shoulder belts. These seats boost children up to ensure correct seat belt fit.
- When correctly positioned on a booster seat, vehicle seat belts fit over the shoulders and hips much like an adult in a seat belt.
- Use only shoulder belt positioners that are provided with the belt-positioning booster. See the manufacturer's instructions.
- Video demonstrates what can happen if only a lap belt is used with belt positioning booster.
- Some forward-facing seats may allow for connecting the CR to the vehicle using LATCH when used as a belt positioning booster. Check instructions.


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## STUDENT NOTES

- With a backless booster, the child uses the vehicle's seat back or built-in head restraint for head, neck and back support.
- Most backless booster seats come with a shoulder belt positioner to adjust the shoulder belt height on the child.
- General Guidance: Child's ears should not be above the back of the vehicle seat or top of head restraint.



CLASSROOM NOTES:

- Must use vehicle lap and shoulder belt.
- Are never used on airplanes.
- May fit children up to 90 or 100 pounds or more.


## INSTRUCTOR NOTES:

- Stress that belt-position boosters must never be used with only a lap belt.
- Serious head or internal injuries can result from excessive head excursion and jackknifing over the lap belt.
- The shield booster was made for children between 30 and 40 pounds riding in vehicles that had only lap belts.
- Instead of a shield booster, it is recommended that children use a CR with a full internal harness until they are ready for a booster seat.


## Shield Booster Seats

-These seats are no longer made

- Existing models have 40-pound upper weight limit with shield



## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Point out that although they are no longer made, shield booster seats may still be in use in areas where technicians work.
- Often parents think that having a shield in front of the child is more protective and choose to use a shielded booster instead of a more appropriate belt-positioning booster.
- Labels on more current models state that the shield should be used only with children weighing 30-40 pounds.
- Some models have a removable shield so that they can be used as belt-positioning boosters.
- Best practice is for children under 40 pounds to use a full harness restraint.
- If found in use and is still within the six year age limit, remove the shield and use with the vehicle lap and shoulder belt if possible.


## Frontal Air Bags and Booster

 SeatseChildren under 13 should nde in a back seat

- If a child in a booster scat must ride in the front scat:
- The child must be correctly restrained in a booster scat using the vehicle's lap and shoulder belt
- The vehicle seat must be moved back as far as possible from the dashboard
*An on/off air bag switch is recommended for frequent routine fromt seat use


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

Make the following points:

- Because there are many times when a child may have to sit up front, technicians need to provide the best recommendation. Make the following point:
o The technician must take into account the needs of all people in the vehicle.

Proper booster seat fit:

- Sit with hips back against the booster seat, or against the vehicle seat for a backless booster, with knees bending comfortably at the front edge of seat.
- Keep the lap belt low and tight on hips.
- Place the shoulder belt across mid-chest and shoulder.


## Proper Booster Seat Fit

*Children should use a booster seat until vehicle seat belts fit correctly
-Most children fit properly in a seat beit when they reach 4 feet 9 inches ( 57 inches)
-Boosters should be secured when not being used

- Adjust the head restraint properly.
- Even if the child is not present, booster seats should be secured in the vehicle at all times.
- When not buckled, the booster seat is a projectile (an object that can be tossed around the vehicle causing injury to vehicle occupants during a crash or sudden stop.)


## INSTRUCTOR NOTES:

CLASSROOM NOTES:

- Stress the low-use rate of booster seats because too many children seem to skip this step.
- Booster seat use may be a hard sell to the child, especially if child was prematurely moved to a seat belt.

```
Installing a Booster Seat
-Using a lap and shoulder belt
- Practice the proper use of a booster seat
- Teach a parent to use a booster seat
* Explain the proper placement of the lap and shoulder belt
- Explain why the booster seat is not firmly fixed to the vehicle
```


## Installing a Booster Seat

CLASSROOM NOTES:

## INSTRUCTOR NOTES:

## Demonstration - Installing a Booster Seat - 10 Minutes

## Instructions:

- Have students read manufacturer's instructions to see how lap and shoulder belts are supposed to be positioned over/around the child and booster seat.
- The instructor should then show how to correctly install a high-back BPB and a backless BPB in a vehicle or in the classroom using a demo seat.
- Have students practice installing booster seats a few times in vehicles.


## Materials:

- belt-positioning boosters
- vehicles
- large dolls, if available

Note: This activity may take place outside or inside.

## STUDENT NOTES

- What is the proper placement for the lap and shoulder belt?
- Is there a weight requirement for a booster?
- What would I say to a parent who won't use a booster?


## Chapter Review

*What is the proper placement for the lap and shoulder belt?
-Is there a weight requirement for a booster? -What would I say to a parent who worl' use a booster?

## INSTRUCTOR NOTES:

- Provide review of key points covered during the chapter.


## CLASSROOM NOTES:

## Chapter 12 Kids in Seat Belts

(Student Manual page 185)

## Honims Snz

National Child Passenger Safety Certification Training

Chapter 12: Kids in Seat Belts

Chapter length of time: 15 minutes.

- Activity 1: Communicating Best Practice With Parents - 10 minutes.


## Video:

Video clips are available for this chapter. Refer to the
readme_first_video.txt file on the instructor CD.

## Appendix:

Side Air Bag (SAB) FAQs

## Activity total time: 5 minutes.

## Chapter Objectives

-Identify apprapriate seat belt use
-Review how to secure children in seat
belts
-Identify seat belt misuse

## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Review chapter objectives.

When children outgrow their booster seats (usually at age 8 or when they are 4 feet 9 inches tall), they can use the adult seat belt in the back seat if the belt fits properly.

INSTRUCTOR NOTES:
CLASSROOM NOTES:

- Do not go into detail here.


## Vehicle Seat Belts

Lap belts:
-Attach to the vehicle at two points
-Protect the body at two points - at both
hips.
*Provide lower body protection

- There are two types of seat belt systems found in vehicles: (1) lap belts and (2) lap-and-shoulder belts.

Lap belt:

- A lap belt offers two-point protection because it connects with the body in two places - at each hip.
- The lap belt should rest low across the hips/upper thigh area- not across the stomach.
- Lap belts do not provide upper body protection. As a result, head, spine, and/or neck injuries can occur. With no restraint above the waist, the upper body moves forward until it is stopped by something. Many times, it is the head that contacts the dashboard, front seats, consoles, door frames, floor, or even the individual's knees.


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Remind students that a lap belt is better than no restraint at all, but a lap/shoulder provides the best protection.

Three-point seat belt: A seat belt with both a lap and a shoulder portion, having three attachment points (one at the shoulder, two at the hips).

- A lap/shoulder belt offers three-point protection because it connects with the body in three places - at each hip and at the shoulder.
- The lap belt should fit snugly, placed low over the hips/ upper thighs. If it rides up on the stomach, it could cause serious injuries in a crash.
- Shoulder belt should rest securely across the chest and shoulder, not the neck or face. It should never be placed under the arm or behind the back, as this can cause serious injury.
- Lap-and-shoulder belts are a better choice because they provide upper body protection.


## INSTRUCTOR NOTES:

- A shoulder belt provides needed upper body protection.


## Seat Belts Can Be Used When Children Can:

-5it with their back and hips against the vehicle seat back and sit without slouching -Bend their knees easily over the front edge of the seat and feet stay flat on the floor -Safely wear the seat belt

* Lap bet low and shug acress the hps
- Shoulder belt acroas mid-chest and shoulder -Use properly adjusted vehicle head restraint -Stay in position for the entire rise

To be able to fit a seat belt, a child must:

- Be tall enough to sit without slouching
- Keep the back against the vehicle seat back
- Keep the knees completely bent over the edge of the seat
- Keep the feet flat on the floor
- Be able to stay comfortably seated this way
- Keep the lap belt low and snug across the upper thighs/ lower hips

Never put the shoulder belt under the child's arm or behind the child's back. This can cause severe injuries in a crash. If the seat belt does not fit properly, the child should use a belt-positioning booster (BPB) seat.

- NHTSA recommends that children under 13 ride properly restrained in a back seat.
- NHTSA recommends that children not lean or rest against air bags
- NHTSA recommends consulting the owner's manual.
- For more information on air bags, see Appendix or: http://www.safercar.gov/airbags/pages/SABFAQs.htm.


## Air Bags and Seat Belts

-NHTSA recommends that children under 13 ride in the rear seat
-If a child younger than 13 must ride in front seat:

- The ctild must be correctiy restrained by the veticle's lap-and-shoulder belt
- The vehicle seat must be moved back as far as possible from the dashboard


## INSTRUCTOR NOTES:

Make the following points:

- The best way to find out what type of air bag (side, frontal) a vehicle has is to look in the owner's manual or check with the dealer.
- You can ask the driver where the child is usually seated in the vehicle.
- Remind students that there is an SAB FAQ in the Appendix.


## Seat Belt Use

-Everyone should be buckled up - Every time - On every trip
-Adults are role models
-Car pools should be safe too

- Adults are important role models for children's safety behavior.
- While lap belts are not ideal, they are better than no protection at all!
- The purpose of seat belts is to keep occupants from being thrown outside or around the inside of the vehicle.
- With car pools, always make certain that CRs and seat belts are used correctly every time children ride in a vehicle, whether yours or someone else's.
- There should be a seat belt for each passenger and the proper restraint device for children.
- Child too small/lap belt too high
- Lap belt sits too high, may cause spinal and stomach injuries.
- Belt too loose
- Decreases effectiveness
- Increases forward movement
- Allows child to slide out of position that protects

Misuse of Seat Belts
*Child too small - Belt too loose -Shoulder belt under arm
-Shoulder belt
behind back
-Sharing belts
 against crash forces

- Shoulder belt under arm
- Applies forces to rib cage and can cause serious injuries
- Increases head and neck movement
o Creates a bad habit that continues in later life
- Shoulder belt behind back
- Prevents shoulder-and-lap belt parts from working together well
- Does not provide upper body protection
- Affects proper fit of lap belt
- Sharing Belts
- Not tested this way
- Occupants will collide


## INSTRUCTOR NOTES:

- Point out the serious consequences of placing the belt under the arm or behind the back.

- Seat belt syndrome (SBS) describes injuries that doctors see as a result of occupants' wearing a lap belt in collisions involving only the front of a vehicle. These injuries typically include:
o Severe stomach injuries
- Fractures of the lumbar spine
- Serious head and facial injuries
- These injuries usually result when the occupant's body folds in half over the lap belt during a collision. When this happens, the lap belt applies extreme force along the occupant's pelvis to the mid-section. Securing the waist without restraining the upper body can cause serious head and neck injuries after a head strike.


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

Activity 1: Communicating Best Practices With Parents
Instructions:

- Instructor will select two for role play.
- One student will play the caregiver and the other the technician.


## Activity 1: Communicating Best Practices With Parents

-Role play: My child has used a seat belt since he was 4 years old; what should I do now that he is 6 ?
-Talk with a child about proper seat belt use
-Talk with a parent about proper seat belt use for the entire family

## INSTRUCTOR NOTES:

## Activity 1: Communicating Best Practices With Parents 10 minute

## Instructions:

- Assign two students to do the role play.
- One student will play the caregiver and the other the technician.

Answer: Most children under 8 are not big enough to use an adult seat belt. There are a few simple steps to determine if child is the right size for a seat belt (doesn't slouch, knees bend naturally, etc.)

## Materials: None

Activity objective: Provide an opportunity for students to talk with parents about best practices

## Chapter Review

- What are the two types of seat belt systems found in vehicles?
- What are some types of seat belt misuse?
- What are the two types of seat belt systems found in vehicles?
- What are some types of seat belt misuse?


## CLASSROOM NOTES:

$\qquad$

## INSTRUCTOR NOTES:

Review content covered in this chapter.
What are the two types of seat belt systems found in vehicles?
Answer:

1) Lap belt (2-point belt)
2) Lap and shoulder belt (3-point belt)

What are some types of seat belt misuse?
Answer:

- Shoulder belt behind the back
- Shoulder belt under the arm
- Lap belt too high (on stomach)
- Twisted belts
- Non-use


## Chapter 13 Child Passenger Safety in Other Vehicles/ Modes of Transportation

Chapter length of time: 15 minutes.
This chapter is an overview. More information can be found in appendix and listed resources.

## Material needed for chapter:

- Samples of harnesses and vests.

Appendix:

- Guidelines for Safe Transportation of Preschool Age Children in School Buses.
- AAP School Transportation Safety
- AAP Restraint Use on Aircraft
- FAA Approves New Child Safety Device
- 'The Do's and Don'ts of Transporting Children in an Ambulance
- Crash Protection for Children in Ambulances.
(Student Manual page 193)


## Henins sind

National Child Passenger Safety Certification Training

Chapter 13: Child Passenger
Safety in Other Vehicles/Modes of Transportation

CLASSROOM NOTES:
$\qquad$

## Chapter Objectives

-Show how vehicie design affects the correct selection and use of CRs -Identify appropriate CRs by vehicle type - Explain current recommendations for CRS in other vehicles

## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- Review chapter objectives.
- Point out that the technician must understand how vehicle design impacts the correct use of CR in all modes of transportation.
- The occupant restraint standards are the same as for passenger cars.
- Some regular-cab and extended-cab pickup trucks with frontal passenger air bags have on-off switches for the frontal passenger air bag.
- CRs are crash tested on forward facing vehicle seats and cannot be secured on a pickup truck's side facing jump seat.

- Limited rear bench seats may not allow enough space between front and rear seating areas to achieve the correct recline angle for a rear-facing car seat.
- According to CR manufacturers, a CR must have $80 \%$ of the base supported by the vehicle seat with no more than a $20 \%$ hangover on the front edge of the vehicle seat.
- Cargo areas are not designed for passenger seating under any circumstances.


## INSTRUCTOR NOTES:

- Refer to vehicle manufacturer manual for additional CR requirements and airbag information.
- Children and adults can be easily thrown from cargo areas at relatively slow speeds as a result of a sharp turn.

- 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

CLASSROOM NOTES:
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

- 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.


## 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


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

Federal Motor Vehicle Safety Standard (FMVSS) 222, "School Bus Passenger Seating and Crash Protection", does not require the installation of seat belts (other than for the driver) on new school buses with gross vehicle weight ratings (GVWRs) of greater than 10,000 pounds, the standard large school bus. Buses with GVWRs of 10,000 pounds or less are required to have seat belts for all passenger positions, but the larger buses rely on strong, well-padded, energy absorbing seats and higher seat backs to "compartmentalize" and protect passengers during a crash.

## School Bus Safety Issues



- 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.ntsb.gov/publictn/1999/sir9904.pdf.
- For AAP recommendations on school bus safety see policy statements at http://www.aap.org

CLASSROOM NOTES:
$\longrightarrow$

## INSTRUCTOR NOTES:

- Current school bus occupant protection rules are based on compartmentalization. School bus seats made since April 1, 1977, meet the compartmentalization requirement.
- SRP = Seated reference point

NHTSA recommendations for infants and preschool age children on buses are as follows:

- Preschool age children should be correctly protected in CRs meeting FMVSS 213 when they ride on a school bus.
- NHTSA recommends retrofitting seat belts on existing school bus seats only when manufacturer's instructions are followed.

- Tethers are not used on school buses. One exception involves certain special-needs CRs that require the use of a tether.
- When a tether is required, use the seat belt in the seat behind the CR as the anchor point.
- Always check the CR and school bus manufacturer's instructions.


## Appendix:

Guideline for the Safe Transportation of Pre-School Age Children in School Buses
School Bus Safety: Safe Passage For America's Children
Buckling Up Preschoolers on School Buses, Special Report, July 2003
Also see the AAP policy statement "School Transportation Safety" at http://www.aap.org.

## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

- Encourage students to use the appendix resources for additional information.
- Some new buses can be ordered with lap-andshoulder belts. School buses can also be ordered with lower anchors.
- Anytime a retrofit is performed, it is critical that only parts provided by the manufacturer are used and that the manufacturer's instructions are followed to satisfy FMVSS.

- Options for children who need restraints on a school bus:
- Integrated CRs
- CRs
o Harnesses and vests
- Wheelchairs
- Safety vests are an option for children 20 pounds and more when other CRs will not work.
- Safety vests used on school bus seats use a "cam wrap" which wraps all the way around the seat back. A "cam wrap" cannot be used on other vehicles.


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

- A bus monitor assists the driver in keeping children safe while they ride, board, or get off the vehicle and during emergencies.
- For information on the Head Start Transportation Regulations, go to http://www.headstartinfo.org
- The child's IEP (for children 3 to 21 years old) is developed to support each child's special needs when not in the direct care of a parent or guardian. The transportation needs of the child are included in the IEP.
- Children under age 3 who have special health care needs receive the same kind of services through an Individual Family Service Plan (IFSP) which looks at the family needs of the child as they receive early intervention services.


## Children With Special Health Care Needs

-Individual Education Plan (IEP) Detaila on safe trewaportabon of the child should

- National Standards for School Transportation School bus drivers, peed focysed training on
Special-needs occupant restraint systems
- Approprate selection
+ Regilar CR5 that may work with a chid having specis needs
- Use of approved devioes
+Trenst eption wheelchairs
- Children with special health care needs can use one of several CRs:
- Integrated CR
o Conventional CR
- Special-Needs CR,
o Wheeled transportation devices (wheelchairs and strollers) that may have labels stating they are approved for transportation purposes.
- Resources

National Center for the Safe Transportation of Children With Special Healthcare Needs 1-800-755-0912 http://www.preventinjury.org

## INSTRUCTOR NOTES:

CLASSROOM NOTES:

- Reference the brochure entitled "Ride Safe" at http://www.travelsafer.org.

FAA Issues
*No restraint required from birth to 2 years old
-Turbulence and survivable crashes -Required labeling for airplane use

- Any CR used on an airplane must have a label stating it is certified for aircraft use.
- The Department of Transportation's Federal Aviation Administration (FAA) encourages, but does not require, the use of CRs on airplanes.
- Airlines currently allow children under the age of 2 to fly free of charge as "lap children," and many airlines offer half-price tickets so parents can be guaranteed that their children can travel in a safety seat.
- Turbulence (rough flying) can happen with little or no warning. The safest place for children during turbulence or in an emergency is in an approved CR.
- The FAA strongly urges parents and guardians to secure children in an appropriate restraint based on child weight and size.
Resources
- http://www.faa.gov/passengers/fly_children/
- Safe Ride News Fact Sheet "AirplaneTravel with Babies" at http://www.saferidenews.com.


## CLASSROOM NOTES:

$\qquad$

## INSTRUCTOR NOTES:

Background: In August 2005, the FAA announced that it will not require the use of child safety seats on airplanes. The decision was based on current FAA and NHTSA studies showing that such a requirement could result in another 13 to 42 added family member deaths in highway crashes over 10 years, if requiring extra airline tickets forced some families to drive.

## Other resources:

- "Airplane Travel With Babies"Safe Ride News -http://www.saferidenews.com and the AAP Policy Statement "Restraint Use on Aircraft" -http://www.aap.org.
- FAA requirements for CPS refer to the FAA website at http://www.faa.gov/passengers/fly_children/
- Use a rear-facing CR for infants less than one and 20 pounds.
- Use a forward facing CR for children over age 1 and 20 pounds.
- Use the airplane seat belt for all children over age 2 if no CR is available.
- Do not use booster seats or vests, as there are no lap/

FAA Issues
*Allowable CRS by child weight:

- Rear facing up bo 20 pounds
- Forward flacing to 49 pounds
- Seat belt over 40 pounds
- No boowsers or vests
- CARES shoulder belts for airline passengers.
- The FAA has approved the AmSafe Aviation CARES device. The FAA recently established guidelines for the use of a restraint system for use on planes only, not in motor vehicles.
- CARES uses an additional belt and shoulder harness that goes around the seat back and attaches to the passenger lap belt. It is designed for children weighing between 22 and 44 pounds.
- For more information: http://www.faa.gov/passengers/fly_children


## INSTRUCTOR NOTES:

## CLASSROOM NOTES:

All booster seats and vest systems cannot be used as of
September 1996 regardless of labeling.

Emergency Vehicle Issues
-Side-facing vehicle seats
-Rear-facing vehicle seat
-Atermarket equipment

- Safetr screen in polce vehicle
- Plantic seats
-Use in certified anchor locations
-Control of loose objects
-Transport of non-injured child in alternate vehicle
- There are no standards for crash-testing a CR on a sidefacing or rear-facing vehicle seat, and a CR should not be used in these seating positions.
- Rear-facing car seats are made to face backward on a forward- facing vehicle seat. They cannot be safely installed on a rear-facing ambulance seat.
- If possible, non-patient children should be transported in another vehicle. CRs should be secured with seat belts anchored only in locations considered safe in a crash.
- Emergency services should develop and follow guidelines to transport children safely. The guidelines may include use of another vehicle when possible.
- CR should not be installed in police vehicles if a prisoner screen is present. This screen does not allow enough space for the forward movement of the child's head. In cases where police equipment is present and correct installation is not possible, police officers will need to find another way to transport the child.


## Appendix:

Crash Protection for Children in Ambulances: http://www.preventinjury.org/research.asp
Refer to http://www.nhtsa.dot.gov/people/injury/ems for more information on Transporting Children in an Ambulance.

## CLASSROOM NOTES:

$\qquad$

## INSTRUCTOR NOTES:

Encourage students who work in a hospital, police department or EMS provider to work with their supervisors to research, develop and implement a child transportation plan.

Since children may need to ride in an emergency vehicle, bus, truck or plane, consider the special needs for each situation. Answer these questions on your own and review the materials in the appendix.

## Best Practices and Tough Choices

-What are some vehicie design factors that need to be considered when selecting a CR for the following vehicles?

- Mchup brucka
- School buses and achool vehicles
- Arplanes
- Emergency vehides


## INSTRUCTOR NOTES:

This is for the students to work on independently.

## Chapter Review

-Identify how vehicle design affects the correct choice and use of CRSs
-Identify appropriate CRSs by vehicle type

- Explain current recommendations for CRSs in other vehicles


## CLASSROOM NOTES:

## INSTRUCTOR NOTES:

Encourage students to do this on their own.

## Chapter 14 In the Field

(Student Manual page 205)
"ouling int
National Child Passenger Safety Certification Training

Chapter 14: In the Field

## Chapter length of time: $\mathbf{1}$ hour and 15 minutes

Pre-chapter activities: None.
Materials needed for chapter: none
Activity total time: 55 minutes.

- Activity 1: Where does everyone sit safely? - 20 minutes
- Activity 2: Watch the Abbey video - 8 minutes

Video discussion-7 minutes

- Activity 3: Planning a checkup event-20 minutes


## Appendix:

- Using Your New Skills
- CPS Inspection and Checkup Events
- It is the responsibility of the Lead Instructor to assure that the end-of class checkup event is planned in advance and that, barring circumstances beyond the control of the Instructor team, will allow all students to actively participate as a checker in the clinic. The Lead Instructor may delegate the planning and coordination for the end-of-class checkup to another Instructor and/or local CPS program coordinator. The Lead Instructor and/or the end-of-class checkup coordinator should:
- Visit the site of the planned checkup event to identify safe traffic patterns and establish a safe environment for all attendees, especially children.
- Assure that the planned checkup site will be able to accommodate the desired size of the event and the number of traffic lanes you will need to enable all students to actively participate as checkers.
- Use a grid to draw a map of the physical environment and layout of the event so it can be explained to the students and any other event volunteers who may be assisting with the event
- Be sure to include a clearly marked entrance, registration area and exit with one way traffic flow, if possible.
- Identify lane locations and where supplies will be available for technicians.
- Course Instructors must take the time to review important information about the end-of-class checkup to be sure all students and instructors know what to expect and how the clinic will be set up and operated.


## STUDENT NOTES

## Activity 1: Where can everyone sit safely?

Using your new skills, review the needs of the family and identify possible safe seating arrangements. Start with identifying what seat belt system is required for each occupant using the appropriate restraint. You will try this on your own and then discuss as a group.

- Parent \#2: $\qquad$
- 2 month old: $\qquad$

- 3 year old: $\qquad$
- 7 year old: $\qquad$
This is a general activity based on available seating and best practice recommendations. The answers based on best practice may not conform to your State's CPS laws.


## INSTRUCTOR NOTES:

## Activity 1A: Where can everyone sit safely?

## Instructions:

- Instruct students to use the information provided in the chart to:
o Mark down where each family member could safely sit.
o Select the appropriate CR.
- Instruct students that their answers should be based on best practice recommendations rather than requirements of your State's CPS laws.
- Have everyone work independently.
- Use a white/chalk board/flipchart draw the scenario while students are working on their answers
- After 5 minutes:
o Ask for volunteers to share their findings and discuss with the class.
o Use a white/chalk board/flipchart draw the scenario.


## CLASSROOM NOTES:

- Write ideas on the white/chalk board/flipchart,
o Discuss if the seat belt system is appropriate for the selected seat/person or CR selected.

Materials: workbook, whiteboard or chalkboard
Time: 20 minutes ( 10 minutes for each scenario)

## Activity 1A: Where can everyone sit safely?

## Answers:

- Parent \#2: Front passenger
- 2 month old: Rear passenger (may swap with 3 year old)
- 3 year old: Rear center (may swap with 2 month old)
- 7 year old: Rear driver (NEED Lap-Shoulder belt system for BPB)


## STUDENT NOTES

## 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: $\qquad$
- 7 month old: $\qquad$

- 2 year old: $\qquad$
- 4 year old: $\qquad$
- 12 year old: $\qquad$


## INSTRUCTOR NOTES:

CLASSROOM NOTES:

## Activity 1B: Where can everyone sit safely?

Conduct this activity the same way as for 1 A .

## Answers:

- Parent \#2: Front passenger (NEED Lap-Shoulder belt system)
- 7 month old: Rear middle
- 2 year old: front center (NOTE: full harness will keep him away from active airbag)
- 4 year old: Rear outboard (NEED Lap-Shoulder belt system - however, if the 4 year old is in a seat with a higher weight full harness he/she could be interchanged with the 2 year old in the front center position)
- 12 year old: Rear outboard (NEED Lap-Shoulder belt system)

Working With Families
-What are caregivers really asking?
-Remember that learning and communication styles may vary among caregivers!

* Une worda mesyuers all indertand
+ linclide the chiditumiy ehaverar pow ces
+ Indertand hew the parsel nuat lieel

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"?
- 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.


## INSTRUCTOR NOTES:

- Ask the student to provide examples of good communication with individuals.
- Ask students to provide examples of good communication techniques with individuals without English as their first language?


## 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 instal the seat
- Remember that the caregiver should be a full partner from beginning to end
- 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:
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

- 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.
- 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: "Abbey 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?


## CLASSROOM NOTES:

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## INSTRUCTOR NOTES:

## Activity 2: "Abbey the CPS Tech" video

Watch the Abbey video (8 minutes)
Lead a discussion: (7 minutes)
Explain to students becoming a good technician takes time and practice. Refer students to "Using Your New Skills" in the Appendix.

Discuss what makes Abbey such a good technician and her thoughtful approach to the inspection:

- How does Abbey provide an environment conducive to learning?
o Well organized checking station
o Adequate supplies and resources - forms, recall lists, LATCH Manual, CR instructions, Technician Manual, etc.
o Works with a team
- Does Abbey respond in a positive manner to the caregiver?
o Explains they will check the CR and teach parents how to use it correctly
o Involves parents in the check and discusses use of the CR to them
o Tries to tell them in a nice way how to make adjustments
o Makes sure parents demonstrate back how to install and use the CR
- What examples of best practices does Abbey demonstrate and/or provide to the parent/caregiver?
o Uses the CR instructions to point out how to adjust the harness
o Points out warnings in instructions, but allows parents to make the final decisions (e.g., leaving the foam toy attached to the handle)
o Points out neither LATCH nor seat belt installations are safer, but to use only one method
o Used the CR angle indicator to check recline angle
- How would you describe Abbey's style of communication and body language?
o Pays attention to parents facial expressions to determine if they understand points she is trying to get across
o Asks parents questions to gauge understanding
o Doesn't try to answer questions she is not sure of, but points them towards references
o Provided written materials as a part of the checkup
$\square$
- 

$\qquad$
$\square$
$\qquad$
$\qquad$


## 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. 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:
o Physical Environment:
o 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
o 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
o Everything you do
- Advice you give the parent/caregiver
o 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.

## INSTRUCTOR NOTES:

## Discuss the end-of-class checkup event

Explain to students that there are recommendations for policies and procedures for conducting CPS programs and events. Refer students to "Using Your New Skills" and "CPS Inspections and Checkup Events" in the Appendix. Also refer students to any State-specific policies or procedures for conducting CPS events or setting up programs or services such as CPS Inspection Stations.
Remind students that they must stay for and actively participate in the end-of-class checkup event in order to be eligible for certification as a CPS technician

Be sure participants understand:

- Who has been invited to the course checkup event and how they were recruited. Are they from a local daycare center, library, community group, etc?
- How many families can be expected at the event?
- How will registration be handled?
- 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

Be sure to have a wrap up following the end-of-class checkup

- For all involved to talk about what they saw, what they learned and how it could have been a better event.
- To remind class participants about what to expect following class:
o When grades will be entered online and processed as CPSTs
o How to access individual profiles and print wallet cards
o Locate State and local resources
- Locate more experienced Techs to work with
- Learn about and sign up for CPS events and/or inspection stations
- Learn about and sign up for CPS continuing education opportunities
- Obtain educational and promotional materials
- Find out about potential funding for local CPS programs


## 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.

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


## CLASSROOM NOTES:

- 

$\qquad$

## INSTRUCTOR NOTES:

When reviewing the check up, be sure everyone is comfortable with the expectations and understands this importance of taking steps for a safe and well documented event whether a large or small.

Review the relevant resources in the appendix:

- National Child Passenger Safety Resources (Student Manual p. 213)
- Using Your New Skills (p. 311)
- CPS Inspections and Check up Events (p. 315)
- Map It Out—CPS Check Up Events (p. 320-A)

Emphasize the benefits of referring to their student workbooks.

## INSTRUCTOR NOTES:

CLASSROOM NOTES:
Remind students that:

- The end product of their hard work for the entire class is that they will be able to provide quality caregiver communication.
- The caregiver makes any tough choices.
- As technicians, their duty is to promote the safe travel of the entire family.
- By practicing what they have learned, using the Learn, Practice, Explain model, providing fact rather than opinion, carefully reading instructions and taking time to find the right answers, they will be able to serve the families of their communities at health fairs, community events, retailers, and check up events.


## CLASSROOM NOTES:

## Appendix

National Child Passenger Safety Resources ..... 321
Child Restraint and Vehicle Manufacturer Contacts ..... 327
Child Safety Seat Registration Form ..... 331
Child Safety Seat Questionnaire: To report a complaint, defect or incident ..... 333
Quick Reference Guide to Federal Motor Vehicle Safety Standards and Regulations ..... 335
FMVSS No. 213: Highlights of the Regulation for Child Restraint Systems ..... 339
LATCH Requirements: Summary of Changes to Federal Regulations (FMVSS 213 and 225) ..... 341
Child Crash Test Dummies ..... 343
IMMI Memorandum on Twisting Seat Belts ..... 345
Types of Seat Belt Systems, Latch Plates and Use of a Locking Clip or a Belt-shortening Clip ..... 347
Installation of Child Restraints with Different Types of Seat Belts ..... 349
Frequently Asked Questions About LATCH and Tethers ..... 351
LATCH Manual 2005 Excerpt - Appendix A: Vehicle Information ..... 355
Request for Air Bag On-Off Switch ..... 359
NHTSA Frequently Asked Questions About Side-Impact Air Bags (SABs) ..... 361
Compilation of Child Passenger Safety Checklist Forms ..... 365
Child Passenger Safety A Parent's Primer: 4 Steps for Kids ..... 379
Rear Facing Quotables: Guiding Parents to Keep Children Rear-facing Longer ..... 380A
American Academy of Pediatrics: Car Safety Seats: A Guide for Families 2007 ..... 381
Selecting and Using the Most Appropriate Car Safety Seats for Growing Children ..... 383
AAP Policy Statement: Safe Transportation of Newborns at Hospital Discharge ..... 385
AAP Clinical Report: Safe Transportation of Preterm and Low Birth Weight Infants at Hospital Discharge ..... 387
James Whitcomb Riley Hospital For Children Hospital Discharge Protocol Essentials ..... 391
Transporting Children With Special Health Care Needs ..... 395
Guideline for the Safe Transportation of Pre-school Age Children in School Buses ..... 401
School Transportation Safety ..... 405
Restraint Use on Aircraft ..... 409
FAA Approves New Child Safety Device ..... 413
The Do's and Don'ts of Transporting Children in an Ambulance ..... 415
Crash Protection for Children in Ambulances: Recommendations and Procedures ..... 417
Using Your New Skills ..... 419
CPS Inspections and Check up Events ..... 423
Map It Out—CPS Checkup Events ..... 428A

# National Child Passenger Safety Resources ${ }^{1}$ 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.

[^0]
## 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.saferidenews.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
$800-815-6330$
$330-733-5928$
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
160053 rd St
North Bergen, NJ 07047
$87-306-1001$
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

## ProRider

Children-N-Safety Program
7818 S 212th St \#106
Kent, WA 98032
800-642-3123
www.prorider.com/nonprofit
Safe Traffic System 3343 W Eastwood Ave
Chicago, IL 60625
847-329-8111
www.safetrafficsystem.com
Sammons Preston Rolyan
1000 Remington Blvd
Bolingbrook, IL 60440
800-323-5547
www.sammonspreston.com

## Sunshine Kids Juvenile Products

3104 142nd Ave South, \#105
Sumner, WA 98390
888-336-7909
www.skjp.com
Triple Play Products
(Safeline Kids)
904 Main St, Suite 330
Hopkins, MN 55343
800-829-1625
www.tripleplayproducts.com

Peg Perego U.S.A.
3625 Independence Dr.
Fort Wayne, IN 46808
800-671-1701
www.perego.com

## Q'Straint

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

Safeguard / IMMI
18881 US 31 North
PO Box 408
Westfield, IN 46074
800-586-7839
www.safeguardseat.com
Serenity Safety Products
75 W Baseline Rd \#29
Gilbert, AZ 85233
800-536-0676
serenitysafetyproducts.com
Team-Tex America
(Nania, Car Seat Specialty)
PO Box 3194
Rock Hill, SC 29732
877-912-1313

## Volvo Cars of North America

Seven Volvo Dr
Rockleigh, NJ 07647
800-458-1552
www.volvocars.com/us

## Porsche Cars Of North

America
980 Hammond Drive
Suite 1000
Atlanta, Georgia 30328
800-545-8039
www.porsche.com
Recaro
3275 Lapeer Rd West
Auburn Hills, MI 48326
248-364-3818
www.recaro.com

Safety Angel / Safe Start
P.O. Box 740151

Boynton Beach, FL 33474
888-743-3798
www.safetyangel.com

## Snug Seat

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

## Teutonia USA

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

Vehicle Manufacturer Contacts
Manufacturer
Acura
Audi
Bentley
BMW
Buick
Cadillac
Customer Service
$800-382-2238$
$800-822-2834$
$800-236-8539$
$800-831-1117$
$800-521-7300$
$800-458-8006$

## Web site

www.acura.com
www.audiusa.com
www.bentley.com
www.bmwusa.com
www.buick.com
www.cadillac.com

April, 2007 (R10/10)

## Vehicle Manufacturer Contacts

| Manufacturer | Customer Service | Web site |
| :---: | :---: | :---: |
| Chevrolet | 800-222-1020 | www.chevrolet.com |
| Chrysler - DaimlerChrysler | 800-992-1997 | www.chrysler.com |
| Daewoo | 877-362-1234 | www.daewoous.com |
| Dodge - DaimlerChrysler | 800-992-1997 | www.dodge.com |
| Ferrari | 201-816-2600 | www.ferrariusa.com |
| Ford | 800-392-3673 | www.ford.com |
| GMC | 800-462-8782 | www.gmc.com |
| Hummer (H2) -GMC | 800-732-5493 | www.hummer.com |
| Honda | 800-999-1009 | www.hondacars.com |
| Hyundai | 800-633-5151 | www.hyundaiusa.com |
| Infiniti | 800-662-6200 | www.infiniti-usa.com |
| Isuzu | 800-255-6727 | www.isuzu.com |
| Jaguar | 800-452-4827 | www.jaguar.com |
| Jeep/Eagle-DaimlerChrysler | 800-992-1997 | www.jeep.com |
| Kia Motors | 800-333-4542 | www.kia.com |
| Land Rover | 800-637-6837 | www.landrover.com |
| Lexus | 800-255-3987 | www.lexus.com |
| Maserati | 201-816-2600 | www.maserati.com |
| Mazda | 800-222-5500 | www.mazdausa.com |
| Mercedes_Benz | 800-367-6372 | www.mbusa.com |
| Mini | 866-275-6464 | www.miniusa.com |
| Mitsubishi | 800-222-0037 | www.mitsucars.com |
| Nissan | 800-647-7261 | www.nissan-na.com |
| Oldsmobile-GMC | 800-442-6537 | www.oldsmobile.com |
| Plymouth-DaimlerChrysler | 800-992-1997 | www.daimlerchrysler.com |
| Pontiac-GMC | 800-762-2737 | www.pontiac.com |
| Porsche | 800-545-8039 | www.porsche.com |
| Rolls-Royce | 877-300-8803 | www.rollsroyce.com |
| Saab | 800-955-9007 | www.saabusa.com |
| Saturn | 800-553-6000 | www.saturn.com |
| Subaru | 800-782-2783 | www.subaru.com |
| Suzuki-GMC | 800-934-0934 | www.suzuki.com |
| Toyota | 800-331-4331 | www.toyota.com |
| Volkswagen | 800-822-8987 | www.vw.com |
| Volvo | 800-458-1552 | www.volvocars.com |

## CHILD SAFETY SEAT REGISTRATION FORM <br> FOR YOUR CHILD'S CONTINUED SAFETY

Although child safety seats undergo testing and evaluation, it is possible that your child seat could be recalled. In case of a recall it is important that the manufacturer be able to contact you as soon as possible so that your seat can be corrected.

All child safety seats manufactured since March 1993 have a registration form so that owners can provide their names/addresses to the manufacturer. In case of a safety recall, the manufacturer can use that information to send recall letters to owners. Also, child safety seat manufacturers have agreed to maintain owner names/addresses for child safety seats manufactured before March 1993, so they can notify those consumers in the event of a future safety recall. However, in order for the manufacturer to know which child safety seat you own, all of the information on the lower half of this page must be provided.

If you would like the National Highway Traffic Safety Administration (NHTSA) to give your name and address to the manufacturer of your child safety seat, so that you can be notified of any future safety recalls regarding your child safety seat, fill out this form. Please type or print clearly, sign and mail this postage-paid, pre-addressed form.

If you have any questions, or need help with any child safety seat or motor vehicle safety issue, call the U.S. Department of Transportation's toll-free Auto Safety Hotline at 1-800-424-9393 (Washington DC AREA RESIDENTS, 202-366-0123).

Your Name: $\qquad$ Telephone $\qquad$
Your Street Address $\qquad$
$\qquad$
City: , State: Zip Code:

IMPORTANT: The following information is essential and can be found on labels on your child seat.

## Child Seat Manufacturer:

$\qquad$
Child Seat Model Name \& Number: $\qquad$
Child Seat Date of Manufacture:

## I AUTHORIZE NHTSA TO PROVIDE A COPY OF THIS REPORT TO THE CHILD SAFETY SEAT MANUFACTURER.

## SIGNATURE:

$\qquad$ DATE: $\qquad$
The Privacy Act of 1974 - Public Law 93-579, As Amended: This information is requested pursuant to the authority vested in the National Highway Traffic Safety Act and subsequent amendments. You are under no obligation to respond to this questionnaire. Your response may be used to assist the NHTSA in determining whether a manufacturer should take appropriate action to correct a safety defect. If the NHTSA proceeds with administration enforcement or litigation against a manufacturer, your response, or statistical summary thereof, may be used in support of the agency's action.

Send this form to:
NHTSA
Auto Safety Hotline, NAD-40
Room 2318
400 Seventh Street, SW
Washington, DC 20590

Form Approved: O.M.B. No. 2127-0008


DESCRIBE INCIDENT/DEFECT IN DETAIL (Please explain how the Child Seat failed)

CONTINUE ON BACK IF NEEDED

The Privacy Act of 1974-Public Law 93-579 This information is requested pursuant to authority vested in Chapter 301 of Title 49 of the United States Code You are under no obligation to respond to this questionnaire. Your response may be used to assist the NHTSA in determining whether a manufacturer should take appropriate action to correct a safety defect. If the NHTSA proceeds with administrative enforcement or litigation against a manufacturer, your response, or a statistical summary thereof, may be used in support of the agency's action.

HS Form 350C (April 2005)

Reverse of HS-Form 350C

| Fold to show Return Address (no stamp needed). Fasten with tape or staple and mail. |
| :--- | :--- |
| Narrative Description (Continued): |

BUSINESS REPLY MAIL<br>FIRST CLASS PERMIT NO 73173 WASHINGTON, D.C.

POSTAGE WILL BE PAID BY NATL. HWY. TRAFFIC SAFETY ADMIN.
U.S. Department of Transportation National Highway Traffic Safety Administration Office of Defects Investigation (NVS-216)
400 7th Street, S.W. Washington, DC 20590

# Quick Reference Guide to Federal Motor Vehicle Safety Standards and Regulations 

DOT HS 805878 - Revised March 2004

## Foreword

The National Highway Traffic Safety Administration (NHTSA) has a legislative mandate under Title 49 of the United States Code, Chapter 301, Motor Vehicle Safety, to issue Federal Motor Vehicle Safety Standards (FMVSS) and Regulations to which manufacturers of motor vehicles and items of motor vehicle equipment must conform and certify compliance. FMVSS 209, Seat Belt Assemblies, was the first standard to become effective on March 1, 1967. A number of FMVSS became effective for vehicles manufactured on and after January 1, 1968. Subsequently, other FMVSS have been issued. For instance, NHTSA has issued seven new FMVSS and has amended six FMVSS and two consumer information regulations and requirements since this booklet was revised in March 1999. New standards and amendments to existing standards are published in the Federal Register.

These Federal safety standards are regulations written in terms of minimum safety performance requirements for motor vehicles or items of motor vehicle equipment. These requirements are specified in such a manner that the public is protected against unreasonable risk of crashes occurring as a result of the design, construction, or performance of motor vehicles and is also protected against unreasonable risk of death or injury in the event crashes do occur.

This booklet lists the Federal Motor Vehicle Safety Standards that were in effect as of October 2003, and provides a brief summary of each safety standard. It also provides similar information on other Federal consumer information regulations and requirements.

Title 49: Chapter V - National Highway Traffic Safety Administration, Department of Transportation

| Part 571 Federal Motor Vehicle Safety Standards <br> Subpart B$\quad$ Federal Motor Vehicle Safety Standards 571.101- 571.500 |  |
| :--- | :--- |
| Standard No. 101: | Controls and Displays |
| Standard No. 102: | Transmission Shift Lever Sequence, Starter Interlock, and Transmission Braking <br> Effect |
| Standard No. 103: | Windshield Defrosting and Defogging Systems |
| Standard No. 104: | Windshield Wiping and Washing Systems |
| Standard No. 105: | Hydraulic and Electric Brake Systems |
| Standard No. 106: | Brake Hoses |
| Standard No. 107: | [Reserved] |
| Standard No. 108: | Lamps, Reflective Devices, and Associated Equipment |
| Standard No. 109: | New Pneumatic Bias Ply and Certain Specialty Tires* |
| Standard No. 110: | Tire Selection and Rims for Motor Vehicles* |
| Standard No. 111: | Rearview Mirrors |
| Standard No. 112: | [Reserved] |
| Standard No. 113: | Hood Latch System |
| Standard No. 114: | Theft Protection |
| Standard No. 115: | [Reserved] Requirements moved to Part 565-Vehicle Identification Number |


| Part 571 Federal Motor Vehicle Safety Standards |  |
| :---: | :---: |
| Subpart B | Federal Motor Vehicle Safety Standards 571.101-571.500 |
| Standard No. 116: | Motor Vehicle Brake Fluids |
| Standard No. 117: | Retreaded Pneumatic Tires |
| Standard No. 118: | Power-Operated Window, Partition, and Roof Panel Systems |
| Standard No. 119: | New Pneumatic Tires for Vehicles Other Than Passenger Cars* |
| Standard No. 120: | Tire Selection and Rims for Motor Vehicles Other Than Passenger Cars |
| Standard No. 121: | Air Brake Systems |
| Standard No. 122: | Motorcycle Brake Systems |
| Standard No. 123: | Motorcycle Controls and Displays |
| Standard No. 124: | Accelerator Control Systems |
| Standard No. 125: | Warning Devices |
| Standard No. 129: | New Non-Pneumatic Tires for Passenger Cars—New Temporary Spare Non-Pneumatic Tires for Use on Passenger Cars |
| Standard No. 131: | School Bus Pedestrian Safety Devices |
| Standard No. 135: | Light Vehicle Brake Systems* |
| Standard No. 138: | Tire Pressure Monitoring Systems** |
| Standard No. 139: | New Pneumatic Radial Tires for Light Vehicles** |
| Standard No. 201: | Occupant Protection in Interior Impact |
| Standard No. 202: | Head Restraints |
| Standard No. 203: | Impact Protection for the Driver from the Steering Control System |
| Standard No. 204: | Steering Control Rearward Displacement |
| Standard No. 205: | Glazing Materials |
| Standard No. 206: | Door Locks and Door Retention Components |
| Standard No. 207: | Seating Systems |
| Standard No. 208: | Occupant Crash Protection* |
| Standard No. 209: | Seat Belt Assemblies |
| Standard No. 210: | Seat Belt Assembly Anchorages |
| Standard No. 211: | [Reserved] |
| Standard No. 212: | Windshield Mounting |
| Standard No. 213: | Child Restraint Systems |
| Standard No. 214: | Side Impact Protection |
| Standard No. 215: | [Reserved] |
| Standard No. 216: | Roof Crush Resistance |
| Standard No. 217: | Bus Emergency Exits and Window Retention and Release |
| Standard No. 218: | Motorcycle Helmets |


| Part 571 Federal Motor Vehicle Safety Standards <br> Subpart B$\quad$ Federal Motor Vehicle Safety Standards 571.101-571.500 |  |
| :--- | :--- |
| Standard No. 219: | Windshield Zone Intrusion |
| Standard No. 220: | School Bus Rollover Protection |
| Standard No. 221: | School Bus Body Joint Strength |
| Standard No. 222: | School Bus Passenger Seating and Crash Protection |
| Standard No. 223: | Rear Impact Guards |
| Standard No. 224: | Rear Impact Protection |
| Standard No. 225: | Child Restraint Anchorage Systems** |
| Standard No. 301: | Fuel System Integrity |
| Standard No. 302: | Flammability of Interior Materials |
| Standard No. 303: | Fuel System Integrity of Compressed Natural Gas Vehicles |
| Standard No. 304: | Compressed Natural Gas Fuel Container Integrity |
| Standard No. 305: | Electric-Powered Vehicles: Electrolyte Spillage and Electric Shock Protection** |
| Standard No. 401: | Interior Trunk Release** |
| Standard No. 402: | (Reserved) |
| Standard No. 403: | Platform Lift Systems for Motor Vehicles** |
| Standard No. 404: | Platform Lift Installations in Motor Vehicles** |
| Standard No. 500: | Low Speed Vehicles |


| Part 531-Part 595 <br> Subpart B - |  |
| :--- | :--- |
| Part 531: | Other Regulations Relating To Transportation |
| Part 533: | Light Truck Fuel Economy Standards |
| Part 541: | Federal Motor Vehicle Theft Prevention Standard |
| Part 555: | Temporary Exemptions from Motor Vehicle Safety and Bumper Standards |
| Part 557: | Petitions for Hearings on Notification and Remedy of Defects |
| Part 564: | Replaceable Light Source Information |
| Part 565: | Vehicle Identification Number Requirements |
| Part 566: | Manufacturer Identification |
| Part 567: | Certification |
| Part 568: | Vehicles Manufactured in Two or More Stages |
| Part 569: | Regrooved Tires |
| Part 570: | Vehicle In Use Inspection Standards |
| Part 572: | Anthropomorphic Test Devices |
| Part 573: | Defect and Noncompliance Reports |
| Part 574: | Tire Identification and Record Keeping |
| Part 575: | Consumer Information Regulations |
| Part 577: | Defect and Noncompliance Notification |
| Part 579: | Defect and Noncompliance Responsibility |
| Part 580: | Odometer Disclosure Requirements |
| Part 581: | Bumper Standard |
| Part 582: | Insurance Cost Information Regulation |
| Part 583: | Automobile Parts Content Labeling |
| Part 591: | Importation of Vehicles and Equipment Subject to Federal Safety, Bumper, and <br> Theft Prevention Standards |
| Part 595: | Retrofit On-Off Switches for Air Bags <br> Subpart B -Retrofit On-Off Switches for Air Bags <br> Subpart C - Vehicle Modifications to Accommodate People With Disabilities |

## Federal Motor Vehicle Safety Standard No. 213 <br> Highlights of the Regulation for Child Restraint Systems

- Covers all types of systems (infant carriers, child seats, harnesses, and car beds) that restrain children under 65 pounds in motor vehicles.
- Requires that child restraint systems pass a 30 mph frontal sled test, which simulates a crash.
- Specifies maximum rotation during crash test for rear-facing child restraints.
- Specifies limits on child dummy measurements for forward-facing child restraints:
- Head injury criteria (potential brain injury resulting from abrupt deceleration)
- Head excursion (distance dummy head travels forward)
- Force on chest
- Knee excursion
- Requires that restraints not break during dynamic tests.
- Requires that child restraints retain a child dummy within the confines of the restraint during crash tests.
- Specifies padding requirements around the head of child restraints for use by children weighing 22 pounds or less. Flame-retardant fabric required.
- Requires that safety seats pass the 30 mph test secured with vehicle lap belt or lower LATCH attachments only as well as a more stringent test for forward-facing restraints with a tether anchored. Exceptions: child harnesses and products for children with special needs may be tested with top tether straps anchored. Boosters are tested with a vehicle lap-shoulder belt.
- Specifies the amount of force needed to open buckles on child restraints, so that toddlers cannot unbuckle themselves but adults can easily open the buckle. (Before crash test, minimum force is nine lbs. and maximum is 14 lbs. ; after crash test, maximum is 16 lbs .)
- Requires permanent, visible labels on the restraint with the following information: certification that it conforms to standards for use in motor vehicles, basic instructions for correct installation, name and address of manufacturer/distributor, and date made. Air bag warning label required for rear-facing restraints. The restraint must have a designated location for storing the instruction booklet or sheet. An additional label may be present to state certification for use in aircraft.
- Permits child restraint systems to be designed as an integral part of motor vehicle seats.
- Requires that the manufacturer include a registration card with the child restraint and notify consumers of product recalls.
- As of September 1, 2002, child restraints and vehicle were required to provide LATCH attachments (FMVSS 213) and anchors (FMVSS 225). Refer to \#622 for a summary of these requirements.

> | SafetyBeltSafe U.S.A. P.O. Box 553, Altadena, CA $91003 \quad$ www.carseat.org |  |
| :--- | :--- |
| $310 / 222-6860,800 / 745-$ SAFE (English) | $310 / 222-6862,800 / 747-$ SANO (Spanish) |

This document was developed by SafetyBeltSafe U.S.A. and may be reproduced in its entirety. Important: Call to check if there is a more recent version before reproducing this document.

## LATCH* Requirements Summary of Changes to Federal Regulations (FMVSS 213 and 225)

## Vehicle Requirements:

- User-ready top tether strap anchorage hardware (such as a ring, bar, bracket, or webbing loop) for three rear seating positions were available in most passenger vehicles beginning with model year 2000 and were required in all cars, minivans, and pick-up trucks by model year 2001.
- Lower anchors for child restraints, each consisting of two rigid bars 6 mm in diameter and 25-50 mm long, are present in the vehicle seat bight (the crack between the seat back and seat cushion) in specified seating positions in all cars, minivans, and pick-up trucks made after September 1, 2002
 (model year 2003), and in many made before that date.
- Requirements apply to all passenger cars, trucks, and multipurpose passenger vehicles under 8500 lbs .; also apply to buses under $10,000 \mathrm{lbs}$.
- Current belt lockability requirement remains effective until September 1, 2012, so child restraints without new hardware can be attached with regular vehicle belts. After that date, only vehicle belts in seating positions without lower anchorage systems must meet lockability requirement (capable of securing a child restraint without added equipment, such as a locking clip).


## Vehicle Exceptions:

- No tether anchorage hardware is required for convertible cars or school buses.
- A built-in child restraint can replace the required anchorage system in one rear seating position.
- At least one front seating position must have the required anchorage system if the vehicle has an air bag cut-off switch and has either no rear seat or a rear seat too small for a rear-facing child restraint.


## Child Restraint Requirements:

- The head excursion limit (maximum distance the head can travel forward in crash tests) has been reduced by nearly four inches to 28 inches. In order to meet the new requirement, most forward-facing child restraints made after September 1, 1999, are equipped with a top tether strap. They also must meet the previous head excursion requirement without using the tether strap.
- Lower attachment hardware (a hook, buckle, or other type of connector) is required on new child restraints made since September 1, 2002, and is available on many models made before then. Webbingbased attachments must be adjustable.


## Child Restraint Exceptions:

- Belt-positioning boosters, car beds, and harnesses are not required to have a tether strap or lower attachment hardware. However, lower attachment hardware is required on combination seats (forwardfacing restraints with a removable harness that convert to boosters).
- Rear-facing child restraints are not required to have a tether strap. If a rear-facing restraint has a detachable base, only the base must have lower attachment hardware.


## *LATCH (Lower Anchors and Tethers for CHildren)

SafetyBeltSafe U.S.A. P.O. Box 553, Altadena, CA 91003 www.carseat.org 310/222-6860, 800/745-SAFE (English) 310/222-6862, 800/747-SANO (Spanish)
This document was developed by SafetyBeltSafe U.S.A. and may be reproduced in its entirety. Important: Call to check if there is a more recent version before reproducing this document.
\#622 (8-17-05)

## Child Crash Test Dummies

Crash test dummies are full-scale replicas of human beings, weighted and articulated to simulate the behavior of a human body, and instrumented to record as much data as possible on accident variables such as speed of impact, crushing force, bending, folding, or torque of the body, and deceleration rates during a collision.

| CRABI 12-Month Old | Features: <br> - Designed for RF CRS position in front of a passenger front air bag <br> - Weighs 22 lbs. <br> - Standing height 29"; sitting height 19" <br> - Instrumentation: 34 measurements are evaluated |
| :---: | :---: |
| HYBRID III 3-Year Old | Features: <br> - Designed for FF CRS positioned in front of a passenger front air bag <br> - Intended to be used properly restrained on a CRS as well as out-of-position with air bags <br> - Weighs 34 lbs . <br> - Standing height 37"; sitting height 22 " <br> - Instrumentation: 50 measurements are evaluated |
|  | Features: <br> - Q3 is used primarily for frontal tests <br> - It will need further work to optimize its performance to evaluate side impacts |
| HYBRID III 6-Year Old | Features: <br> - Scaled down version of Hybrid III 50th percentile male dummy <br> - Designed for backless and high-back BPB's <br> - Weighs 52 lbs <br> - Standing height 45 "; sitting height 25 " <br> - Instrumentation: 48 measurements are evaluated |
| HYBRID III 10-Year Old | Features: <br> - Developed as a result of CR manufacturers claiming safe performance beyond what is tested under FMVSS 213 (CRS for children weighing 65 lbs . or less) <br> - Weighs 76 lbs. <br> - Standing height 4'6" <br> - 5 seating configurations are tested (2 BPB, 3 non BPB) <br> - 3 non BPB (upright, slouched, belt misuse) |

## H

## IMMI CHILD RESTRAINTS

## SUB.JECT:

Determine the effect of twist (rotation) on the strength of vehicle restraint seat belt webbing.

## INTRODUCTION:

There are times that the vehicle restraint buckle is twisted (rotated) to shorten its length in order to achieve an improved installation of a child restraint seat. A concern has been expressed that the twist may adversely effect the strength of the webbing.

## PURPOSE:

Conduct a series of tests to determine the strength of the vehicle webbing in the twisted condition.

## REOUIREMENTS:

FMVSS - S4.4 (b) 3 indicates that the structure's components in the seat belt assembly (Type 2) which are common to pelvic and upper torso restraints shall withstand a force not less that 3000 pounds ( 1360 kgs )

ECE R16 Section 7.5.2 indicates that a buckle or the adjusting device used as a common part of a three-point belt shall be tested to 1470 daN ( 3304 pounds)

## TEST PROCEDURE:

A typical vehicle restraint webbing meeting the specifications of FMVSS 209 S4.2 was used in the test. The webbing is rated at 6000 pounds strength. Three samples were tested at each condition in accordance with FMVSS 209 S5.1 (b). Tests were conducted on plain and treated webbing The treated samples were soaked in apple juice or Coca Cola for 6 hours, then dried for 24 hours

## TEST RESULTS:

The values recorded are the average of three tests at each condition.

TENSILE STRENGTE OF WEBBING IN POUNDS

|  | No Twist | K Trist | 1 Twist | 14Trists | 2 Twists |
| :--- | :---: | :---: | :---: | :---: | :---: |
| PLAN | 6496 | 6466 | 6343 | 6168 | 5944 |
| APPLE JUICE | 6685 | 6442 | 6118 | 5989 | 5942 |
| COCA COLA | 6690 | 6364 | 6253 | 6018 | 5855 |

## CONCLDSOHF5:









 requirtrotents.
 when the buckles are raister to imprave the fit ot' a child restraint sear.


Легг: Thempson
Enginecririg Managei
Mruthin Civisior


After review and analysis of the IMMI data by the SAE Child Restraint Sub-Committee, an agreement of no more than 3 complete ( 360 degree) twists of the safety belt buckle as the maximum allowed was reached in 2006.

Types of Seat Belt Systems and Approved Additional Steps* Needed to Pre-Crash Lock the Lap Belt

| Type of Seat Belt <br> and Retractor | Type of Retractor |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
|  | Emergency <br> locking <br> retractor | Automatic <br> locking <br> retractor | Switchable <br> retractor | No <br> retractor |
| Lap-shoulder belt with <br> switchable latchplate | Switch latchplate to <br> "car seat" position | N/A | N/A | N/A |
| Lap-shoulder belt with <br> sliding latchplate | Locking clip | None | None | N/A |
| Lap-shoulder belt with <br> locking latchplate | None** | None | None | N/A |
| Lap belt only with <br> sewn latchplate | Belt shortening clip | None | None | N/A |
| Lap belt portion of <br> Lap-shoulder belt with <br> sewn latchplate | Belt shortening clip | None | None | N/A |
| Lap belt with <br> locking latchplate | N/A | N/A | N/A | None |

This is a general guide and does not apply to ALL latchplate-belt systems. Carefully read the vehicle owner's manual for more information.

* N/A = Not applicable. Vehicles are not equipped with this combination of belt type, latchplate, and retractor. None = Lap belt can be pre-crash locked with no additional steps.
** Some locking latchplates, when used to install child restraints, may fail to lock belts in place. Try flipping latchplate $180^{\circ}$ or twisting the buckle stalk. If that doesn't work, in some cases, a locking clip may be used.


## COMMENTS ONUSE WTH CHILD RESTRAINTS (CRS)

Vehicles manufactured on or after September 1, 1995 (1996 model year) must be equipped with belt systems that secure child restraints (CRs) without the need for locking dips or other additional hardware. Check the vehide owner's manual, as well as labels on belt webbing, for instructions for installation of child restraints. Note also that LATCH (Lower Anchors and Tethers for C-Hildren) hardware is required on most CRs and vehicles manufactured after September 1, 2002. Using the LATCH systems may or may not make the installation easier and/or more secure than installing the CRwith the available safety belt.

| TYPE OF BET | CHARACTERISTICS/HOWTO LOCK | COMMENTS ONUSE WTH CHID RESTRAINTS (CRS) |
| :---: | :---: | :---: |
| Lap Only Bets: WithPre-Crash Locking Features |  |  |
| Locking Latchplate with No Retractor | Insert latch plate in buckle and pull on free end to tighten. Belt stays locked as long as belt webbing and latch plate are parallel. Tilt latch plate to release webbing to loosen. | Latch plate must be at correct angle to stay locked. If belt will not stay tight when buckled and reasonable force applied, 1) flip latch plate upside down before buckling, or 2) shorten buckle end of belt by twisting belt webbing as much as needed to correct the latch plate angle. |
| Sewn Latchplate and Automatic Locking Retractor (ALR) | Pull belt from retractor. Will automatically lock after webbing retracts about a quarter inch. Remains locked and cannot lengthen belt until webbing rewinds completely into retractor. | Pull enough webbing out of the retractor to fit through/around CR before allowing retractor to lock. Buckle belt and push CR into the vehicle seat while pushing excess belt webbing back into the retractor while belt "ratchets" down. Check to be sure belt remains long enough to stay locked with child in CR. |
| Sewn Latchplate and Switchable ELRJALR Combination Retractor | Works as ELR for use by adults. Corverts to ALR for use with CSS. Converts back to ELR for use by adults and larger children. | Most switch when belt is fully extended to engage the ALR. Other types convert by flipping a switch on the retractor (check owner's manual). Route belt through CR and buckle, switch retractor to ALR and use like ALR above. |
| Lap Only Beits: Without Pre-Crash Locking Features |  |  |
| Sewn Latchplate and Emergency Locking Retractor (ER) | Belt webbing moves freely in and out of the retractor during normal driving. Belt locks only if there is sudden movement of the vehicle. Belt will not lock when webbing is pulled on sharply (vehicle sensitive ELR). All ELRs are vehide sensitive. Some ELR belts also lock when there is sudden movement of the belt itself (belt sensitive ELR). Tug sharply on the belt webbing to test. | BEL SHORTENNG CLIP MUST BE USED TO KEEP LAP BELT TIGHT. ELR retractors not stay locked during normal driving conditions. Solutions: 1) Move to another position, 2) Use belt-shortening dip from Ford or Toyota or other vehic manufacturer to shorten belt enough to stay tight around CR when fully extended. May need more than one clip. Difficult and inconvenient to use, 3) Replace with manually adjusting belt for long termuse. <br> NOTE: Belt sensitive ELR may be confused with ALR unless belt is pulled very gently in and out of the retractor. |
| LAP AND SHOULDER (LS) Combination Belis: Potentally MThout Pre-Crash Locking Features |  |  |
| Separate Lap and Shoulder Belts | Lap and shoulder belts are two different belts with separate buckles or latch plates that interlock before buckling. | Determine what type of lap belt is present. Can be used with child restraint if lap belt is not ELR. If lap belt is ELR, use ELR lap belt fixes noted above. (Most often found on older cars.) |
| LS Belts With Sewn-on (Fixed) Latch Plates | Lap and shoulder portions each have their own retractors with each belt sewn onto one latch plate. | Determine what type of lap belt is present. Can be used with CR if lap belt is not E.R. If lap belt appears to be ELR, check to see if it will convert to ALR. If lap belt is in fact ELR, use ELR lap belt fixes noted above. |
| LAP AND SHOULDER (LS) Combination Belts: WTH Pre-Crash Locking Features |  |  |
| Continuous Loop LS Belt Wth Locking Latch Plate | One piece of webbing passes through a latch plate to form both the lap and shoulder portions of the belt. Belt webbing is threaded through and around a locking bar in the latch plate or other locking mechanism that holds lap portion tight when lap belt is parallel to latch plate. | Thread lap belt through belt routing location (shoulder portion will follow lap belt), then pull on shoulder belt to tighten. Check to see that lap belt does not loosen due to improper angle of latch plate. If belt will not stay tight when CR is pulled on: 1) flip latch plate upside down before buckling, 2) shorten buckle end of belt by twisting belt webbing - using no more than 3 twists - to correct the latch plate angle, or 3) use a locking clip. |

Page 2
INSTALATION OF CHLD RESTRAINTS (CRs) MTH DIFFERENT TYPES OF SEAT BELTS
COMMENTS ON USE WTH CHILD RESTRAINTS (CRS)

| TYPE OF BELT | CHARACTERISTICS/HOWTO LOCK | COMMENTS ON USE WTH CHILD RESTRAINTS (CRS) |
| :---: | :---: | :---: |
| Continuous Loop LS Belt Wuth Switchable Latch Plate <br> Continuous Loop Lap/ Shoulder Belt Wth Sliding Latch Plate and Switchable Retractor | Switch on latch plate converts it from a free-sliding to a locking latch plate. <br> Works as ELR for use by adults. Can be converted to ALR for installing CRs. | Note: Some latchplates have a switch that converts it from a free-sliding to a locking latch plate. Follow vehicle owner's manual for instructions on switching latch plate from free-sliding to locking. <br> Most switch when belt is fully extended to engage the ALR. Other types convert by flipping a switch on the retractor (check owner's manual). Route belt through CR, bucke, then switch retractor to ALR. Push CR into vehicle seat while pushing belt back into retractor. May need to reinstall with less force applied or use locking clip if tension on shoulder belt pulls too hard and tilts the CR enough to pul it off of the vehicle cushion on one side. |
| LAP AND SHOULER CON <br> Continuous Loop Lap/ Shoulder Belt With FreeSliding Latch Plate and ELR Retractor | bination Belts: Without Pre-Crash Locking Features <br> Belt webbing threaded through slot in latch plate. Webbing can be pulled back and forth through latch plate after being buckled. Allows lap portion to loosen after CR is buckled in. | LOCKING CLP MUST BE USED TO KEEP LAP BELT TIGHT. Standard locking or belt-shortening clip can be used. Route belt through correct path, buckle and tighten. Grasp and hold both portions of webbing directly behind latch plate \& unbuckle. Thread locking clip on belt as close to latch plate as possible (within 1 inch) \& re-buckle. Should be relatively difficult to re-buckle if belt is made tight enough. |
| AUTOMATIC RESTRAINTS |  |  |
| Automatic Shoulder Belt with Knee Bolster | Shoulder belt is fixed to the door. Belt closes over occupant when door is dosed. No lap belt is provided. Knee bolster (padded lower dashboard) stops forward movement. | CANNOT BE USEDTOINSTA $\amalg$ CR. No lap belt is provided. Must be installed in rear seat. |
| Automatic Shoulder Belt with Manual Lap Belt | Shoulder belt is fixed to the door or on a motorized track above door frame. Belt doses over occupant when door is closed or ignition is tumed on. Lap belt must also be used, but must be fastened manually. | MAY NOT BE ABLE TO USE AS IS. Shoulder belt must be disconnected. Majority of lap belts are on an non-pre-crash locking emergency locking retractor. Check owner's manual for model specific information. If lap belt is ELR: 1) Install CR in rear seat, 2) Check to see if auxiliary locking lap belt is available from dealer, or 3) Use belt-shortening dip. |
| Automatic Lap and Shoulder Belt | Lap and shoulder belts are both on retractors inside door. Occupant slides under belts when getting in and both belts close over occupant when door is closed. Primarily on General Motors vehicles. | DO NOT USE AS IS. Lap belt cannot be threaded through CR with door open plus the lap belts are on emergency locking retractors. Options are to: 1) Install CR in rear seat, or 2) Have auxiliary lap belt designed for use with CR installed by dealer (free part and service for GM vehides through local dealers). |
| Air Bags (Supplemental Restraint Systems) | Inflates instantly in frontal crashes over 12-15 mph. Positions covered by air bags have manual lap/shoulder belts. Owners can petition NHTSA to receive permission for a dealer to install an or/off switch. Petitions are generally granted only when use of front seat to transport children is absolutely necessary. | DO NOT INSTALL REAR-FACING CRS IN AN AR BAG EQUIPPED POSITION MUST USE REAR SEAT FOR CHILD UNDER 20 LBS. AND LESS THANA YEAR OLD. INSTALL FRONT-FACING CRS IN AN AIR BAG POSITION ONLY IF ABSOLUTE Y NECESSARY. For front-facing CRs, check owner's manual for recommendations for specific vehicles. May be allowed by vehide manufacturer for front-facing CRs, but use with extreme caution and move the vehicle seat back as far as possible. Air bag equipped vehicles have manual belts. If installation of CR is allowed, refer to "Lap/Shoulder Belt Combinations" section above for corments on use. |

How tight is tight enough? Child restraints should be installed so that there is no more than one inch of movement front to back and side to side when tested at the belt path. A secure
installation can be achieved without causing damage to the vehicle or CR and without using brute force.
Prepared by the UNC Highmay Safety Research Center / CB \#3430 / Chapel Hill, NC 27599 / 919-962-2202 / 800-672-4527 (in NC) / wnw.hsrc.unc.edu

# Frequently Asked Questions About LATCH and Tethers 

Frequently Asked Questions About LATCH*<br>*Adapted with permission from SRN Publications, "Tethering Child Restraints Including LATCH," Spring 2001 edition.

## Can new LATCH equipped child restraints still be used in older model vehicles without

 LATCH?Yes. New child restraints are required to have both safety belt and LATCH options for installation in the vehicle. If the vehicle does not have upper (tether) anchors, it is beneficial to have them installed so that the child restraint can be tethered.

Can two CR lower attachments be installed on a single vehicle lower anchor?
No, attaching two child restraints to a single lower anchor point could cause the anchor to fail in a crash.

Is installation with the LATCH anchors always better than with the safety belt? Not always. If a tight anchorage can be obtained with the safety belt, then there is no need to use
LATCH. For example, with only one child in the rear seat, placing the child restraint in the center rear securely installed with a tight safety belt - and tether, if available for the CR would be very protective.

Can the two inner LATCH anchors from the outboard seating positions be used to install a LATCH-equipped child restraint in the center seat?
Unless a vehicle has a set of LATCH anchors specifically for the center position, the safety belt in that position should be used in most cases. In some vehicles, the inner anchors for the outboard positions will be spaced too far apart to be used as anchors. There is some concern that widely spaced anchors may create forces on some flexible CR attachments that could affect the integrity of the system. If anchors were spaced too close together, access would be very difficult and restraint might be less effective. Some vehicle instructions specifically state that the center rear seating position should not be used to anchor a child restraint using the LATCH lower anchors. Other vehicle owner's manuals may indicate, however, that LATCH-equipped child restraints with webbing-mounted (flexible) attachments can be used with inboard anchors spaced from 280 mm (11 inches) to 500 mm (19.7 inches) apart. Child restraint manufacturers may specify the minimum and maximum vehicle anchor spacing appropriate for installation of their LATCH CRs; however, some do not specify. NOTE: Use of the inboard LATCH anchors would mean that no LATCH restraints could be installed in the outboard seating positions. Child restraints with rigid attachment systems will fit only with the standard ( 280 mm or 11 inches) spacing. Therefore, it is unlikely that such CRs would fit in the center position of vehicles unless a separate set of LATCH anchors had been installed there or the distance between the two inboard bars is also 280 mm .

## Can vehicles be retrofitted with lower LATCH anchors?

Currently, only certain VW models (1999-2001) can have lower anchors retrofitted into rear outboard seating positions. These vehicles were designed with this in mind. VW provides a
kit for this purpose. Also, Audi reports that a retrofit kit may be forthcoming for 1999-2001 models.

## Can child restraints be retrofitted with flexible lower LATCH attachments?

Several child restraint manufacturers provide flexible lower attachment kits that can be used in the belt paths of certain older model child restraints.

## Does it matter in which direction the child restraint tether hook is attached to the vehicle tether anchor?

Yes, in some cases the vehicle owner's manual specifies the exact direction the tether hook must be attached (e.g., Ford Windstar). A one-half twist (180 degrees) in the tether strap may be permissible if necessary to position the hook correctly. Always check for specific child restraint and vehicle instructions prior to installation.

## How can I achieve the 45 degree recline angle with a rear-facing LATCH child restraint?

CRs with flexible LATCH attachments can have their angle adjusted in the same way as with CRs installed with a safety belt (using rolled towels or "noodles"). Rigid LATCH seats, when available, will not be adjustable that way. New designs will have to consider the angle. Remember that the recline 45 degree angle is a MAXIMUM, and necessary only during the first few months, until the baby's neck strength is developed enough to hold the head up.

## Should the LATCH system be used to attach a combination child restraint/ beltpositioning booster (BPB) when it is being used as a BPB?

LATCH is for CRs that have harnesses or harness/shields to restrain the child. Beltpositioning boosters do not have harnesses, so they are not, strictly speaking, child restraints. The safety belts that hold the child in place are the actual restraint system. The BPB positions the child so the lap and shoulder belts fit the child better. When a combination CR/BPB with a tether or complete LATCH system is used with its harness, use of the tether and lower LATCH anchors are appropriate. When this type of restraint is used as a BPB, however, there are questions as to whether to use tether straps and/or lower anchors to hold the device in place in the vehicle.

This issue is currently under discussion. Testing is being done by vehicle and child restraint manufacturers as well as regulators. The best practice recommendation at this time is to follow the CR instructions, if they deal with the issue at all. Some CR manufacturers suggest using the tether, while others advise against it.

The use of lower LATCH anchors on a BPB raises larger questions than the use of the tether. The concern is the effect of a firmly anchored booster base on the occupant, who will slide forward somewhat while being restrained by the lap and shoulder belt. This motion might cause submarining and potential injury. This concern should not apply to vehicles with builtin BPBs, which are designed specifically to provide effective restraint in those particular vehicles.

## Must LATCH anchors be replaced after use in a crash?

Vehicle owners should tell insurance adjusters and collision repair shops if LATCH anchors were in use during a crash. If so, the anchors should be inspected for damage. In a severe crash, the anchors may become bent, in which case they must be replaced. This repair
should be a normal aspect of repairing the vehicle. Service manuals should include information on how to repair or replace them. In some cases, this is only a matter of bolting a new part into place. In others, an entire seat must be replaced, which will cost more.

## Is it ever appropriate to install a CR using both the LATCH anchors and the safety belt?

The two systems duplicate the same function. It should be unnecessary to use both. The system that provides the tightest, most secure installation for the CR should be used. In a few cases, this may be the safety belt, rather than the LATCH anchors.

## Frequently Asked Questions About Using Tethers*

*Adapted with permission from SRN Publications, "Tethering Child Restraints Including LATCH," Spring 2001 edition.

If a child restraint comes with a standard tether, must the tether always be used? All U.S. forward-facing child restraints made since Sept. 1, 1999, must meet a stringent federal requirement which allows approximately 4 inches less head excursion than previously. Most CRs use a tether in order to meet this requirement. A CR with a tether must also meet the previously required test without the tether. In Canada, forward-facing CRs have been required to meet the stricter head excursion criteria for many years (Appendix B "Tethering Child Restraints, Spring 2001 edition). Best practice is to always use a tether if it is available for a forward-facing CR, because less head excursion means less risk of injury. However, installation with a safety belt alone will provide a fairly good level of protection, if the safety belt holds the CR in place tightly.

## Can a tether strap kit made for one restraint be used on a different restraint?

No, the kits are not interchangeable. Even if parts look the same, it is best practice to always use the parts supplied by the manufacturer for its own products.

## Can two tethers be hooked to the same anchor?

No. Each tether must have its own anchor. The tether anchor is intended to withstand potential crash forces of just one child restraint in a crash.

## Is it possible to tighten a tether strap too much?

A tether strap on a forward-facing CR cannot be tightened too much. It should be as snug as possible, without excessive force being applied. Compressing the vehicle seat padding will reduce motion in a crash. However, if helping a consumer install a CR in their vehicle, be careful not to tighten the safety belt and tether enough to damage the upholstery. A Canadian study found that even a slightly loose tether was better than no tether in all tested cases, although a tighter tether is certainly preferable. Harness straps of some CRs can get pinched and be very difficult to adjust when the CR has been very tightly installed and tethered. If necessary, loosen the tether strap to adjust the harness straps, then retighten the tether strap. If the restraint has straps on a retractor or the harness straps must be adjusted frequently; the tether strap could be adjusted slightly less tightly. For rear-facing tethers, tightening is slightly different. The angle at which the baby reclines is an important factor. An infant needs a reclined seat because his or her head control is poor. If the CR is tethered
toward the rear of the vehicle (TRV) remove the slack but do not pull the seat too upright. If a rear-facing CR is tethered below and forward (toward front of vehicle - TFV), the tether should be tight. However, it should not pull the CR down to farther than 45 degrees from the vertical. Too much of a recline angle could cause the child to slide out head first in a serious crash.

## Can a tether cause neck injury?

There have been no known instances of neck injury related to the use of a tether. In fact, the study cited in the question above showed that all measurements relating to potential neck injury were lower with a tether than without it. This is because the tether secures the CR and the child - more tightly to the vehicle, allowing the child's body to "ride down" the crash with the vehicle as it crushes and absorbs crash energy. Without a tether there may be more potential of higher forces on the neck when the CR suddenly stops moving forward.

## Can a tether cause injury to other passengers in the vehicle?

There are no known cases of this. It is possible, however, that a loose, unsecured tether could injure the child or another passenger. Unused tethers should always be stored securely (or removed if the manufacturer so directs).

## Where is the tether stowed when it is not being used?

For convertible seats with tethers for forward-facing use only, the tether must be stowed or stored for the rear-facing position. If the manufacturer recommends removing the tether when it is not in use, it is important to replace the tether correctly when needed later. Some CRs have a special location to store the tether strap. For restraints without this feature, the tether strap should be tied up close to the restraint when not in use. One CR has a plastic storage clip on which the tether strap can be hooked. In this case, make sure the strap is adjusted to its shortest length before attaching it. If not, the tether hardware would be left dangling loosely. In rare cases, heavy anchor hardware comes attached to the tether strap. Remove any anchor hardware before storing the strap on the restraint.

## Can tether anchors be used to attach safety belts or harness systems for adults or larger children?

No, vehicle upper (tether) anchors and the lower anchors are designed and tested to withstand only those loads imposed by restraints for children weighing up to about 50-60 pounds. See current LATCH Manual for information (available from Safe Ride News Publications).

## Should a tether anchor be replaced after a crash?

The tether anchor should be examined for damage after it has been used in a crash, as with any other part of the vehicle. Be sure to inform the insurance adjuster and collision repair shop that they need to check the anchor. If it is bent or the sheet metal into which it is installed has been damaged, it should be replaced. In many cases, if the tether anchor is damaged, other parts of the vehicle will also have suffered considerable damage. The entire vehicle may be totaled.
LATCH Manual © 2005, Safe Ride News Publications, excerpt reprinted with permission. Appendix A: Vehicle Information•2005

Vehicles with one or two rows of seats - Chrysler

| MODEL | BODY | YEAR | SECOND ROW |  | NOTES |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | CENTER | OUTBOARD |  |
| CONCORDE | 4D | 93-99 | 04519077AB | 04519077AB | (3) TA points in rear filler panel |
|  |  | 00-01 | Tether anchor | (2) Tether anchors | Use two outboard LATCH positions or single center position; not all three at one time. |
|  |  | 02-03 | LATCH w/ TA in rear filler panel | (2) LATCH w/ TAs in rear filler panel |  |
| CONQUEST | 2D | 87-89 | MB597261 | MB597261 | (3) TA points in rear filler panel |
| CROSSFIRE | Sports Coupe | 04-05 | N/A | N/A | Front Seat: LATCH <br> Front passenger seat equipped with air bag on/off switch. |
|  | Convert | 05 | N/A | N/A | Front Seat: LATCH <br> Front passenger seat equipped with air bag on/off switch. |
| 5TH AVENUE | 4D | 89 | 04519077AB | 04519077AB | (3) TA points in rear filler panel |
| IMPERIAL | 4D | 90-93 | 04519071AB | 04519071AB | (3) TA points in rear filler panel |
| LEBARON | Convert. | 87-95 | N/A | None |  |
|  | Coupe | 87-93 | 04519077AB | 04519077AB | (3) TA points in rear filler panel |
|  | 4D | 89-94 | 04519071AB | 04519071AB |  |
| LEBARON GTS | 4D | 85-89 | 04519076AB | 05003422AB | (3) TA points in rear filler panel |
| LHS | 4D | 94-97 | 04519077AB | 05017645AA | (3) TA points in rear filler panel <br> Canadian Recall (may affect U.S. vehicles as well) - LHS and New Yorker vehicles manufactured from 4/1/94 - 11/11/94. Tether anchorage covered during production. Contact dealer. |
|  |  | 98-99 | 04519077AB | 04519077AB |  |
|  |  | 00-01 | Tether anchor | (2) Tether anchors |  |
| NEW YORKER | 4D | 93-96 | 04519077AB | 04519077AB |  |
| NEW YORKER 5TH AVENUE | 4D | 90-93 | 04519071AB | 04519071AB |  |
| NEW YORKER /LANDAU | 4D | 89-93 | 04519073AB | 04519072AB |  |
| PACIFICA | $\begin{aligned} & \text { 4D } \\ & \text { SUV } \end{aligned}$ | 05 | TA on lower back of seat | (2) LATCH w/ TAs on lower back of seat | 5-Passenger seating; Second-row center position can be used with flexible LATCH child seat |
|  | $\begin{gathered} \hline \text { SUV } \\ \text { (3-rows) } \end{gathered}$ | 04-05 | NA | (2) LATCH w/ TAs on lower back of seat | 6 passenger seating: $3^{\text {rd }}$ Row: has one tether anchor on driver side, back of seat |

LATCH Manual © 2005, Safe Ride News Publications, excerpt reprinted with permission. Appendix A: Vehicle Information•2005
132
LATCH Manual ${ }^{\circledR}$ 2005, Safe Ride News Publications, excerpt reprinted with permission. Appendix A: Vehicle Information • 2005

| Vehicles with one or two rows of seats - Chrysler |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| MODEL | BODY | YEAR | SECOND ROW |  |  |  | NOTES |
|  |  |  | CENTER |  | OUTBOARD |  |  |
| PROWLER <br> (MY-02 Prowler is Chrysler brand; other years are Plymouth) | $\begin{gathered} 2 \mathrm{D} \\ \text { Convert. } \end{gathered}$ | 02 | N/A |  | N/A |  | Front Seat: Tether anchor <br> Front passenger seat equipped with air bag on/off switch. |
| PT CRUISER | 4D | 01-05 | LATCH w/ TA on back of seat |  | (2) LATCH w/ TAs on back of seat |  | Use two outboard LATCH positions or single center position at one time, not all three at one time. One of the lower anchors is longer than the others and can be used for either the passenger side or center position. |
|  | 2D Convert | 05 | N/A |  | (2) LATCH w/TAs behind seat |  |  |
| SEbRING | 4D | 95-99 | MB597261 |  | MB612814 |  | (3) TA points in rear filler panel |
|  |  | 00 | Tether anchor |  | (2) Tether anchors |  | (3) TAs in rear filler panel |
|  |  | 01-03 | LATCH w/ TA in rear filler panel |  | (2) LATCH w/ TAs in rear filler panel |  | Use two outboard LATCH positions or single center position at one time, not all three at one time. |
|  |  | 04-05 | TA in rear filler panel |  | (2) LATCH w/ TAs in rear filler panel |  | Center position can be used with flexible LATCH child seat |
|  | $\begin{gathered} \hline \text { 2D } \\ \text { Convert. } \end{gathered}$ | 96-00 | N/A |  | None |  |  |
|  |  | 01-02 | N/A |  | (2) Tether anchors |  | (2) TAs on body structure behind seat |
|  |  | 03-05 | N/A |  | (2) LATCH w/ TAs |  | (2) TAs on body structure behind seat |
| Vehicles with three or more rows of seats - Chrysler |  |  |  |  |  |  |  |
| MODEL <br> Body | YEAR |  | SECOND ROW |  | THIRD ROW |  | NOTES |
|  |  |  | CENTER | OUTBOARD | CENTER | OUTBOARD |  |
| TOWN \& COUNTRY Van | 90-95 |  |  | 05017529AA | 05017529AA | 05017529AA | (5) TA points located on floor. |
|  | 96-00 |  | N/A | 04864118AB | 05018506AA | 05018506AA |  |

Vehicles with three or more rows of seats－Chrysler

| $\begin{aligned} & \text { m } \\ & \stackrel{4}{2} \\ & \mathbf{2} \end{aligned}$ |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | $\begin{aligned} & \text { © } \\ & \stackrel{0}{\mathrm{Z}} \end{aligned}$ | $\begin{aligned} & \text { © } \\ & \stackrel{0}{\Sigma} \\ & \hline \end{aligned}$ |  | $\begin{aligned} & \text { O} \\ & \text { ¿ } \end{aligned}$ | $\begin{aligned} & 0 \\ & \stackrel{0}{0} \\ & \text { 2 } \end{aligned}$ |  |
|  |  |  |  |  |  |  |  | § |
| $$ |  |  |  |  |  |  |  |  |
| $\begin{aligned} & \stackrel{\text { 号 }}{\underset{~}{\leftrightarrows}} \\ & \underset{\sim}{u} \end{aligned}$ | $\stackrel{\nwarrow}{Z}$ |  | $\stackrel{\swarrow}{\Sigma}$ | $\underset{Z}{\Sigma}$ | $\stackrel{\nwarrow}{¿}$ | $\stackrel{\nwarrow}{z}$ | $\stackrel{\varangle}{Z}$ | $\stackrel{\varangle}{\Sigma}$ |
|  | $\overline{0}$ |  |  | $\stackrel{\circ}{\circ}$ | $\overline{0}$ | 苍 | $\stackrel{0}{0}$ | $\left\lvert\, \begin{aligned} & \text { n } \\ & \vdots \\ & \dot{寸} \end{aligned}\right.$ |
|  |  |  |  |  |  |  |  | $\frac{\mathbb{U}}{\frac{U}{U}}$ |

LATCH Manual © 2005，Safe Ride News Publications，excerpt reprinted with permission．Appendix A：Vehicle Information • 2005

US. Depotrment ef Trarspofigtion
Notionot Highwey
Thaffle Solefy Adminishation

Vehicle Owner or Lessee Instructions: Read the National Highway Traffic Safety Administration (NHTSA) information brochure, Air Bagy of On-Off Switches: Information for an Informed Decision. If you want authorization for your driver air bag, passenger air bag, or both, fill our Parts A, B, E, and F completely, fill out Parts C and D as appropriate, and send this form to:

National Highway Traffic Safety Administration
Attention: Air Bag Switch Requests
400 Seventh Street, SW
For faster response due co mail delays throughout the governnent sector fax $t$ FAX: 202-493-2833
Washington, DC 20590-1000

- Please print.
- Please note: Incomplete forms will be returned to the owner or lessec.
- If you need a copy of the brochure or have any questions about how to fill out this form, call the NHTSA Hotline at 1-888-DASB-2-DOT (1-888-327-4236).

Part A. Name and Address

| First | Middle | Last |  |  |
| :--- | :--- | :--- | :--- | :--- |
| Sereet Address (Residence) | Ciry |  | State | ZIP Code |

Part B. I own or lease the following vehicle (owners of multiple vehicles should consult the additional instructions at the end of this form):

| Make |  | Vchicle Identification Number (locaind an drivert side of dublboand near wisdalield and en certification lubel on driver' door framel |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Model | Model Year |  |  |  |  |  |  |  |  |  |  |  |  |  |

## Part C. Switch for Driver Air Bag

I request authorization for the installation of an on-off switch for the driver air bag in my vehicle. I certity that I or another driver of my vehicle meets the criteria for the risk group checked below. (At least one box must be checked.)

| $\square$ | Medical condition. The driver has a medical condition which, according to his or her physician: <br> * Causes the driver air bag to pose a special risk for the driver; and <br> - Makes the potential harm from the driver air bag in a crash greater than the potential harm from turn- <br> ing off thar air bag and allowing the driver, even if belted, to hit the steering wheel, dashboard, or <br> windshield in a crash. |
| :--- | :--- |
| $\quad$Distance from driver air bag. Despite taking all reasonable steps to move back from the driver air <br> bag, the driver is not able to maintain a 10 -inch distance from the center of his or her breastone to the <br> center of the driver air bag cover. |  |

## Part D. Switch for Passenger Air Bag

I request authorization for the installation of an on-off switch for the passenger air bag in my vehicle. I certify that I or another passenger in my vehicle meets the criteria for the risk group checked below. (At least one box must be checked.)


Infant. I transport an infant (less than 1 year old) who must ride in the front sear because:

- My vehicle has no rear seat:
- My vehicle has a rear seat too small to accommodate a rear-facing infant scat; or
- The infant has a medical condition which, according to the infant's physician, makes it necessary for the infant to ride in the front seat so that the driver can constantly monitor the chald's condition.

Child age 1 to $\mathbf{1 2}$. A child age 1 to 12 must ride in the front seat because:

- My vehicle has no rear seat:
- Although children ages 1 to 12 ride in the rear sear(s) whenever possible, children ages It 12 sometimes must ride in the front because no space is available in the rear seat(s) of my vehicle; of
- The child has a medical condition which, according to the child's physician, makes it necessary for the child to ride in the froat seat so that the driver can constantly monitor the child's condition.

Medical condition. A passenger has a medical condition which, according to his or her physician:

- Causes the passenger air bag to pose a special risk for the passenger; and
- Makes the potential harm from the passenger air bag in a crash greater than the potential harm from turning off that air bag and allowing the passenger, even if belted, to hit the dashboard, or windshield in a crash.

Part E. I make this request based on the following certification and understandings (check each box below after reading carefully):

|  | Information brochure. I certify that I have read the NHTSA information brochure, Air Bags of On-Off Switocher: Information for an Informed Deciuion. I understand that air bags should be turned off only for people at riak and turned back on for people not at risk. |
| :---: | :---: |
|  | Loss of air bag protection. I understand that turning off an air bag may have serious safety consequences. When an air bag is off, even belted people may hit their head, neck, or chest on the steering wheel, dashboand, or windshield in a moderate to serious crash. That possibility may be incressed in some newer vehicles with seat belss that are specially designed to work with the air bag. Those belts, which are designed to reduce the concentration of crash forces on any single part of the body, typically allow the occupant to move farther forward in a crash than older belts. Without the air bag to cushion this forward movement, the chance of the occupant hitting the vehicle interior is incteased. |
|  | Waives. I understand that motor vehicle dealers and repair businesses may require me to sign a waiver of liability before they install an on-off switch. |

## Part F. Certification

I certify to the U.S. Department of Transportation that the information, certifications, and undersandings given or indicated by me an this form are trathful, correct, and complete to the best of nay knowledge and belief. I recognize that the statements I have made on this form concern a matter within the jurisdiction of a department of the United States and that making a false, fictitious, or fraudulent statement may render me subject to criminal prosecution under Title 18, United States Code, Section 1001.

| Date | Signarure of ownetlessee |
| :--- | :--- |

[^1]
# National Highway Traffic Safety Administration Frequently Asked Questions About Side-I mpact Air Bags (SABs) 

April 15, 2005

## 1. What are side-impact air bags (SABs) and where are they located?

Side-impact air bags (SABs) are inflatable devices that are designed to help protect your head and/or chest in the event of a serious crash involving the side of your vehicle. There are three main types of SABs: chest (or torso) SABs, head SABs and head/chest combination (or "combo") SABs.

Chest (or torso) SABs are mounted in the side of the seat or in the door and are designed to help protect an adult's chest in a serious side-impact crash.


Seat-mounted SAB


Door-mounted SAB

Head SABs are usually mounted in the roof rail above the side windows and are designed to help protect an adult's head in a side-impact crash. There are two types of head SABs: curtain SABs and tubular SABs. Typically, curtain SABs help protect both front and rear occupants in a sideimpact crash; some may also provide protection from ejection if your car rolls over after being struck on the side.


Tubular SAB (with a door-mounted chest SAB)


Curtain SAB

Head/chest combination ("combo") SABs are usually mounted in the side of the seat and are typically larger than chest (or torso) SABs. Combo SABs are designed to help protect both the head and chest of an adult.


Combination (or "combo") SAB
All photos courtesy of the Insurance Institute for Highway Safety
Consult your owner's manual or vehicle manufacturer for specific information on your vehicle's side air bag system.

## 2. How do SABs work?

SABs inflate in a fraction of a second and are designed to help keep your head and/ or chest from being hit by hard objects both inside and outside your vehicle in serious side-impact crashes.
Sensors determine whether a crash is severe enough to inflate the SABs. Unlike frontal air bags, some of the side curtain air bags may stay inflated for several seconds during a crash for additional protection in the event of a rollover.

## 3. Can a vehicle have both front and side air bags?

Yes, some vehicles are equipped with both front and side air bags. Frontal air bags have been standard equipment in all passenger cars since model year 1998 and all SUV's, pickups and vans since model year 1999. SABs are being offered as standard or optional equipment on many new passenger vehicles.

## 4. What are the benefits of SABs?

SABs can provide significant safety benefits to adults in side impact crashes. NHTSA estimates that if all the vehicles on U.S. roads were equipped with head protection SABs, 700 to 1,000 lives would be saved per year in side impact crashes. NHTSA also estimates that, in side-impact crashes involving at least one fatality, nearly 60 percent of those killed have suffered brain injuries.

## 5. Does the Federal government regulate SABs?

Unlike front air bags, SABs are not required by NHTSA. Because they are not required safety equipment, the federal government does not mandate that vehicles be equipped with SABs. NHTSA has recently proposed an upgrade to the federal standard for side impact protection. The standard establishes occupant protection performance requirements, but does not mandate particular technologies to meet those requirements. Manufacturers may meet this upgraded rule with various types of innovative head, chest, and pelvis protection systems, such as SABs.

## 6. What has been done to minimize risks from SABs?

A group of experts representing the automotive and insurance industries and known as the Technical Working Group (TWG) has developed voluntary SAB testing procedures to minimize the potential risk of SAB-related injuries for occupants, especially children, who are seated very close to a deploying SAB (called "out-of-position").

Manufacturers now report to the government if the SABs in a given vehicle model have met the voluntary TWG out-of-position testing procedures. NHTSA provides this information to consumers in our "Buying a Safer Car" brochure and at our www.safercar.gov Website. Vehicles whose SABs meet all the voluntary guidelines are designated with an "M" for Meets requirement in the column labeled "SAB Out of Position Testing" in the Available Features chart for each vehicle at www.safercar.gov. If your vehicle does not have an "M," you should check your owner's manual or contact the vehicle manufacturer for their recommendation on where your child should be seated in that vehicle.

Although out-of-position testing procedures are very good at identifying "aggressive" SABs and are intended to minimize risks to children and small adults seated next to them, they are not intended to replicate all possible scenarios.

## 7. How do I know if my SABs were designed to minimize risks to children?

Prior to the development of the recommended TWG performance guidelines for SABs (see \#6 above), many chest (torso) and head/chest combination (combo) SABs showed a potential for serious or fatal injury to children seated very close to the deployment of the bag. However,

April 15, 2005
very few cars sold in the U.S. have these types of SABs in the rear seating positions. The first head SABs were introduced in model year 1998, but did not become widely available until recently. NHTSA has not seen any indication that current roof-mounted head SABs pose a risk to children. Many roof-mounted SABs now extend rearward to include the second and even the third row seating positions.

Vehicles that meet the voluntary TWG guidelines will have an " M " for Meets requirement in the column labeled "SAB Out of Position Testing" in the Available Features chart of each vehicle's page at www.safercar.gov. If your vehicle does not have an "M," you should check your owner's manual or contact the vehicle manufacturer to find out whether your car's SABs are safe for children.

The best way to find out what type of SAB your vehicle has is to look in your owner's manual or to check with your dealer. NHTSA also provides this information in a searchable SAB database at www.safercar.gov. Currently only model year 2004 and 2005 information is available. Earlier model year information, 1997-2003, will be available shortly.

This information also is available at www.safercar.gov by viewing an individual vehicle's Available Features chart.

## 8. What are NHTSA's recommendations regarding child passenger safety and SABs?

All air bags (frontal or side) are supplemental safety devices and are intended to work best in combination with safety belts. Therefore, even with SABs that meet TWG testing procedures ( see \#6 above), make sure that:

- ALL children use a safety restraint appropriate for their age and size (this could be a safety seat, booster seat or adult safety belt).
- Children aged 12 and younger are safest sitting in the rear seat properly restrained.
- NEVER place a rear-facing infant seat in the front seat of a vehicle with a front passenger air bag.
- To minimize injury risks, NHTSA recommends that children not lean or rest against chest-only or head/chest combination SABs.
- NHTSA has not seen any indication of risks to children from current roof-mounted head SABs.


## 9. What is the real world experience with children and SABs?

NHTSA crash investigators actively seek out cases where SABs have deployed in crashes. So far, 92 cases have been investigated; of these only 6 involve children. There have been no moderate or serious injuries to children from SAB deployments, and only one minor injury - a skin laceration from an SAB cover. This small number of cases involves a limited number of vehicles with SABs and may not be representative of the variety of SAB systems currently available. NHTSA continues to closely monitor the real world performance of SABs involving children and adults.

## 10. Did NHTSA issue a Consumer Advisory warning against seating children near SABs?

Yes. In 1999, prior to the establishment of the TWG voluntary guidelines, NHTSA issued a Consumer Advisory warning consumers not to seat children next to activated SABs. At that time nearly all of the SABs in the rear seat were chest (torso) or head/chest combination SABs. However, the information provided in this Web page supercedes the 1999 Consumer Advisory and reflects the agency's most current understanding regarding the protection provided by SABs and any potential risk to children seated near them. NHTSA is monitoring the new SAB technologies and will continue to provide consumers with additional updates as more information becomes available.

## 11. What do I do if my car has pre-TWG SABs?

Consult your owner's manual or call your vehicle manufacturer for their recommendation on where your child should be seated in your vehicle.
12. How can I contact my vehicle manufacturer for information on children and SABs?

| Contact your vehicle manufacturer using the |  |
| :--- | :--- |
| information below : |  |

## Compilation of Child Passenger Safety Checklist Forms

- Safe Kids Worldwide Child Passenger Safety Checklist
- City of Livermore Child Safety Seat Checklist
- Child Passenger Checklist for use at St. John's Hospital, Springfield
- NC Child Passenger Safety Inspection Checklist


## CHILD PASSENGER SAFETY CHECKLIST



Add your own waiver in this text box.


- Official Use Only - See Guide on Other Sile



## CHILD NUMBER 2



$\square$

## CITY OF LIVERMORE <br> Child Safety Seat Checklist

Technicians: Have parent put child in seat to record restraint use before making corrections.



## CITY OF LIVERMORE

## CHILD PASSENGER RESTRAINT (CAR SEAT) SYSTEM CHECK AND INSPECTION PROGRAM WAIVER, HOLD HARMLESS AND INDEMNIFICATION AGREEMENT

## Please read, sign and date

I, the undersigned, will hold harmless the City of Livermore, its officials, employees, agents and volunteers and waive any claim on my behalf, on behalf of any child for which I am a parent or guardian, or for any child who may be in my custody or care, and on behalf of my heirs, representatives and assigns against the City of Livermore, its officials, agents and volunteers for illness, death, injury, debts, damage to property, or other harm arising from the City of Livermore's Child Passenger Restraint (car seat) Check and Inspection Program, and I will assume all responsibility for the use of my Child Passenger Restraint (car seat) before, during and after the check and inspection.

(Print or type name)

If the person availing himself/herself of the check and inspection does not read and understand English, the waiver may be read to the person, and verified that it is understood.
I, the undersigned, read the above waiver and indemnification agreement to the person who's name and signature appear above.
indicated to me in the affirmative that he or she understood the waiver, and agrees to its terms.
$\overline{\text { (Signature) }} \quad \overline{\text { (Print or type name) }}$

Please complete the following

| Parent / Care Giver: | Relationship to child, if not parent: |  |  |
| :---: | :---: | :---: | :---: |
| Address: | City, State, Zip code: |  |  |
| Phone Number: | Child's Name: |  |  |
| Expectant Mom: Yes $\square$ No $\square$ Child's Age and Size: Years: | Months: Child's Weight: | Child's Height: |  |
| Any Medical Concerns? ie: Breathing problems, Pre-mautre birth etc. |  |  |  |
| Are there other children do you regularly transport? |  |  |  |
| Vehicle Information: Year: Make: Model: | Tether anchors: Yes $\square$ No $\square$ | Latch equipped: Yes | No $\square$ |
| Is the Vehicle Owner's Manuel Available ? Yes $\square$ No $\square$ |  |  |  |
| $\begin{array}{llllll}\text { Air Bag - Driver Side } & \text { Yes } \square \text { No } \square \text { Passenger Side Yes } \square \text { No } \square \text { Side Yes } \square \text { No } \square \text { Other }\end{array}$ |  |  |  |
| Air Bag - Disabled: Yes $\square$ No $\square$ On / Off Switch: Yes $\square$ No $\square$ |  |  |  |
| How did you find out about this event or service ? |  |  |  |

For Official Use Only: Checker/Technician Comments:
$\square$

## Instructions for using the Child Passenger Checklist deemed appropriate for use at St. John's Hospital, Springfield <br> Revised: March 20, 2006

## The purposes of the Child Passenger Checklist form are to:

1) Provide guidance to any Child Passenger Safety (CPS) Technician, regardless of experience, to insure that a complete inspection of the child restraint device (CRD) is made and
2) Provide a means for the CPS technician to document and, if necessary to do so at a later date, reconstruct the services provided, including:
a) That all aspects of correct restraint use, including type of restraint selected, harness/shield adjustment, and CRD installation are evaluated
b) That this evaluation is based on information contained in the CRD manufacturer's instructions
c) That the results of this evaluation have been communicated to the parent and that the technician has taught the care giver how to use and (as is applicable) how to install the CRD in the vehicle
d) That the caregiver understands the scope and intent of the services provided and that the care giver was taught and understands how to use and install the CRD and
e) That the caregiver made the final decision on how to use and install the CRD.
3) The purpose of this form is NOT to serve as an educational tool for the caregiver. Brochures, fact sheets or other educational material or referrals to additional sources of technical information must be provided to the caregiver. St. John's employees must use the standardized fact sheets provided by Safe Ride News. The title of each sheet provided must be documented.
4) Important notes about this form are that:
a) This form should be used to assess the restraint use for only one child. COMPLETE ONE FORM PER CHILD and
b) COMPLETE A FORM FOR EACH CHILD IN THE VEHICLE - even those who are in a seat belt rather than a CRD.
c) The use/nonuse and correctincorrect use of restraints by all vehicle occupants should be assessed and concerns or suggestions communicated to the driver and/or occupants as is deemed appropriate.
d) Except for items skipped as directed, none of the items on the form should be left blank. ALL OF THE ITEMS ON THE FORM SHOULD BE COMPLETE AS IS APPROPRIATE OR MARKED AS "UNKNOWN" OR "NOT APPLICABLE." This is to help assure that the CPS technician is providing a complete assessment and to document that all pertinent aspects of the situation have been addressed. Only complete the sections that pertain to the situation. For example, if the child is in a rear-facing infant only seat, there is no need to provide information in any other section since this information is not applicable.
e) Most items can be answered by checking the appropriate box. If an item is marked as " N " for incorrect use, the technician must correct the error if possible. If the situation is not correctable due to lack of proper equipment or materials being available, the technician must provide appropriate advice and or arrange for alternate transportation or restraint. If the restraint is determined to be totally unsafe, another restraint should be provided. Any St. John's CPS technician should contact the St. John's Trauma Prevention Education Coordinator at the provided telephone numbers to provide another restraint or to seek a solution.

## Parental/Care Giver Consent:

Sections to be filled out by the parent, driver or other caregiver are surrounded by heavy double-lined borders. These include sections titled Driver Information, Vehicle Information, Child Information and Important Information. The area that contains the parental/caregiver consent and information about the child and vehicle should be filled out by the person whom you are providing the service for and whom you will be interacting with. The consent should be complete and signed before checking the restraints in the vehicle. If the caregiver refuses to sign the consent form, do not provide the service. Obtaining signed consent is an important part of the complete documentation needed for liability protection.

## Safety Seat Information:

1. Check the appropriate box to indicate the type of restraint that the child is in upon arrival.
2. Child restraint manufacturing information can be found on the FMVSS 213 required labels. Sometimes, this information is on the back or bottom of the restraint and can not be read unless the CRD is removed. This item can be skipped and returned to later.Do not remove the CRD to locate the model and manufacturing date information until after you have had a chance to 1) check the positioning and snugness of the harness on the child and 2) check the routing of the seatbelt used to install it and the snugness of the installation.
3. Once the appropriate labels are located, record the information in the designated areas on the checklist. Please note that if the model name cannot be found, this information is not required as long as the model number is present.
4. Using the information on the labels and through conversation with the participant, determine the following:
a) Is the safety seat instruction manual present?
b) Is the owner of the seat the original owner?
c) Has the seat been involved in a crash?
d) Is the seat FMVSS Certified?
e) Has the seat been recalled?
f) Was the participant informed of the recall?

## Safety Seat Location:

5. Indicate, using the appropriate symbols, the location of the safety seat upon arrival and if the seat was moved to a different seating location.
6. Mark the appropriate boxes to indicate the presence of airbags in the driver, passenger and side locations. If present, the exact location of side airbags must be noted.

## Safety Belt Type:

7. Indicate the type of retractor present at the safety seat location. Automatic Locking Retractor is designated as ALR, and Emergency Locking Retractor is designated as ELR. Other choices are a switchable retractor or none if there is no retractor present.
8. Indicate the type of latch plate present at the safety seat location. These include Locking, Lightweight Locking, Sliding, Fixed and Switchable.
9. Indicate the type of restraint system present at the safety seat location. These include lap belt, lap/shoulder belt, LATCH and other.

## Program/Technician Information:

Use this section to record information about the event and the CPS Technician(s) responsible for the inspection as follows. Remember that a CRS Checkup (individual or group event) is intended as an educational service, not an installation service for families. Parents and other caregivers should be active, learning participants in the process and leave with the knowledge and skills to use and install their own CRS for the safe transportation of their own children.
10. Write in the date and the site of the inspection.
11. At least one Technician must print his/her name and then sign to attest to the fact that the proper installation and proper use of the child restraint system, including seatbelts, has been taught to the parent or other care giver. A second line is provided for a second Technician participating in the inspection or for a senior checker to attest that he/she agrees with the assessment and parental education provided.
12. If the program provided a restraint for the participant, indicate the manufacturer, name, model number, manufacturing date and the type of seat provided.
13. Use the "Comments" section to list in detail any problems that were encountered, corrections that were made, and/or recommendations that were given to the parent. Be especially sure to document instances where the parent or caregiver has chosen not to follow the advice you have provided. If additional space is needed continue attach an addendum sheet. Take the time to document whatever needs to be documented.

Page 2 Child Passenger Checklist (continued)

## Rear Facing Child Safety Seats

Using best practice guidelines provided to you in the 32 hour standardized technician curriculum manual, indicate the type of seat the child arrived in and answer the listed questions.

- Is the child seated near an airbag? By indicating "no", you are indicating that the CRS is not in front of an airbag. If you indicate "yes" immediate action must be taken to place the child and the CRS in a seating position without an active airbag. Discuss this situation with the parents to prevent the infant from leaving in this high risk seating position.


## Forward Facing Child Safety Seats

Using best practice guidelines provided to you in the 32 hour standardized technician curriculum manual, indicate the type of seat the child arrived in and answer the listed questions.

- Is the child seated near an airbag? By indicating "no", you are indicating that the CRS is not in front of an airbag or that the seat is as far from the airbag as possible.


## Belt Positioning Booster

Using best practice guidelines provided to you in the 32 hour standardized technician curriculum manual, indicate the type of seat the child arrived in and answer the listed questions. Please note that a belt-positioning booster may only be used with a lap AND shoulder belt system.

- Is the child seated near an airbag? By indicating "no", you are indicating that the CRS is not in front of an airbag or that the seat is as far from the airbag as possible.


## Vehicle Seat Belt

Using best practice guidelines provided to you in the 32 hour standardized technician curriculum manual, indicate the type of seat the child arrived in and answer the listed questions. Please note that upper body protection (lap and shoulder belt) is the best practice guideline for children riding in the vehicle seat belt. This may require a child to sit in a front seating position with the seat as far from the airbag as possible.

## Child Passenger Checklist



## Safety Seat Information:

Type of Seat:
$\square$ Infant
$\square$ Convertible
$\square$ Forward Facing only
$\square$ High Back Booster only
$\square$ Other Booster
$\square$ Vest
$\square$ Integrated
$\square$ No seat being used

Is the safety seat instruction manual present?
$\square$ yes $\square$ no
Is the owner of the seat the original owner?
$\square$ yes $\quad \square$ no
Has the seat been involved in a crash?
$\square$ yes $\quad \square$ no $\quad \square$ Unknown
Is the seat FMVSS Certified?
$\square$ yes no $\quad \square$ Unknown
Has the seat been recalled?
$\square$ yes $\square$ no
Was participant informed of recall?
$\square$ yes $\square$ no $\square$ N/A

## Safety Belt Type:

Type of Restraint System
$\square$ Lap belt $\square$ Lap/Shoulder belt $\square$ LATCH $\square$ Other
$\square$ Parent educated regarding type, function and proper use of restraint system.

## Type of Retractor

$\square$ ALR $\square$ ELR $\square$ Switchable $\square$ None
$\square$ Parent educated regarding type, function and proper use of retractor
Type of Latch Plate or LATCH Attachment $\square$ Locking $\square$ Lightweight Locking $\square$ Sliding $\square$ Fixed $\square$ Switchable $\square$ push on attachment $\square$ Rigid attachment
$\square$ Parent educated regarding type, function and proper use of latch plate


Child Passenger Checklist (continued)
Technicians: Record restraint use as child arrived. " Y " $=\mathrm{Yes}$, " N " $=\mathrm{No}$, " $N / A$ " = Not applicable, " $\mathrm{C} "=$ problem corrected. Record all changes made.


PARENTALCARE GIVER CONSENT: I understand and agree that the sole purpose of this program is to help reduce the incidence of the improper installation and/or use of child restraints (CR's) and safety belts; that this inspection is being provided as a free service to me; that this program and/or service cannot fully evaluate the quality, safety, or condition of any CR or vehicle safety belt inspected; and that this program cannot guarantee my child's safety in a vehicle collision. However, I do understand that the CR installation and use assistance and recommendations given to me by the program participants will help to reduce, but will not eliminate, the chance of my child being killed or seriously injured in a vehicle collision. For these reasons, I choose to participate in this program and release the program and program participants from any present or future liability for any injuries or damages that may result from a vehicle collision or otherwise.



CARE GIVER ACKNOMEDGMENT: The correct use of my restraint system has been clearly explained, demonstrated and taught to me.


# Child Passenger Safety 

## A PARENT'S PRIMER

When you're an expectant mother, it's important to always wear your seat belt to protect you and your unborn child. Wear the lap belt across your hips and below your belly with the shoulder belt across your chest (between your breasts). Once your baby is born, follow these important safety steps.

## GROWING UP SAFE: It's a four-step process.

## As children grow, how they sit in your car, truck or SUV should change.

Save your child from injury or death by observing all four steps:


## Get Help!

ON THE WEB
Go to www.nhtsa.gov and choose Child Safety Seat Information from the menu or click on the child passenger safety icon. The site includes child safety seat installation tips, product ratings, recalls, and other useful information.

## BY PHONE

For more information about child safety seats, booster seats,
inspection/fitting stations in your area, seat belts, air bags, and
other highway safety issues, call the DOT Vehicle Safety Hotline at: 1-888-327-4236.

## NEAR YOU

A certified child passenger safety technician can check your installation and answer questions. To find a technician or an inspection station near you, go to www.nhtsa.gov, click on the child passenger safety icon, and then click on the Fitting/ Inspection Station link or go to www.seatcheck.org.

## REMEMBER: All children under 13 should ride in the back seat.



March 2007


# 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 rearfacing 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.


# AMERICAN ACADEMY OF PEDIATRICS 

Committee on Injury and Poison Prevention

# Selecting and Using the Most Appropriate Car Safety Seats for Growing Children: Guidelines for Counseling Parents 


#### Abstract

Despite the existence of laws in all 50 states requiring the use of car safety seats or child restraint devices for young children, more children are still killed as passengers in car crashes than from any other type of injury. Pediatricians and other health care professionals need to provide up-to-date, appropriate information for parents regarding car safety seat choices and proper use. Although the American Academy of Pediatrics is not a testing or standard-setting organization, this policy statement discusses the Academy's current recommendations based on the peer-reviewed literature available at the time of publication and sets forth some of the factors that parents should consider before selecting and using a car safety seat.


ABBREVIATIONS. AAP, American Academy of Pediatrics, NHTSA, National Highway Traffic Safety Administration.

## INTRODUCTION

In 2000, 539 children younger than 5 years died while riding in motor vehicles; almost half were unrestrained, ${ }^{1}$ and many others were restrained improperly. ${ }^{2}$ Many parents want to know which car safety seat is best for their child. An appropriate car safety seat is the right size for the child, fits the vehicle's seats and seat belt systems, and is easy for parents to use properly. In addition, it must meet all applicable federal safety standards.
Pediatricians also need to be aware that the child occupant protection laws in their states may not reflect the safest way to transport a child. Parents should be counseled to follow the American Academy of Pediatrics (AAP) recommendations for best child passenger restraint, and pediatricians should advocate to improve their state laws to provide better child protection.

## AAP RECOMMENDATIONS

## Seat Selection

1. Children should face the rear of the vehicle until they are at least 1 year of age and weigh at least 20 lb to decrease the risk of cervical spine injury in the event of a crash. Infants who weigh 20 lb 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. ${ }^{3,4}$ If a car safety seat accommodates children rear facing to higher

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.
PEDIATRICS (ISSN 0031 4005). Copyright © 2002 by the American Academy of Pediatrics.
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. ${ }^{3}$
2. Premature and small infants should not be placed in car safety seats with shields, abdominal pads, or arm rests that could directly contact an infant's face or neck during an impact and injure the child. ${ }^{5}$
3. For optimal protection, pediatricians should counsel parents of most children (those who weigh more than 12 lb at 4 months of age) to encourage use of a convertible car safety seat that will accommodate them rear facing at higher weights.
4. A convertible car safety seat is positioned semireclined and rear facing for a child until at least 1 year of age and at least 20 lb . The seat is positioned upright and forward facing for an older and heavier child who weighs up to 40 lb and may be used as long as the child fits well (eg, tops of ears below the top of the car safety seat back and shoulders below the seat strap slots). ${ }^{6}$
5. A forward-facing seat, a combination seat, or a belt-positioning booster seat should be used when the child has outgrown a convertible safety seat but is too small to use the vehicle's safety belts. Vehicle safety belts should not be used until the shoulder belt can be positioned across the chest with the lap belt low and snug across the thighs ${ }^{7,8}$; the child should fit against the vehicle's seat back with his or her feet hanging down when the legs are bent at the knees. A belt-positioning booster seat should be used until the vehicle safety belt fits well.
6. Many new vehicles are equipped with integrated (built-in) car safety seats that are designed for forward-facing riders who are at least 1 year of age and weigh at least 20 lb . All younger infants should be positioned rear facing in separate car safety seats until they are at least 1 year of age and weigh at least 20 lb . When purchasing a new vehicle, parents should consider selecting a vehicle with an optional integrated car safety seat. Some integrated seats convert to booster seats for older children. ${ }^{9}$
7. On the basis of Federal Motor Vehicle Safety Standards established by the National Highway Traffic Safety Administration (NHTSA), shield boosters have not been certified by their manufacturers for use by children who weigh more than 40 lb . ${ }^{3,10}$ In current models, the shield can be removed and the restraint can be used with a lap and shoulder
belt as a belt-positioning booster seat for children who are too heavy or tall to fit in a seat with a full harness.

Children who weigh 40 lb or less are best protected in a seat with a full harness. ${ }^{3,11}$ Significant injuries to the head, spine, abdomen, and extremities of children in shield boosters have been documented in crash investigations resulting from ejection, excessive head excursion, and shield contact. ${ }^{11-14}$ Although boosters with shields may meet current Federal Motor Vehicle Safety Standards for use by children who weigh 30 to 40 lb , on the basis of current published peer-reviewed literature, the AAP does not recommend their use.
8. A number of aftermarket add-on devices claim to solve the problem of poorly fitting seat belts; however, these products may actually interfere with proper lap and shoulder harness fit by positioning the lap belt too high on the abdomen and allowing too much slack in the shoulder harness, placing it too low across the shoulder. ${ }^{15}$ Until performance requirements are developed by the NHTSA for aftermarket devices, these products should not be used.
9. Children with special health care needs should have access to appropriate restraint systems. ${ }^{16,17}$ Specific information is available in the AAP policy statement "Transporting Children with Special Health Care Needs"17 and "Safe Transportation of Children With Special Needs: A Guide for Families." ${ }^{18}$

## Installation in Vehicle

1. A rear-facing car safety seat must not be placed in the front passenger seat of any vehicle equipped with an air bag on the front passenger side. Death or serious injury to an infant can occur from the impact of the air bag against the back of the car safety seat. ${ }^{3,19}$
2. Parents should be advised that the rear vehicle seat is the safest place for children of any age to ride. Any front-seat, front-facing passengers should ride properly restrained and positioned as far back as possible from the front air bag on the passenger side. ${ }^{19}$
3. Parents should be instructed to read the vehicle owner's manual and child restraint device instructions carefully. When the car safety seat is installed in the car, it should be tested for a safe, snug fit in the vehicle to avoid potentially lifethreatening incompatibility problems between the design of the car safety seat, vehicle seat, and seat belt system.

Lower Anchors and Tethers for Children (LATCH) is a new standardized car safety seat attachment system that will simplify car safety seat installation and enhance safety. Most new vehicles and car safety seats will be equipped with this system by September 2002.
4. Infants should ride at approximately a $45^{\circ}$ angle to prevent slumping and airway obstruction. If the vehicle seat slopes so that the infant's head flops forward, the car safety seat should be positioned back at an approximately $45^{\circ}$ tilt according
to the manufacturer's instructions. Some car safety seats have built-in features that allow adjustment of the angle. For car safety seats that do not adjust, a firm roll of cloth, a solid-core Styrofoam roll, or a tightly-rolled newspaper can be wedged under the car safety seat below the infant's feet to achieve this angle. ${ }^{20}$
5. Experience with the interaction of vehicle side air bags and car safety seats is limited. To date, no crash studies have established that a child properly restrained in a car safety seat is at risk from current side air bag impact. ${ }^{3}$ Laboratory simulations have indicated, however, that unrestrained and out-of-position children are at risk of serious injury from a deploying side air bag. ${ }^{21}$ Because children cannot be depended on to remain in position at all times and until additional research and experience is acquired, parents should be counseled about the potential risks and benefits of having side air bags. Parents should consider placing children and car safety seats away from all air bags, choosing a vehicle without side air bags in the rear seat, or deactivating side air bags in rear seats if children are transported in adjacent positions. They may also refer to the vehicle owner's manual for recommendations specific to their vehicle.

## Placement of Child in Seat

1. In rear-facing car safety seats for infants, shoulder harnesses usually should be placed in the slots at or below the infant's shoulders, the harness should be snug, and the car safety seat's retainer clip should be positioned at the level of the infant's armpit, not on the abdomen or in the neck area (see manufacturers' instructions for details).
2. In forward-facing car safety seats for older children, the shoulder strap should be at or above the child's shoulders, the harness should be snug, and the retainer clip should be positioned level with the child's armpits. This seat should be used until the child reaches the top weight limit of the seat or the tops of his or her ears reach the top of the car safety seat back (see manufacturers' instructions for details).
3. A child should never be left unattended in a car safety seat in or out of the car.

## SUMMARY

Existing products provide effective restraint for children riding in motor vehicles and minimize risk of death and injury during car crashes if used appropriately. Parents look to pediatricians for up-to-date, accurate information on selecting and properly using car safety seats. New products that address gaps in restraint protection are continually being developed. Manufacturers should be encouraged to develop car safety seats that accommodate children rear facing to 4 years of age ( 45 lb ). It is important that pediatricians keep abreast of innovations in child passenger safety. ${ }^{21}$ The use of the AAP materials, including "Car Safety Seats: A Guide for Families,"9 the "OneMinute Car Seat Safety Check-Up," ${ }^{23}$ and "Safe Transportation of Children With Special Needs: A

Guide for Families"18 can assist the physician in providing specific advice for patients. The information in Fig 1 in this statement will also aid in selecting the appropriate type of restraint. Additional consultation for detailed technical information can be obtained from certified child passenger safety technicians identified by state on the NHTSA Web site (http://www.nhtsa.dot.gov/people/injury/childps/ contacts/index.cfm). This information will help parents ensure that their children are transported as safely as possible.

Committee on Injury and Poison Prevention, 2001-2002
Marilyn J. Bull, MD, Chairperson
Phyllis Agran, MD, MPH
Victor Garcia, MD
H. Garry Gardner, MD

Danielle Laraque, MD
Susan H. Pollack, MD
Gary A. Smith, MD, DrPH
Milton Tenenbein, MD
Joseph Wright, MD, MPH

## Liaisons

Ruth A. Brenner, MD, MPH
National Institute of Child Health and Human Development
Stephanie Bryn, MPH
Health Resources and Service
Administration/Maternal and Child Health Bureau
Richard A. Schieber, MD, MPH
Centers for Disease Control and Prevention
Alexander Sinclair
National Highway Traffic Safety Administration
Deborah Tinsworth
US Consumer Product Safety Commission
Lynn Warda, MD
Canadian Paediatric Society

## Consultant

Murray L. Katcher, MD, PhD

Staff
Heather Newland

## REFERENCES

1. National Highway Traffic Safety Administration, National Center for Statistics and Analysis. Traffic Safety Facts 2000: A Compilation of Motor Vehicle Crash Data From the Fatality Analysis Reporting System and the General Estimates System. Washington, DC: US Department of Transportation; 2000. DOT HS Publ. No. 809 337. Available at: http:// www.nhtsa.dot.gov/people/ncsa/. Accessed January 22, 2002
2. Decina LE, Kneobel KY. Child safety seat misuse patterns in four states. Accid Anal Prev. 1997;29:125-132
3. Weber K. Child passenger protection. In: Nahum AM, Melvin JW, eds. Accidental Injury: Biomechanics and Prevention. New York, NY: SpringerVerlag; 2002:523-549
4. Weber K. Rear-facing restraint for small child passengers: a medical alert. UMTRI Res Rev. 1995;25:12-17
5. Bull MJ, Weber K, Stroup KB. Automotive restraint systems for premature infants. J Pediatr. 1988;112:385-388
6. Johnston C, Rivara FP, Soderberg R. Children in car crashes: analysis of data for injury and use of restraints. Pediatrics. 1994;93:960-965
7. Agran PF, Dunkle DE, Winn DG. Injuries to a sample of seatbelted children evaluated and treated in a hospital emergency room. J Trauma. 1987;27:58-64
8. Winston FK, Durbin DR, Kallan MJ, Moll EK. The danger of premature graduation to seat belts for young children. Pediatrics. 2000;105: 1179-1183
9. American Academy of Pediatrics. Car Safety Seats: A Guide for Families. Elk Grove Village, IL: American Academy of Pediatrics; (updated annually)
10. Federal Motor Vehicle Safety Standards and Regulations. 49 CFR §571.213 (1998)
11. Marriner PC, Woolford JG, Baines GA, Dance DM. Abdominal shield booster cushions in motor vehicle accidents. In: Proceedings of the Canadian Multidisciplinary Road Safety Conference IX. Montreal, Quebec, Canada: University of Montreal; 1995:233-240
12. Whitman GR, Brown KA, Cantor A, D'Aulerio LA, Eisentraut DK, Markushewski ML. Booster-with-shield restraint case studies. SAE 973307. Child Occupant Protection 2nd Symposium. Warrendale, PA: Society of Automotive Engineers; 1997:149-157
13. Stalnaker RL. Spinal cord injuries to children in real world accidents. SAE 933100. Child Occupant Protection 2nd Symposium. Warrendale, PA: Society of Automotive Engineers; 1997:173-183
14. Slavik DH. Cervical distraction injuries to children. SAE 973306. Child Occupant Protection 2nd Symposium. Warrendale, PA: Society of Automotive Engineers; 1997:137-148
15. Blue Ribbon Panel II. Protecting Our Older Child Passengers. Recommendations. March 15, 1999. Available at: http://carseat.org/ whatsnew/blueribbon.htm. Accessed April 9, 2001
16. American Academy of Pediatrics, Committee on Injury and Poison Prevention. Safe transportation of newborns at hospital discharge. Pediatrics. 1999;104:986-987
17. American Academy of Pediatrics, Committee on Injury and Poison Prevention. Transporting children with special health care needs. Pediatrics. 1999;104:988-992
18. American Academy of Pediatrics. Safe Transportation of Children With Special Needs: A Guide for Families. Elk Grove Village, IL: American Academy of Pediatrics; In press
19. Centers for Disease Control and Prevention. Warnings on interaction between air bags and rear-facing child restraints. MMWR Morb Mortal Wkly Rep. 1993;42:280-282
20. American Academy of Pediatrics, Committee on Injury and Poison Prevention and Committee on Fetus and Newborn. Safe transportation of premature and low birth weight infants. Pediatrics. 1996;97:758-760
21. Duma SM, Crandell JR, Pilkey WD, Seki K. Dynamic response of the Hybrid III 3-year-old dummy head and neck during side air bag loading. In: Proceedings of the Association for the Advancement of Automotive Medicine 42nd Conference. Barrington, IL: Association for the Advancement of Automotive Medicine; 1998:193-208
22. Bull MJ, Sheese J. Update for the pediatrician on child passenger safety: five principles for safer travel. Pediatrics. 2000;106:1113-1116
23. American Academy of Pediatrics. One-Minute Car Seat Safety Check-Up. Elk Grove Village, IL: American Academy of Pediatrics; 2001

# AMERICAN ACADEMY OF PEDIATRICS 

Committee on Injury and Poison Prevention

# Safe Transportation of Newborns at Hospital Discharge 


#### Abstract

All hospitals should set policies that require the discharge of every newborn in a car safety seat that is appropriate for the infant's maturity and medical condition. Discharge policies for newborns should include a parent education component, regular review of educational materials, and periodic in-service education for responsible staff. Appropriate child restraint systems should become a benefit of coverage by Medicaid, managed care organizations, and other third-party insurers.


ABBREVIATIONS. FMVSS, Federal Motor Vehicle Safety Standard; AAP, American Academy of Pediatrics; NHTSA, National Highway Traffic Safety Administration.

A11 newborns discharged from hospitals should be transported home in car safety seats that meet Federal Motor Vehicle Safety Standard (FMVSS) 213 and that are selected to meet the specific transportation needs of healthy newborns, premature infants, or infants with special health care needs.

In 1996, 1780 children (newborns to 14 years of age) were killed, and 305000 were injured as occupants in motor vehicles. ${ }^{1}$ Of the fatalities, $60 \%$ were unrestrained. The fatality rate for infants was higher than any other age group, 4.4/100 000. ${ }^{2}$ In 1996, 653 children (newborns through 4 years of age) were killed as occupants in motor vehicles. Of these fatalities, $52 \%$ were unrestrained.

The American Academy of Pediatrics (AAP) has made major contributions to child passenger safety, including contributions to the passage of legislation in all 50 states that requires the use of car safety seats or child restraint devices for infants and young children. Assuring that newborns are restrained properly when riding for the first time establishes the pattern for continued compliance with a measure that can save their lives or prevent serious injury. Correctly used car safety seats are $71 \%$ effective in preventing fatalities attributable to car crashes and $67 \%$ effective in preventing injury that requires hospitalization. With $100 \%$ correct use, about 53000 injuries and 500 deaths could be prevented each year in the United States among children from birth to 4 years of age. ${ }^{3}$

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.
PEDIATRICS (ISSN 0031 4005). Copyright © 1999 by the American Academy of Pediatrics

## RECOMMENDATIONS

1. In conjunction with their medical staff, all hospitals with services for newborns should develop policies for the discharge of newborns in car safety seats that are crash tested and meet the FMVSS 213. These policies should be developed in consultation with a car seat expert who has successfully completed the National Highway Traffic Safety Administration (NHTSA) 4-day course. ${ }^{4}$ Although the resources of hospitals and patients vary greatly, at discharge every newborn should be properly restrained in a car safety seat.
2. Pediatricians should work with these hospitals in establishing hospital policies that clearly define staff roles for each required task. Also, pediatricians should reinforce the need for compliance with these policies with both hospital staff and parents/guardians. Hospital policies related to newborns should include the following:

- Methods by which expectant parents will be informed, before delivery, of the importance of using car safety seats and potential problems with vehicle incompatibility. Parents should be advised through prenatal classes, their obstetrical provider, or pediatric prenatal visits to obtain a car safety seat, properly secure it in their vehicle, and resolve compatibility issues before delivery. This is especially important because physicians frequently discharge infants after only a short hospital stay.
- Designation of an individual responsible for implementing hospital policies and procedures related to discharge of newborns in car safety seats that are used properly. Hospital policy also should include designation of an individual or team specifically trained to assess the needs of infants with special health care needs with regard to the selection of the most appropriate child safety seat. ${ }^{5-8}$ Hospitals should develop a policy to ensure provision of a period of observation in a car safety seat before hospital discharge for each infant born at $<37$ weeks' gestation to monitor for possible apnea, bradycardia, or oxygen desaturation. ${ }^{5}$ Provision for periodic in-service education of staff responsible for parent and guardian education on correct use of car safety seats. Those responsible for training other hospital staff and parents and guardians should have successfully completed the NHTSA 4-day course. ${ }^{4}$
- Provision of regular periodic review by a designated person who has completed the NHTSA 4-day course of all materials distributed to parents and guardians of newborns about proper car safety seat use. Hospitals should ensure that information is current, relevant, and accurate, with date of publication or revision noted. ${ }^{9}$
- Provisions to make available an appropriate car safety seat by sale, short-term loan, or donation to parents before discharge if the parents are unable to provide their own. Hospitals should consider giving a low-cost infant car seat, which can also be used for generic instruction, to parents at discharge as a gift.
- Assessment of the degree of compliance with the policies and procedures on discharge in child safety seats in routine quality assurance surveillance by hospital staff. Hospital staffs should take appropriate actions to correct deficiencies when present.

Admission orders for newborns should include an order written by a physician for parent instruction about use of child safety seats. This should be included as a part of standard admission orders to ensure its completion before discharge.

Discharge policies for newborns should include the following:

- Determination of the most appropriate car safety seat for each newborn according to maturity and medical condition by a designated hospital employee.
- Provision of information and training for parents and guardians should be presented before discharge on the generic issues related to correct use of car safety seats. Hands-on teaching including "return demonstration" should be a part of this instruction. The installation of a specific car seat in a specific car must be the parent's responsibility. Resources to address these issues are available from the AAP. ${ }^{10,11}$
- A period of observation in a car safety seat before hospital discharge should be provided to each infant born at $<37$ weeks' gestation to monitor for possible apnea, bradycardia, or oxygen desaturation. ${ }^{5}$
- Pediatricians with other child health and safety advocates should work for coverage of appropriate child restraint systems as a benefit of coverage by Medicaid, managed care organizations, and other third-party insurers. Until that time, hospitals are encouraged to have a giveaway or loan program for parents who cannot afford to purchase a car seat.

Committee on Injury and Poison Prevention, 1999-2000
Marilyn Bull, MD, Chairperson
Phyllis Agran, MD, MPH
Danielle Laraque, MD
Susan H. Pollack, MD
Gary A. Smith, MD, DrPH
Howard R. Spivak, MD
Milton Tenenbein, MD
Susan B. Tully, MD
Liaison Representatives
Ruth A. Brenner, MD, MPH
National Institute of Child Health and Human Development
Stephanie Bryn, MPH
Maternal and Child Health Bureau
Cheryl Neverman, MS
National Highway Traffic Safety Administration
Richard A. Schieber, MD, MPH
Centers for Disease Control and Prevention
Richard Stanwick, MD
Canadian Paediatric Society
Deborah Tinsworth US Consumer Product Safety Commission
William P. Tully, MD Pediatric Orthopaedic Society of North America
Section Liaison
Victor Garcia, MD Section on Surgery

## Consultant

Murray L. Katcher, MD, PhD

## REFERENCES

1. US Department of Transportation, National Highway Traffic Safety Administration. Traffic Safety Facts 1996. A Compilation of Motor Vehicle Crash Data From the Fatal Accident Reporting System and the General Estimates System. Washington, DC: US Department of Transportation, National Highway Traffic Safety Administration; 1997
2. Fingerhut LA, Annest JI, Baker SP, et al. Injury mortality among children and teenagers in the United States: 1993. Inj Prev. 1996;2:93-94
3. An Evaluation of Child Passenger Safety: The Effectiveness and Benefits of Safety Seats. Springfield, VA: National Technical Information Service; 1986. DOT report DOT MS 806890
4. National Highway Traffic Safety Administration. Standardized Child Passenger Safety Training Program. Washington, DC: National Highway Traffic Safety Administration; 1998
5. American Academy of Pediatrics, Committee on Injury and Poison Prevention and Committee on Fetus and Newborn. Safe transportation of premature and low birth weight infants. Pediatrics. 1996;97:758-760
6. American Academy of Pediatrics, Committee on Injury and Poison Prevention. Selecting and using the most appropriate car safety seats for growing children: guidelines for counseling parents. Pediatrics. 1996;97:761-763
7. American Academy of Pediatrics, Committee on Injury and Poison Prevention. Transporting children with special health care needs. 1999; 104:988-992
8. Summerfelt M, Spitzer A, Wallace E, et al. Kars/Special Kars. An Easter Seals' Model Program Training Manual. Chicago, IL: National Easter Seal Society; 1992
9. National Highway Traffic Safety Administration. Is This Child on the Road to Danger? Washington, DC: National Highway Traffic Safety Administration; 1997. DOT report DOT HS 808672
10. American Academy of Pediatrics. 1999 Family Shopping Guide to Car Seats (brochure). Elk Grove Village, IL: American Academy of Pediatrics; 1999
11. American Academy of Pediatrics. Car Seat Shopping Guide for Children With Speical Needs. (brochure). Elk Grove Village, IL: American Academy of Pediatrics; 1998

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

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 ( $<2500 \mathrm{~g}$ 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 $3.3 \mathrm{lb}(1.5 \mathrm{~kg})$.

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
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 l).
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 $45^{\circ}$ or as directed by the instructions


FIGURE 2
Seat with tightly rolled towel to recline seat halfway back at a $45^{\circ}$ 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.

COMMITTEE ON INJURY, VIOLENCE AND POISON PREVENTION, 2006-2007
Gary A. Smith, MD, DrPH, Chairperson
Carl R. Baum, MD
M. Denise Dowd, MD, MPH

Dennis R. Durbin, MD, MSCE
Kyran P. Quinlan, MD, MPH
Robert D. Sege, MD, PhD
Michael S. Turner, MD
Jeffrey C. Weiss, MD
Joseph L. Wright, MD, MPH

## LIAISONS

Julie Gilchrist, MD
Centers for Disease Control and Prevention

Lynne Haverkos, MD, MPH
Eunice Kennedy Shriver National Institute of Child Health and Human Development
Jonathan D. Midgett, PhD
Consumer Product Safety Commission
Lori Roche
Health Resources and Services Administration
Alexander "Sandy" Sinclair National Highway Traffic Safety Administration
Lynne J. Warda, MD
Canadian Paediatric Society

## STAFF

Bonnie Kozial

## COMMITTEE ON FETUS AND NEWBORN, 2006-2007

Ann R. Stark, MD, Chairperson
David H. Adamkin, MD
Daniel G. Batton, MD
Edward F. Bell, MD
Vinod K. Bhutani, MD
Susan E. Denson, MD
Gilbert I. Martin, MD
Kristi L. Watterberg, MD

## LIAISONS

Keith J. Barrington, MD
Canadian Paediatric Society
Gary D. V. Hankins, MD
American College of Obstetrics and Gynecology
Tonse N. K. Raju, MD
National Institutes of Health
Kay M. Tomashek, MD
Centers for Disease Control and Prevention
Carol Wallman, MSN, RNC, NNP National Association of Neonatal Nurses and Association of Women's Health, Obstetric and Neonatal Nurses

## STAFF

Jim Couto, MA

## REFERENCES

1. National Highway Traffic Administration. Research Note: Revised Estimates of Child Restraint Effectiveness. Washington, DC: US Department of Transportation, National Center for Statistics and Analysis; 1996. Available at: www.nhtsa.dot.gov/portal/site/nhtsa/ menuitem.e649cd1b2b018c7d8eca01046108a0c/. Accessed March 10, 2008
2. Bull M, Weber K, Stroup K. Automotive restraint systems for premature infants. J Pediatr. 1988;112(3):385-388
3. National Center for Safe Transportation of Children With Special Needs. Child Restraint System Test Results. Available at: www.preventinjury.org/uploads/researchinfo/ResearchInfo_ 11.pdf. Accessed April 9, 2009
4. Weber K. Crash protection for child passengers: a review of best practice. UMTRI Res Rev. 2000;31 (3):1-28
5. Willett LD, Leuschen MP, Nelson LS, Nelson RM Jr. Risk of hypoventilation in premature infants in car seats. J Pediatr. 1986;109(2):245-248
6. Salhab WA, Khattak A, Tyson JE, et al. Car seat or car bed for
very low birth weight infants at discharge home. J Pediatr. 2007;150(3):224-228
7. Kinane TB, Murphy J, Bass JL, Corwin MJ. Comparison of respiratory physiologic features when infants are placed in car safety seats or car beds [published correction appears in Pediatrics. 2006;118(5):2270]. Pediatrics. 2006;118(2):522-527
8. Bull MJ, Stroup KB. Premature infants in car seats. Pediatrics. 1985;75(2):336-339
9. Simsic JM, Masterson K, Kogon BE, Kirshbom PM, Kanter K. Pre-hospital discharge car safety seat testing in infants after congenital heart surgery. Pediatr Cardiol. 2008;29(1):142-145
10. Ramanathan R, Corwin MJ, Hunt CE, et al. Cardiorespiratory events recorded on home monitors: comparison of healthy infants with those at increased risk for SIDS. JAMA. 2001; 285(17):2199-2207
11. Willett LD, Leuschen MP, Nelson LS, Nelson RM Jr. Ventilatory changes in convalescent infants positioned in car seats. J Pediatr. 1989;115(3):451-455
12. Merchant JR, Worwa C, Porter S, Coleman JM, deRegnier RA. Respiratory instability of term and near-term healthy newborn infants in car safety seats. Pediatrics. 2001;108(3): 647-652
13. Bass JL, Mehta KA, Camara J. Monitoring premature infants in car seats: implementing the American Academy of Pediatrics policy in a community hospital. Pediatrics. 1993;91(6):1137-1141
14. Hunt CE, Corwin MJ, Baird T, et al. Cardiorespiratory events detected by home memory monitoring and one-year neurodevelopmental outcome. J Pediatr. 2004;145(4):465-471
15. Bass JL, Corwin M, Gozal D, et al. The effect of chronic or intermittent hypoxia on cognition in childhood: a review of the evidence. Pediatrics. 2004;114(3):805-816
16. American Academy of Pediatrics; American College of Obstetricians and Gynecologists. Neonatal complications. In: Guidelines for Perinatal Care. 6th ed. Washington DC: American College of Obstetricians and Gynecologists; 2007:251-301
17. Côté A, Bairam A, Deschenes M, Hatzakis G. Sudden infant deaths in sitting devices. Arch Dis Child. 2008;93(5):384-389
18. American Academy of Pediatrics, Committee on Injury and Poison Prevention. Transporting children with special health care needs. Pediatrics. 1999;104(4 pt 1):988-992
19. Callahan CW. Increased gastroesophageal reflux in infants: can history provide an explanation? Acta Paediatr. 1998;87(12): 1219-1223
20. Orenstein SR, Whittington PF, Orenstein DM. The infant seat as treatment for gastroesophageal reflux. N Engl J Med. 1983; 309(13):760-763
21. National Highway Traffic Safety Administration. National Standardized Child Passenger Safety Training Program. Available at: www.safekids.org/certification/index.html. Accessed March 12, 2008
22. American Academy of Pediatrics, Committee on Injury and Poison Prevention. Safe transportation of newborns at hospital discharge. Pediatrics. 1999;104(4 pt 1):986-987
23. National Center for Safe Transportation of Children With Special Needs. Special Needs Transportation: Restraints. Available at: www.preventinjury.org/SNTrestraints.asp. Accessed March 12, 2008
24. Stening W, Nitsch P, Wassmer G, Roth B. Cardiorespiratory stability of premature and term infants carried in infant slings. Pediatrics. 2002;110(5):879-883
25. American Academy of Pediatrics, Committee on Injury and Poison Prevention. Selecting and using the most appropriate car safety seats for growing children: guidelines for counseling parents. Pediatrics. 2002;109(3):550-553
26. Henary B, Sherwood C, Crandall J, et al. Car safety seats for children: rear facing for best protection. Inj Prev. 2007;13(6): 398-402
27. National Highway Traffic Safety Administration. Child Passenger Safety: A Parent's Primer. Available at: www.nhtsa.gov/ staticfiles/DOT/NHTSA/Traffic\%20Injury\%20Control/Articles Associated\%20Files/4StepsFlyer.pdf. Accessed April 9, 2009
28. Braver ER, Whitifield R, Ferguson SA. Seating positions and children's risk of dying in motor vehicle crashes. Inj Prev. 1998;4(3):181-187
29. Durbin D, Chen I, Smith R, Elliott M, Winston F. Effects of seating position and appropriate restraint use on the risk of injury to children in motor vehicle crashes. Pediatrics. 2005;115(3). Available at: www.pediatrics.org/cgi/content/full/115/3/e305

## James Whitcomb Riley Hospital <br> For Children <br> HOSPITAL DISCHARGE PROTOCOL ESSENTIALS

## PURPOSE

Promote safe transportation of high-risk infants.

## INCLUSION CRITERIA

1. Discharge/transfer in a child safety seat and
2. High-risk infants:
a. Less than 37 weeks gestational age at birth, or
b. Other medical conditions which place the infant at high risk for apnea
or oxygen desaturation.

## INSTRUCTION

1. Medical personnel should discuss child safety seat choices with the family and recommend guidelines regarding distances from the crotch strap to seat back ( $51 / 2$ inches) and from lower harness strap to seat bottom (10 inches). Examples of appropriate child safety seats for infants should also be communicated (see AAP Family Shopping Guide and information sheet). Medical personnel should discuss and demonstrate additions of rolls along the torso of the infant and behind the crotch strap. In addition, a small roll under the child safety seat base may be needed to provide optimal positioning of the seat to minimize forward slumping of the infant.
2. When an infant is to be discharged within the next seven days, an observation period in the INFANT'S PERSONAL child safety seat should be performed to monitor for possible apnea, bradycardia or oxygen desaturation. This will require the family to bring in their infant's safety seat and placement of the child in the safety seat while continuous apnea, bradycardia and oxygen saturation monitoring are used. In the event that a personal car seat is not available, monitoring in an approved car safety seat is acceptable.
3. It would be optimal to perform the observation period 1 to 7 days prior to discharge/transfer.
4. The observation period should begin after a greater than 1 hour interval from the last feeding. Duration of observation period: 60 minutes or estimated travel time, whichever is the longer period of time.

## INTERPRETATION GUIDELINES

1. No apnea ( $>20$ second cessation of respiratory effort), bradycardia ( $<80$ beats per minute) or oxygen desaturation ( $\mathrm{SaO} 2<88 \%$ ) during the observation period is considered a PASS.
2. If the infant develops apnea, bradycardia or oxygen desaturation (as defined in 1 above) the observation is considered a FAILURE.
3. In the event of apnea, bradycardia, and/or oxygen desaturation, clinical stimulation, repositioning, oxygen and other appropriate interventions should be performed and documented on the CAR SEAT MONITORING DATA FORM (to be placed in the chart). Verbal
communication of significant events are to be reported to the attending neonatal faculty or fellow.

## CLINICAL RESPONSE GUIDELINES

1. If the patient fails the observation period, the following response may be considered: Retesting in a completely supine or prone position in a car bed that meets or exceeds federal safety standards.
2. If the patient fails in a supine positioning or prone positioning, consideration should be given to other medical evaluation and intervention (i.e. Oxypneumocardiogram, polysomnogram, oxygen, methylxanthines, cisapride, etc.).
3. If the patient fails the observation period, the parents should be counseled to avoid the use of other upright positioning equipment including infant swings, infant seats, and infant carriers.
4. These are guidelines for child safety seat use; the recommendation of the physician may vary from these guidelines depending on individual circumstances and the physician's discretion.

## DOCUMENTATION

Documentation of PASS or FAIL should be made in chart and reported to the physician.

## CAR SEAT MONITORING-GUIDELINES FOR PHYSICIANS

Indications for car seat monitoring:

1. $<37$ weeks gestational age at birth
2. Infants at risk of apnea or oxygen desaturation

MD responsibilities:

1. Identify patient for monitoring prior to discharge (preferably 1-2 week prior)
2. Explain monitoring to families and request they bring in their baby's personal car seat or give permission to order car seat from hospital
3. Write order fro car seat monitoring
*Nurses will contact families by letter, at bedside, or phone. Will need MD support so patient discharges are not delayed.
4. Interpret results of monitoring, make recommendations, and sign Car Seat Monitoring Data Form in bedside chart (Discharge Planning Section).
*Marilyn Bull, M.D. and William Engle, M.D. are consultants if questions arise.
5. Parents may wish to forego car seat monitoring or go home in a car seat other than the one in which the baby was tested. If this occurs, this decision should be documented in the chart.

## FOLLOW UP FOR INFANTS WHO REQUIRE FLAT POSITIONING

Physicians may wish to consider scheduling a follow up home oxypneumocardiagram to be performed within several months with the infant positioned in the family's upright car seat to determine if it is no longer necessary for the infant to be positioned flat.

## FOR MORE INFORMATION, CONTACT:

1. Marilyn J. Bull, M.D., Medical Director, Automotive Safety for Children, Riley Hospital for Children, 702 Barnhill Drive, Room 1603, Indianapolis, IN 46202-5225, (317) 274-4955 OR (317) 274-2977 (regarding use of car safety seats, development of hospital systems to provide car safety seats)
2. William A. Engle, M.D., Associate Professor of Pediatrics, Section of Neonatal/Perinatal Medicine, Riley Research 208, 702 Barnhill Drive, Indianapolis, IN 46202-5225, (317) 274-4719 (regarding technical questions relating to monitoring of infants)

Reproduced by permission

# AMERICAN ACADEMY OF PEDIATRICS 

Committee on Injury and Poison Prevention

## Transporting Children With Special Health Care Needs


#### Abstract

Children with special health care needs should have access to proper resources for safe transportation. This statement reviews important considerations for transporting children with special health care needs and provides current guidelines for the protection of children with specific health care needs, including those with a tracheostomy, a spica cast, challenging behaviors, or muscle tone abnormalities as well as those transported in wheelchairs.


ABBREVIATION. FMVSS, Federal Motor Vehicle Safety Standard.

A11 children, including those with special health care needs, should have access to proper resources for safe transportation. Families and health care professionals should be informed of basic guidelines for selecting restraints, positioning children into them, and securing these restraints in all types of vehicles, primarily the family vehicle and school bus. ${ }^{1}$ Parents should be informed of the resources available for proper restraint of children with special health care needs during travel ${ }^{2}$ and thereby avoid use of substandard products, makeshift restraint systems, or unsafe methods of securement in motor vehicles.

Federal Motor Vehicle Safety Standard (FMVSS) 213, which regulates design and performance of child restraint systems, does not recognize that children with special needs may require the use of special occupant restraint systems. ${ }^{3}$ The standard also does not regulate specific design and performance criteria for occupant protection devices that can provide safe seating for children with disabilities. Crash testing of car safety seats that meet FMVSS 213 has been done with test dummies representing children without special medical problems that would affect restraint use in motor vehicles. The biomechanical effects of a crash on test dummies representative of children with special medical needs in any restraint system have not been studied. Further research is needed, including development of such test dummies by the National Highway Traffic Safety Administration to address these concerns.

Children with special needs should not be exempt from the requirements of each state's laws regarding child restraint and seat belt use. Pediatricians can serve as resources for information to legislators, policy makers, and law enforcement professionals, as

[^2]well as school officials who may be unaware of the importance and availability of occupant protection systems for children with special needs.

## IMPORTANT CONSIDERATIONS

1. The rear seat is the safest place for all children, and rear-facing car safety seats must never be placed in the front seat of a vehicle that has a front passenger air bag. The impact of a deploying air bag can severely injure or kill an infant or small child. Children may also be at risk of injury if they are out of position or lie against the door of a vehicle with a side air bag.
2. For a child with special health care needs who requires frequent observation during travel and for whom no adult is available to accompany the child in the back seat, an air bag on/off switch should be considered for the vehicle.
3. Instructions provided by the manufacturer of the vehicle and the manufacturer of the car safety seat must be followed
4. Plans for procurement of the most appropriate restraint and training for the proper use of the device and its installation in the vehicle should be incorporated into hospital discharge planning for all children with special needs. ${ }^{4}$ Any child with a medical problem should have a special care plan that includes what to do during transport if a medical emergency occurs.
5. Parents, health care professionals, and educators should be encouraged to incorporate a child's special transportation needs into the individual education plan developed with the school.
6. There have been rapid changes in development and availability of resources for safer transportation of children with special needs. The current version of the American Academy of Pediatrics' "Car Seat Shopping Guide for Children With Special Needs" should be a helpful reference for health care professionals, parents, and school transportation providers. ${ }^{5}$
7. For additional information on transporting newborns or premature infants and children with special needs on school buses, refer to the appropriate policy statements by the American Academy of Pediatrics. ${ }^{6,7}$

## GUIDELINES FOR PROTECTION

Although research has been limited, current information suggests the following guidelines be adhered to when selecting an appropriate occupant protection system and positioning a child with special needs properly.

## General: Infants and Young Children

1. The child restraint system should meet FMVSS 213. ${ }^{3}$ Standard child restraint devices may be used for many children with special health care needs, and, whenever possible, a standard child restraint is the preferable choice. Use of a "special" child restraint system for a child with health care needs often may be postponed until a child exceeds the physical limitations of a car safety seat.
2. Car restraint systems should not be modified or used in a manner other than that specified by the manufacturer unless the modified restraint system has been crash tested and has met all applicable Federal Motor Vehicle Safety Standards approved by the National Highway Traffic Safety Administration.
3. Infant-only car safety seats with capacity to recline are useful for infants with many medical problems, especially respiratory conditions. Some convertible car safety seats also can be used in the rear-facing position for children up to a weight of $13.5 \mathrm{~kg}(30 \mathrm{lb})$. These restraints may be especially useful for children with poor head and neck control.
4. If the child's head drops forward while in a rearfacing car safety seat because the position of the seat is too upright, a roll of cloth can be wedged in the vehicle seat crease and under the car safety seat base at the child's feet, so that the child reclines at no more than a $45^{\circ}$ angle or as specified in the manufacturer's instructions (Fig 1).
5. Premature and small infants should not be placed in car safety seats with a harness-tray/shield combination or an armrest that could directly contact the infant's neck or face during an impact. ${ }^{4,7,8}$
6. Car safety seats with five-point harnesses anchored at both shoulders, both hips, and between the legs, can be adjusted to provide good upper torso support for many children with special needs.


Fig 1. Rear-facing seat with wedge to recline seat at a $45^{\circ}$ tilt.

## General: Older Children and Adolescents

1. When a child has outgrown a car safety seat, other choices are available for proper and secure occupant restraint. Some systems provide for full support for the child's head, neck, and back and accommodate children up to $47.2 \mathrm{~kg}(105 \mathrm{lb})$. Others, such as the conventional E-Z-On Vest (E-Z-On Products, Jupiter, FL), can be used to provide additional trunk support for a child who already has stable neck control. Tethers, additional lap seat belts, or appropriate tie-down systems are required for some of these devices and should be a consideration for selection and proper use (Fig 2).
2. Some older children with disabilities can be transported in a special needs belt-positioning booster or a conventional belt-positioning booster for trunk support. The booster seats help to position the shoulder and lap belt across the child's chest and pelvis.
3. Conventional lap-shoulder belt systems may also be useful in providing for chest restraint of some children with special needs. Lap-shoulder belts should be used properly. Lap belts should be low and flat across the child's hips, and the shoulder belt should be snug across the chest. If a lap belt lies on the child's abdomen or if a shoulder belt rests on a child's neck, use of a belt-positioning booster seat will help assure proper placement of the belts. The shoulder belt should never be placed underneath the child's arm(s) or behind the child's back.

## TRACHEOSTOMIES

Infants and children with a tracheostomy should not use child restraint systems with a harness-tray/ shield combination or an armrest. On sudden impact, the child could fall forward causing the tracheostomy to contact the shield or armrest, possibly resulting in injury and a blocked airway. ${ }^{9}$ A rearfacing car safety seat with a three-point harness or a


Fig 2. Large child forward-facing safety seat with tether anchored to vehicle.
car safety seat with a five-point harness should be selected for children with a tracheostomy.

## MUSCLE TONE ABNORMALITIES

1. For toddlers with poor head control, a convertible car safety seat approved by the manufacturer for use in a semireclining position when facing forward may be beneficial.
2. Crotch rolls, made with a rolled towel or a diaper, may be added between the child's legs and the crotch strap to keep the hips against the back of the seat and prevent the child from slumping forward in the seat. This modification should be used for any child who cannot maintain appropriate posture.
3. Lateral support may be provided with rolled blankets, towels, or foam rolls (Fig 3).
4. Soft padding that does not alter the function of the harness may be positioned behind the neck and on either side of the head to promote anatomic alignment. However, padding should never be placed behind or under the child in the seat. ${ }^{10}$ Soft padding (such as blankets, pillows, or soft foam) compresses on impact and can prevent harness straps from maintaining a secure, tight fit on a child's body (Fig 3).
5. A foam roll or rolled blanket may be placed under a child's knees to inhibit hypertonicity or opisthotonic posturing (Fig 3).

## PRONE AND SUPINE POSITIONING OF INFANTS

Infants who must lie prone after surgical repair of myelomeningocele or infants who must lie prone to maintain an open airway, such as those with Pierre Robin sequence, may require a restraint that allows prone positioning. 5 ,11,12

## SPICA CASTS

1. For children with spica casts, a specially modified convertible car safety seat, the Spelcast (Snug Seat, Inc, Matthews, NC), has cut-away sides and seat


Fig 3. Child in convertible car seat with soft padding behind the neck, on either side of the head and along the sides to promote anatomic alignment. Foam roll or rolled blanket may be placed under knees to inhibit hypertonicity.


Fig 4. Child with spica cast seated in modified seat with cut-away sides and seat bottom.
bottom that provide room for a comfortable and snug fit into the restraint system (Fig 4). This seat fits infants up to a weight of $9.0 \mathrm{~kg}(20 \mathrm{lb})$ (rearfacing position) and toddlers who weigh up to $18.0 \mathrm{~kg}(40 \mathrm{lb})$ (front-facing position).
2. Many older toddlers and preschool and schoolaged children in body or hip spica casts have limited resources available for safe transport in motor vehicles. One resource, the modified E-Z-On Vest, has performed satisfactorily during dynamic crash testing with a test dummy weighted to $47.2 \mathrm{~kg}(105 \mathrm{lb})$ and is available commercially. Two sets of seat belts routed through the vest are used to secure the child at the child's side against the vehicle seat. An ancillary belt loops around the casted leg or legs at the knees and is routed through the other seat belt (Fig 5). When it is not possible to fit a child onto a vehicle seat, use of an ambulance for transport is recommended. For lateral positioning on the vehicle seat (eg, as required by a car bed restraint or the modified E-Z-On Vest), position the child's head as far as possible from the side of the vehicle (Fig 6).

## CHALLENGING BEHAVIOR

1. Older children with hyperactivity, autism, or emotional problems may require a safety restraint


Fig 5. Child with modified E-Z-On Vest (E-Z-On Products, Inc, Jupiter, FL).


Fig 6. Infant positioned supine in the Ultra Dream Ride car bed (Cosco, Columbus, IN).
that is less likely to be unbuckled by the child. High back booster seats with internal harnesses that have seat belts routed underneath the seat base may be helpful in reducing the child's likelihood of unbuckling the restraint during travel. Large child car safety seats with a 5-point harness may be required for children weighing over 40 lb who cannot be restrained in a belt positioning booster seat with only a lap/shoulder harness.
2. Vests with rear back closure also may be helpful for use with children who have behavioral problems that may interfere with safe travel. ${ }^{5}$

## WHEELCHAIR TRANSPORTATION

Any child who can assist with transfer or be "reasonably" moved from a wheelchair, stroller, or special seating device to the original manufacturer's forward-facing vehicle seat equipped with dynami-cally-tested occupant restraints or be "reasonably" moved to a child restraint system complying with FMVSS 213 requirement should be so transferred for transportation. The unoccupied wheelchair also should be secured adequately in the vehicle to prevent it from becoming a dangerous projectile in the event of a sudden stop or crash. ${ }^{13}$

Occupied wheelchair(s) should be secured in a forward-facing position. Any occupied wheelchair should be secured with four-point tie-down devices. Lap boards or metal or plastic trays attached to the wheelchair or to adaptive equipment should be removed and secured separately for transport. An occupant restraint system that has been tested at 30 mph and 20G force conditions and that includes upper torso restraint (ie, shoulder harness) and lower torso restraint (ie, a lap belt over the pelvis) should be provided for each wheelchair-seated occupant. ${ }^{14}$ Head bands should not be used to restrain the child's head separately from the torso.

## EQUIPMENT TRANSPORTATION

1. When a child with special needs is in transit, ancillary pieces of medical equipment (eg, walkers, crutches, oxygen tanks, monitors) should be
secured on the vehicle floor; underneath a vehicle seat or wheelchair; or to the bus seat, bus floor, or bus wall below the window line so that they do not become a projectile during a crash and strike an occupant.
2. Electrical equipment for use during transit should have portable self-contained power for twice the expected duration of the trip. For improved safety, lead acid batteries or electrically powered wheelchairs or other mobile seating devices and respiratory systems should be converted, when possible, to gel-cell or dry-cell batteries. To house and protect batteries during everyday use, transportation, and collision, the use of external battery boxes is recommended.

## RESOURCE AVAILABILITY

The National Easter Seal Society (800-221-6827) can assist identifying local community resources for procurement of specific restraint systems. ${ }^{5}$

```
Committee on Injury and Poison Prevention,
        1999-2000
Marilyn Bull, MD, Chairperson
Phyllis Agran, MD, MPH
Danielle Laraque, MD
Susan H. Pollack, MD
Gary A. Smith, MD, DrPH
Howard R. Spivak, MD
Milton Tenenbein, MD
Susan B. Tully, MD
Liaison Representatives
Ruth A. Brenner, MD, MPH
        National Institute of Child Health and Human
        Development
Stephanie Bryn, MPH
    Maternal and Child Health Bureau
Cheryl Neverman, MS
    National Highway Traffic Safety Administration
    Richard A. Schieber, MD, MPH
        Centers for Disease Control and Prevention
    Richard Stanwick, MD
        Canadian Paediatric Society
    Deborah Tinsworth
        US Consumer Product Safety Commission
    William P. Tully, MD
        Pediatric Orthopaedic Society of North America
Section Liaison
Victor Garcia, MD
        Section on Surgery
    Consultant
    Murray L. Katcher, MD, PhD
```


## REFERENCES

1. American Academy of Pediatrics, Committee on Injury and Poison Prevention. Selecting and using the most appropriate car safety seats for growing children: guidelines for counseling parents. Pediatrics. 1996;97: 761-763
2. Stout JD, Bull MJ, Stroup KB. Safe transportation for children with disabilities. Am J Occup Ther. 1989;43:31-36
3. National Highway Traffic Safety Administration: Federal Motor Vehicle Safety Standards; child restraint systems; child restraint anchorage systems. Federal Register. 2127(1999)
4. American Academy of Pediatrics, Committee on Injury and Poison Prevention. Safe transportation of newborns at hospital discharge. 1999; 104;986-987
5. American Academy of Pediatrics. Car Seat Shopping Guide for Children

With Special Needs (brochure). Elk Grove Village, IL: American Academy of Pediatrics; 1998
6. American Academy of Pediatrics, Committee on Injury and Poison Prevention. School bus transportation of children with special needs. Pediatrics. 1994;93:129-130
7. American Academy of Pediatrics, Committee on Injury and Poison Prevention and Committee on Fetus and Newborn. Safe transportation of premature and low birth weight infants. Pediatrics. 1996;97:758-760
8. Weber K. Rear-facing restraint for small child passenger: a medical alert. University of Michigan Transportation Res Inst Res. 1995;25:12-17
9. Stroup KB, Wylie P, Bull MJ. Car seats for children with mechanically assisted ventilation. Pediatrics. 1987;80:290-292
10. Bull MJ, Stroup KB, Stout J, Doll JP, Jones J, Feller N. Establishing a
special needs car seat loan program. Pediatrics. 1990;85:540-547
11. Stroup KB, Weber K, Bull MJ. Safe Transportation Solutions for Children With Special Needs. In: 31st Proceedings of the American Association for Automotive Medicine; September 28-30, 1987; New Orleans, LA. Pages 297-307
12. Bull MJ, Stroup KB, Everly JS, Weber K, Doll J. Child safety seat use for infants with Pierre Robin sequence. Arch Pediatr Adolesc Med. 1994;148: 301-305
13. American Academy of Pediatrics, Committee on Injury and Poison Prevention. School transportation safety. Pediatrics. 1996;97:754-757
14. National Safety Council. National Standards for School Buses and School Bus Operations. Revised ed. Warrensburg, MO: Missouri Safety Center, Central Missouri State University; 1995

# Guideline for the Safe Transportation of Pre-school Age Children in School Buses 

National Highway Traffic Safety Administration<br>February 1999

Introduction

School age children transported in school buses are safer than children transported in motor vehicles of any other type. Large school buses provide protection because of their size and weight. Further, they must meet minimum Federal motor vehicle safety standards (FMVSSs) mandating compartmentalized seating, improved emergency exits, stronger roof structures and fuel systems, and better bus body joint strength.

As more pre-school age children are transported to school programs, often in school buses, the public is increasingly asking the National Highway Traffic Safety Administration (NHTSA) about how to safely transport them. To help answer these questions, NHTSA conducted crash testing of pre-school age size dummies in school bus seats. The test results showed that preschool age children in school buses are safest when transported in child safety restraint systems (CSRSs) that meets FMVSS 213, Child Restraint Systems, and are correctly attached to the seats.

Based on its research, NHTSA recommends pre-school age children transported in school buses always be transported in properly secured CSRSs. In partial response to questions from school (and child care) transportation offices, this Guideline seeks to assist school and other transportation managers in developing and implementing policies and procedures for the transportation of pre-school age children in school buses.

Note: The proper installation of CSRSs necessitates that a school bus seat have safety belts or other means of securing the CSRS to the seat. NHTSA recommends that lap belts or anchorages designed to meet FMVSS 225, Tether Anchorages and Child Restraint Anchorage Systems, be voluntarily installed to secure CSRSs in large school buses.

## RECOMMENDATIONS FOR THE TRANSPORTATION OF PRE-SCHOOL AGE CHILDREN IN SCHOOL BUSES

When pre-school age children are transported in a school bus, NHTSA recommends these guidelines be followed:
(1) Each child should be transported in a Child Safety Restraint System (suitable for the child's weight and age) that meets applicable Federal Motor Vehicle Safety Standards (FMVSSs).
(2) Each child should be properly secured in the Child Safety Restraint System.
(3) The Child Safety Restraint System should be properly secured to the school bus seat, using anchorages that meet FMVSSs.

## Child Safety Restraint System Defined

A Child Safety Restraint System is any device (except a passenger system lap seat belt or lap/shoulder seat belt), designed for use in a motor vehicle to restrain, seat, or position a child who weighs less than 50 pounds.

## Child Safety Restraint Systems Guideline

## 1. Child Safety Restraint System Specifications

The provider of the CSRS should ensure:
Each pre-school age child to be transported has a CSRS appropriate for the child's weight, height, and age.

Each CSRS meets all applicable FMVSSs (look for the manufacturer's certification on the label attached to the system).

Each CSRS has been registered with the CSRS's manufacturer to facilitate any recalls the manufacturer might conduct.

If the CSRS is the subject of a recall, any necessary repairs or modifications have been made to the manufacturer's specifications.

Each CSRS is maintained as recommended by its manufacturer, including disposal of any CSRS that has been involved in a crash.

## 2. Proper Securement

The transportation provider should ensure:
The CSRS is used and secured correctly in the school bus.

Each child is secured in CSRSs according to manufacturer's instructions.
All CSRS attachment hardware and anchorage systems meet FMVSS 210, Seat Belt Assembly Anchorages or FMVSS 225, Tether Anchorages and Child Restraint Anchorage Systems.

School bus seats designated for CSRSs meet FMVSS 225, or include lap belts that meet FMVSS 209, Seat Belt Assemblies, and anchors that meet FMVSS 210 (designed to secure adult passengers or CSRS).

Personnel responsible for securing CSRSs onto school bus seats and children into CSRSs are properly trained and all personnel involved with CSRSs are provided up-to-date information and training.

When transported in the school bus, pre-school age children are supervised according to their developmental and functioning level.

## 3. School Bus Seats Designated for Child Safety Restraint Systems

The transportation provider should ensure:
School-bus seats designated for CSRSs are located starting at the front of the vehicle to provide drivers with quick access to and a clear view of the CSRS occupants.

CSRS anchorages on school bus seats should meet all applicable FMVSSs.
When ordering new school buses, the maximum spacing specified under FMVSS No. 222, School Bus Passenger Seating and Crash Protection, (within 24 inches from the seating reference point) is recommended for seats designated for CSRSs to provide adequate space for the CSRSs.

The combined width of CSRS and/or other passengers on a single seat does not exceed the width of the seat.

If other students share seats with the CSRSs, the CSRSs are placed in window seating position.

## 4. Retrofitting School Buses

The transportation provider should ensure:
Existing school bus seats should only be retrofitted with lap belts or child restraint anchorages as instructed by the school bus manufacturer.

When a school bus is retrofitted with a seat to allow for proper securement of a CSRS, instructions obtained from the school bus or seat manufacturer on how to install the seat and restraint systems should be followed.

When a school bus is retrofitted, the bus owner should ensure that seat spacing is sufficient for the CSRS to be used.

## 5. Evacuation

The transportation provider should ensure:

The establishment of a written plan on evacuating pre-school age children and other passengers in CSRSs in the event of an emergency. This written plan should be provided to drivers, monitors, and emergency response personnel. The plan should explicitly state how children (both in and out of the CSRS) should be evacuated from the school bus.

Evacuation drills are practiced on a scheduled basis, at least as often as that required for the school system's school-aged children.

All personnel involved in transporting children are trained in evacuation and emergency procedures, including those in the written school bus evacuation plan.

All school buses carrying children in CSRSs carry safety belt cutters that are accessible only to the driver and any monitors.

CSRSs are not placed in school bus seats adjacent to emergency exits.
Local emergency response teams are provided copies of the written school bus evacuation plan, including evacuation of pre-school age children. Emergency response personnel should be invited to participate in evacuation drills.

## 6. Other Recommendations

The school transportation provider should establish a policy on whether they or the child's guardian must supply a CSRS to be used on a school bus.school bus purchases should be based on the needs of a projected student population, taking into consideration projected ages, sizes, and other characteristics of the students, including any special needs, and whether pre-school age children or medically fragile students will be transported.

Specified procedures should be established for loading and unloading children in CSRSs.
Procedures should be established for the periodic maintenance, cleaning, and inspection for damage of CSRSs. Procedures should be established to train personnel involved in direct service delivery of infants, toddlers, and pre-school children on the physical day-to-day handling of these young children and means to handle potential exposure to contagious and communicable diseases.

When school bus procedures are established, it should be noted that some children in CSRSs may have special needs, including medical fragility, that must be addressed on a child-by-child basis.

## School Transportation Safety

Committee on School Health and Committee on Injury and Poison Prevention


#### Abstract

The following policy statement is a revision of the American Academy of Pediatrics' 1985 statement entitled "School Bus Safety." It provides updated information regarding relevant federal regulations and outlines recommendations that can enhance community systems for addressing school bus safety education, awareness, and practices. Pediatricians can assist in thls process by sharing these recommendations at both the community and state levels.


According to Special Report 222 of the Transportation Research Board of the National Research Council, in the United States approximately 400000 school buses are used to transport 25 million children nearly 4 billion miles to and from school and school activities each year. Approximately $85 \%$ of these buses are the large, type I school buses that carry more than 16 passengers and are usually not equipped with lap belts. Children riding in small school buses built in accordance with federal safety standards, including lap belts, fared very well in 24 crashes investigated by the National Transportation Safety Board. Children riding in type I school buses fared less well; school bus safety records, however, are considerably better than the safety records for private vehicles.
Given the high numbers of children transported and miles traveled annually, the levels of deaths and injuries to children as a result of school bus-related crashes are relatively low. Of the approximately 150 persons killed in school bus-related events each year, only $12 \%$ are passengers on the buses $8 \%$ student passengers, $2 \%$ adult passengers, and $2 \%$ drivers. The remaining deaths are of occupants of other motor vehicles ( $5 \%$ ), bicyclists $(3 \%$ ), and pedestrians ( $30 \%$ ). Of the fatally injured pedestrians, $84 \%$ were school aged and $16 \%$ were adults. Seventy percent of the victims were struck by school buses. The majority of pedestrians killed were young children who were struck by their own school buses. The number of injuries from school bas-related events is estimated to be 19000 per year, and most injuries are minor. Half of these injuries are sustained by school bus passengers. An estimated $4 \%$ of school busrelated injuries are sustained by pedestrians and are typically more severe.
Public outcry and demands for change predictably surface when tragic crashes occur, even though the

The moomwendations is this statenest de nor indicate as exchnive course of trestment er merve as a stendand of medical care. Variations, taling into stovent insivit at circumitanons, muy tw apporpetate.
 etry of Pediantics.
frequency of on-board deaths and injuries on school buses remains lower than that of incidents outside of the buses. Expectations for school bus safety should be upheld not as a result of public reactions, but from an ongoing commitment from communities and states to assuring the safest ride possible for children on school buses. Because travel by school bus plays such a consistent and long-term role in the daily lives of children from preschool through high school, pediatricians can help by serving as resources, educators, consultants, and advocates for school bus safety.

The National Traffic and Motor Vehicle Safety Act of 1966 authorizes the Department of Transportation to issue minimum standards for new school buses manufactured for sale in the United States. ${ }^{2}$ This act was amended in 1974,' and the National Highway Traffic Safety Administration (NHTSA) developed the current minimum performance standards for school buses manufactured after April 1, 1977.' In recent years, school bus safety in the United States again has been closely scrutinized. Although certain topics continue to be controversial, there is a strong consensus regarding most issues. The recommendations below are derived from several recent studies. ${ }^{-\rightarrow}$

## RECOMMENDATIONS

## School Bus Safety

1. Many school systems provide for the transportation of preschool children. The use of child safety seats and other restraint systems on school buses for preschool chuldren is recommended as a necessary practice to keep preschool children secured on the school bus seats. All restraint systems used during school bus transport should meet the requirements of Federal Motor Vehicle Safety Standard 213.4 The American Academy of Pediatrics (AAP) recommends that school districts provide appropriate and federally approved chald restraint systems for pre-kindergarten-aged children riding in school buses. Children with special needs and who are older than that age and require restraint should be evaluated individually to determine the most appropriate restraint that meets their needs for positioning during travel, regardless of their age, weight, and height. Further recommendations are outlined in the AAP policy statement on transportation of children with special needs."
2 Compartmentalization, or keeping child passengers confined to a padded compartment in a crash, is the major principle by which school bus passengers are currently protected. In general, the higher the
seat back and the closer the spacing between rows, the better the compartmentalization of passengers in a crash. Current provisions are for a seat back height of 20 in above a reference point (about 22 in measured from the seat surface). A study committee of the National Transportation Safety Board has issued a recommendation that the NHTSA revise Federal Motor Vehicle Safety Standard 222 (School Bus Safety and Interions) to require that seat backs be 24 in above the reference point. Seat backs would be slightly more than 26 in from the seat surface.' The AAP supports this recommendation.
2. The issue of school bus safety has been linked frequently with concerns about whether school buses should be required to have safety belts for all passengers. It is estimated that the use of seat belts on large, type I buses may reduce deaths and injuries by $20 \%$, with an assumption that use rates are only $50 \%$ ' Belt use rates can be significantly increased through education and monitoring, and, therefore, effectiveness estimates can be enhanced when all students consistently wear the belts correctly. An additional benefit of seat belt use in buses is that it reinforces seat belt use in private vehicles. Although the cost-effectiveness of seat belt use on school buses may remain controversial, the AAP recommends the installation of seat belts on all newly purchased school buses. School districts that provide seat belts on school buses must ensure the appropriate education of administrators, students, teachers, drivers, and parents in their use.
3. All school buses should be equipped with the following to prevent pedestrian injury: eight warning and loading lights (two flashing red and two flashing amber lights on both the front and back of the bus), stop signal arms, and a cross-view mirror system. The bus should meet all current recommendations for mirrors, including two large round mirrors that allow the driver to view more fully the front of the bus. Additionally, districts should consider installing strobe lights for use during reduced-visibility conditions, an external loudspeaker system to enable the driver to communicate with children outside of the bus, and loading and backing alarms or pulsating backup horns." Electronic sensor systems are available but have not been evaluated adequately. ${ }^{1}$
4. It is recommended that school buses be equipped with brake retarder systems, which may be effective in reducing serious injuries and deaths attributable to sudden stops.
5. Mandatory state school bus inspections are recommended.
6. The state highway patrol (or other independent agency) should make detailed, unexpected, random school bus inspections in addition to regular annual school bus inspections
7. All school buses, including private, for hire, and those for parochial schools, need to be in compliance with all federal regulations. Buses built before 1977 should be retired from use.
8. The use of wheelchairs is common for school bus transportation of children with disabilities. The AAP recommends that states adopt the requirements for
the use of wheelchairs on school buses outlined in the 1995 National Standards for School Buses.

## School Bus Driver Selection and Triining

School bus drivers should meet the following requirements annually:

1. Maintain a valid commercial driver's license;
2. Be a minimum of 21 years of age;
3. Show proof of a yearly health examination, including vision and hearing assessments, which documents the absence of problems that may compromise driving and child supervision;
4. Maintain a satisfactory driving record as determined by the school district and successfully pass a review for a criminal record, including child sexual abuse and incidents or arrests for driving under the influence of alcohol or other drugs;
5. Attend a minimum of 6 hours of instruction and successfully complete a written or oral test covering driver duties, bus operating procedures, traffic and school bus laws and regulations, record keeping, emergency and crash-related procedures, first aid, basic appreciation of the developmental stages and needs of school-aged children, child supervision responsibilities, and transportation of passengers with special needs;
6. Pass a driving performance test and demonstrate safe loading and unloading procedures; and
7. Pass a test for illicit drugs and alcohol as required by the district mandatory testing is recommended if it is not already required.

## School Bus Passenger Instruction

Passengers of all ages need to be taught safe riding and pedestrian behavior, no matter how infrequently they ride the bus, Instruction should include safe pedestrian practices going to and from the bus stop, safe behavior while waiting at the bus stop, safe practices for boarding and disembarking from the bus, safe behavior on the bus, and procedures for emergency situations.

## School Bus Passenger Supervision

Adult supervision on school buses should focus on ensuring that passengers stay seated, use seat belts when available, and keep arms and beads inside windows; assisting in handling emergencies; assisting passengers with special needs; and escorting children across busy roadways. These objectives can best be met by a second adult (other than the driver) serving as a monitor on the school bus.

## School Bus Routes and Stops

Bus routes should avoid the need for the bus to back up, should minimize traffic disruptions, should provide good fields of vision at all stops, and should minimize the need for children to board or leave the bus on, or cross, a busy roadway. It is recommended that an adult supervise children who must cross a roadway after leaving a school bus.

## The Pediatrician's Role

Pediatricians can play important roles at the community, state, and national levels as child advocates and consultants to schools about transportation safety.

## Commanity Level

1. Inquire about current policies relating to school transportation. Find out mechanisms for proposing needed changes, and serve as a resource to the deci-sion-making body.
2. Inquire about and help develop local training programs for bus drivers. Participate in planning and arranging delivery of local training for bus drivers in areas relating to child development and behavior, child safety seat use and positioning needs, and safety belt use. Provide direction for the development of test materials to evaluate driver competency in these areas.
3. Share and promote the recommendations of this policy statement at local school district meetings.
4. Encourage the development and distribution of educational materials on school bus safety through the local school systems.
5. Serve as consultants to local transportation directors, state directors of school transportation, or school boards on the physical and emotional development of preschool children and assist in developing training materials for transportation providers.

## State Level

1. Contact state directors of school transportation and request a copy of current state specifications for school buses. Compare this information with recommendations by National School Bus Safety Standards ${ }^{\text {t }}$ and urge revisions of state specifications, if necessary, through appropriate decision-making channels at the state level.
2. Volunteer to serve on a writing committee for state specifications. Share information from AAP policy statements and recommendations by National School Bus Safety Standards.
3. Contact state departments of education and recommend the development of information on school bus safety for statewide distribution to elementary schools.
4. Serve as a resource and consultant to the state department of education regarding training of bus drivers in areas relating to child passenger safety and child development and behavior.

## National Level

The AAP recommends that research be directed toward understanding how child restraint systems perform under dynamic conditions when secured on the school bus seat. This research would assist the NHISA in assessing requirements for the dimensions of school bus seats (depth, height, and recline angles) to provide for the proper and secure restraint of preschool-aged children.

Commitien on Scaoot. Healtic, 1995 to 19\%
Paula Duncan, MD, Chair
David A. Cimino, MD
Debra E. Seltzer, MD
Howard L. Taras, MD
Susanne T. White, MD
Wayne A. Yankus, MD
Liaison Representatives
Laura Brey
American Medical Association
Stephen Barnett, MD
American School Health Association
Maurees Glendon, RN, CRNP
National Association of Pediatric Nurse Associates
and Practitioners
Karl Hertz, PhD
American Asscciation of School Administrators
Yvonne Lagasse, RN
National Association of School Nurses
Mark Contley, MD
American Acadenvy of Family Physicians
Mary Vernon, MD, MPH
Centers for Disease Control and Prevention
James H. Williams, MEd
National Education Association
Commitres on bejurt and Ponson Privintron, 1995 то 1996
Murray L. Katcher, MD, PhD, Chair
Marilyn J. Bull, MD
S. Donald Palmer, MD

George C. Rodgers, Jr, MD, PhD
Barbara L Smith, MD
Howard R. Splvak, MD
Susan B. Tully, MD
Laason Rerkisentatives
Pbyllis Agran, MD, MPH
Ambulatory Pediatric Assoclation
Stephanie Brymn
Maternal and Child Health Buresu
Dayle L. Maples, MD
Pediatric Orthopaedic Society of North America
Cheryl Neverman
US Dept of Transportation
Peter Scheidt, MD, MPH
National Institute of Child Health and Human
Development
Richard A. Schieber, MD, MPH
Centers for Disease Control and Prevention
Milton Tenenbein, MD
Canadian Pwediatric Society
Deborah Tinsworth
US Consumer Product Safety Commission
Section Liaison
James Griffith, MD
Section on Injury and Poison Prevention

## REFERENCES


 19 \%
2. Rubl No topsue 1902
2. US Department ef Traspertabion, National Mighway Tranoportation


 Act if 196. Whaliggion, DC. US Department of Tressporwion 1977 . Report (DOTN HS*M2 171
4. $40 \mathrm{CFI} \$ 400-90$
5. National Tramportation Selery Boavi, Burnau of Salety Pograma.
 ingtion, DC. National Trunuportation Selity Soard, 10E


7. Colorade Schoel Ban Cominites, Gevenor's Tratlic Salery Adviery Committec. Colmale Scherl hat Solty Roprt. Desver, CO Colonsto Schoot Bus Commines 1ses


 196
9. Amerian Acodesy of Netiarias, Comninee on Injury and Nowon Prevention Trunaporting allitren wath special needs Safr Kidr Mnin 19pol2Winter

# AMERICAN ACADEMY OF PEDIATRICS 

Committee on Injury and Poison Prevention

## Restraint Use on Aircraft


#### Abstract

Occupant protection policies for children younger than 2 years on aircraft are inconsistent with all other national policies on safe transportation. Children younger than 2 years are not required to be restrained or secured on aircraft during takeoff, landing, and conditions of turbulence. They are permitted to be held on the lap of an adult. Preventable injuries and deaths have occurred in children younger than 2 years who were unrestrained in aircraft during survivable crashes and conditions of turbulence. The American Academy of Pediatrics recommends a mandatory federal requirement for restraint use for children on aircraft. The Academy further recommends that parents ensure that a seat is available for all children during aircraft transport and follow current recommendations for restraint use for all children. Physicians play a significant role in counseling families, advocating for public policy mandates, and encouraging technologic research that will improve protection of children in aircraft.


ABBREVIATIONS. AAP, American Academy of Pediatrics; CSSs, child safety seats; FAA, Federal Aviation Administration; NTSB, National Transportation Safety Board; CFR, Code of Federal Regulations; CAMI, Civil Aeromedical Institute; SAE, Society of Automotive Engineers.

## INTRODUCTION

Children younger than 2 years are the only occupants who, under current federal regulation, are not required to be restrained or secured on aircraft during takeoff, landing, and conditions of turbulence; even items such as coffee pots must be secured. This practice relating to nonrestraint of children on airplanes is inconsistent with all occupant protection recommendations of the American Academy of Pediatrics (AAP) in which priority has been placed on safe transportation of children. Many child safety seats (CSSs) used in motor vehicles are also approved for use on aircraft. The Federal Aviation Administration (FAA) has stated that proper use of an approved CSS for aircraft enhances child safety in the event of turbulence or a crash, and the FAA informs parents that a "safety seat can be the most important carry-on item of all." ${ }^{1}$ The FAA strongly recommends but has not yet mandated that all children who fly, regardless of age, should be restrained in the appropriate CSS for their weight and size used in conjunction with the aircraft seat belt.
In a 1996 report to the President of the United

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.
PEDIATRICS (ISSN 0031 4005). Copyright © 2001 by the American Academy of Pediatrics.

States, the White House Commission on Aviation Safety and Security stated that it is inappropriate for infants to be afforded a lesser degree of protection than that for older passengers. ${ }^{2}$ The Commission recommended that the FAA revise its regulations to require that all occupants be restrained in aircraft during takeoff, landing, and conditions of turbulence and that all infants and small children whose weight is less than 40 lb and whose height is less than 40 in be restrained in an aircraft-approved CSS. The Association of Flight Attendants and the National Transportation Safety Board (NTSB) have called for federal regulation requiring appropriate restraint use. ${ }^{3-5}$ The NTSB has also called for the FAA to develop standards for CSS use in aircraft. The FAA has argued that a mandatory requirement for CSS use on aircraft will result in more injuries and deaths to infants and toddlers because parents would not be willing to buy a ticket to reserve a seat for the infant and would opt to travel by car instead ${ }^{6}$; however, no data support this argument.

## CURRENT POLICY FOR CHILDREN

Children younger than 2 years are currently allowed to be held in an adult's lap throughout a commercial aircraft flight, as stipulated by the US Code of Federal Regulations (CFR). ${ }^{7}$ Alternatively, parents may choose to use a CSS certified under the Federal Motor Vehicle Safety Standards and Regulations for travel in aircraft and motor vehicles. ${ }^{8}$ Airlines are required to accommodate the use of approved CSSs for young children with tickets; however, the child must occupy a window seat in a nonexit row. Although many airlines offer discounted rates for children younger than 2 years, these rates are often not advertised, and parents must ask to receive a reduced-rate ticket. If parents want to ensure that the child has a passenger seat in which the CSS can be used, they must purchase a ticket. If the child is held on the lap of an adult, no fare is charged for the child. Children 2 years and older are required to sit in their own passenger seat under the same regulations that apply to all other passengers.
In 1995, in the aftermath of serious and sometimes unexpected events of turbulence, the FAA issued a public advisory to airlines urging the use of seat belts at all times when passengers are seated. ${ }^{6}$ Some airlines now comply, but the requirement does not apply to children younger than 2 years because they are not required to be restrained at any time during the flight.

## BACKGROUND

Approximately 25000 commercial flights depart from and arrive at US airports daily. ${ }^{9}$ Although it is estimated that 4.6 million children younger than 2 years fly on US domestic airlines annually, inaccuracies in the passenger manifest, which contains the names of all passengers as required by the US CFR, make it difficult to obtain precise numbers. The NTSB has issued safety recommendations that require standardized reporting of all passengers. ${ }^{10}$

The risk of death or serious injury in an aircraft is exceedingly small. Using data from 1990 forward not controlled for age, the risk of death was calculated at 1 in 8 million. ${ }^{11}$ During 1996, there were 319 passenger fatalities and 77 serious injuries on US air carriers operating under the CFR. These data are not provided by year of age of passenger but include all scheduled and nonscheduled services on commercial and cargo carriers. ${ }^{12}$ Analysis of aircraft crashes from 1976 through 1979 in which there were fatalities and survivors revealed that unrestrained infant passengers had a relative mortality risk of 5.9 (United States) and 9.6 (worldwide), compared with restrained adult passengers. It could not be determined whether the higher risk of mortality for infants was attributable to lack of restraint use, fragility of infants, or both. ${ }^{13}$

In a study comparing persons fatally injured in aircraft in 1980 and 1990, blunt injury (in particular, head injury) from deceleration forces was the most important threat to survival. Head injuries were listed as the immediate cause of death in $33 \%$ of those younger than 15 years. ${ }^{14}$ As with other forms of transportation, effective restraint systems decrease the probability of head injury.

Turbulence is the leading cause of nonfatal injuries to aircraft passengers and flight attendants. From 1981 through 1997, there were 342 reports of turbulence affecting major airlines. Three passengers died, 80 had serious injuries, and 769 had minor injuries. ${ }^{15}$

A child on the lap of an adult cannot be effectively restrained in a motor vehicle or aircraft crash. A child who travels on the lap of another occupant or unrestrained in a motor vehicle has a substantially greater risk of injury and death, compared with a restrained child. ${ }^{16-18}$ Hazards associated with the on-lap position are also well documented in aircraft crash investigations. Three children on the laps of adults were fatally injured and others nonfatally injured in the 1987 crash in Denver, CO, the 1989 crash in Sioux City, IA, and the 1994 crash in Charlotte, NC - which were all caused by turbulence. ${ }^{19-21}$ The NTSB has reported 2 crashes in which CSSs were used and provided protection to children. ${ }^{3}$

## CERTIFICATION OF CSSs FOR USE ON AIRCRAFT

The FAA's Civil Aeromedical Institute (CAMI) has conducted studies on CSSs for use with aircraft seats. Crash testing of CSSs using child dummies in 1993 revealed that rear-facing CSSs performed well and could be installed with contemporary aircraft seat belts. However, 6 of the 8 tests with forward-facing CSSs resulted in Head Impact Criteria values of more
than 1000, which is the threshold for serious head impact in adults. Difficulty was encountered in securing some of the forward-facing CSSs to the aircraft seats. Moving the anchor points rearward resulted in improved performance of many CSSs; however, most aircraft have seats with poor belt anchor geometry. ${ }^{22}$
Certain restraints that are approved for use in motor vehicles are prohibited for use in aircraft (14 CFR 121.311). ${ }^{7}$ When tested, vest and harness type systems allowed excessive forward body excursion, causing the test dummy to slide off of the front of the seat, potentially impacting the seat in front and resulting in injuries. ${ }^{22,23}$ Shield type booster seats are incompatible with aircraft seats because of the seatback breakover feature common on airplanes.

## POTENTIAL NEW TECHNOLOGY

Testing has shown that aircraft seat belts alone do not adequately protect a child younger than 3 years. ${ }^{22,23}$ The CAMI has developed and fully tested a prototype aircraft seat insertion platform, which can be inserted under the CSS and secured to the aircraft seat with the seat belt. Seat belts attached to the platform are used to secure the CSS. The platform improves ease of installation and decreases the forward excursion of the CSS. A CSS designed for use in aircraft that could be used forward or rear facing is a second alternative. One such device is already approved and is being sold. A third alternative is modifying a certain number of passenger seats on each aircraft to accommodate and ensure adequate performance of CSSs. A relatively simple and low-cost modification has been successfully demonstrated at CAMI. The Society of Automotive Engineers (SAE) has recently adopted a performance standard for CSSs installed on airplane passenger seats. ${ }^{24}$ The objective of this standard is to establish performance criteria for CSSs when installed in airplane seats. The methods of meeting the SAE standard and the pass/ fail criteria are similar to those already imposed on CSSs by automotive regulations (49 CFR 571.213). Inclusion of the SAE standard in automotive regulations for CSSs should be considered.
A national symposium was held by the NTSB in 1999 to explore operation, design, regulations, and experience with CSSs nationally and internationally. ${ }^{25}$ At this meeting, FAA Administrator Jane Garvey announced ". . . We [FAA] are committed to 2 things-mandating the use of child restraint systems in aircraft and assuring that children are accorded the same level of safety as are adults." This statement clearly implies the FAA plans to move forward with regulatory actions mandating the use of effective CSSs in airplanes.

## ENFORCEMENT OF EXISTING RESTRAINT REQUIREMENTS FOR CHILDREN

The NTSB has documented events in which children 2 years and older have been transported on the lap of an adult. The NTSB has been concerned about the inadequacy and lack of enforcement of passenger protection regulations and has recommended that
the FAA implement measures for enforcing restraint regulation for children 2 years and older. ${ }^{26}$

## RECOMMENDATIONS

Consistent with national policies requiring restraint use in all vehicles, the AAP recommends that regulations be promulgated to ensure that all passengers, including those younger than 2 years, are afforded optimal protection during all phases of commercial and general aircraft flights. The AAP believes that children should be afforded the same protection as other passengers and that restraint use in aircraft for children younger than 2 years should be mandatory during takeoff, landing, and conditions of turbulence and should be recommended as much as feasible during flight as it is for all other passengers.

Pediatricians, federal agencies, and airlines are encouraged to work together to accomplish the following:

1. Implement mandatory restraint use requirements using aircraft-approved restraint systems and discontinue the policy of allowing children younger than 2 years to be held on the lap of an adult on aircraft.
2. Enforce current requirements for children older than 2 years, some of whom travel unrestrained and without tickets.
3. Establish standards for appropriate restraint use in aircraft for all children. Amend the CFR ${ }^{7}$ by adding a section on child restraint requirements on aircraft providing intrastate, interstate, or overseas transportation. Establish age and weight recommendations for use of CSSs similar to those for motor vehicles.
4. Provide information on current recommendations for the restraint of children younger than 4 years similar to AAP recommendations for restraint use in motor vehicles as follows ${ }^{27}$ :

- Children should be placed in a rear-facing CSS that is properly secured and installed until they are at least 1 year old and at least 20 lb in body weight.
- A forward-facing seat labeled for use on aircraft should be used for children at least 1 year old and 20 to 40 lb in body weight. The AAP is aware of the problems found by the CAMI study with forward-facing seats but believes that these seats afford more protection to children than do seat belts alone, no restraint use, or being held on a lap. The CSS manufacturers label seats that fit and can be satisfactorily restrained to an aircraft seat.
- According to the FAA, CSSs should not exceed 16 in wide for best fit in aircraft seats; this is especially important in small commuter aircraft.
- Children who weigh more than 40 lb can be secured in the aircraft seat belt. ${ }^{28}$

5. Establish international standards through the International Civil Aviation Organization requiring that passengers on civil aircraft be restrained during takeoff and landing and when directed by the captain of the aircraft.
6. On all types of passenger aircraft, pursue technologic solutions for improving restraint systems for children who are inadequately protected by existing child restraints or seat belt systems.
7. Educate all airline personnel who have contact with families regarding the importance of, and the requirements for, age-appropriate restraint use on aircraft. This includes travel agents, reservation/ gate agents, and cabin crew.
8. The airlines should make available to families CSSs that are compatible and effective in aircraft.
9. Encourage airlines to offer a discounted fare (or a rebate) for restrained children.
Pediatricians should convey the following information to parents:
10. All children should travel properly restrained on aircraft.
11. Similar to travel in motor vehicles, a child is best protected when properly restrained in a CSS appropriate for the age, weight, and height of the child, meeting standards for aircraft until the child weighs more than 40 lb and can use the aircraft seat belt. Child safety seat systems manufactured to US standards for aircraft use after February 26, 1985, bear the label: "This restraint is certified for use in motor vehicles and aircraft" in red letters. ${ }^{28}$
12. Families should explore options for ensuring that each child has an aircraft seat. Currently, to ensure that a child has a seat for the CSS, families must purchase a ticket and should specify a window seat next to the parent in a nonexit row for the CSS. However, it is suggested that parents ask the airline whether the purchase of a seat is required to use a CSS and consider asking for the information in writing. Parents should also ask and be advised about discounted fares and compare the benefits of various airlines. If no discounted or free fare is offered by any airline and it is not feasible to purchase a ticket, parents should select flights that are likely to have empty seats. Parents should inquire about the carrier's policy regarding use of empty seats. Parents who are traveling with CSSs should be reminded that they can request assistance from the airlines between connecting flights.
13. Parents can obtain additional information on safe air travel for children from the FAA (1-800-FAASURE and http://www.faa.gov/).

There is a need for accurate exposure data. Accurate passenger manifests should be generated to include all passengers on all flights. Standard reporting for all passenger injuries should be established and made available by age of passenger and restraint use. Epidemiologic studies and the evaluation of preventive measures may thus be conducted.

[^3]Gary A. Smith, MD, DrPH
Milton Tenenbein, MD
Joseph Wright, MD, MPH
Liaisons
Ruth A. Brenner, MD, MPH
National Institute of Child Health and Human Development
Stephanie Bryn, MPH
Health Resources and Service
Administration/Maternal and Child Health Bureau
Alexander Sinclair
National Highway Traffic Safety

## Administration

Richard A. Schieber, MD, MPH
Centers for Disease Control and Prevention
Lynn Warda, MD
Canadian Paediatric Society
Deborah Tinsworth
US Consumer Product Safety Commission
Consultants
Murray L. Katcher, MD, PhD
Van Gowdy
Howard R. Spivak, MD
Staff
Heather Newland

## REFERENCES

1. US Department of Transportation, Federal Aviation Administration. Are You Sure You Have Everything Baby Needs for the Flight? Washington, DC: Federal Aviation Administration. Pamphlet available from the FAA Consumer Hotline at 1-800-322-7873
2. White House Commission on Aviation Safety and Security. Final Report to President Clinton. Washington, DC: White House Commission on Aviation Safety and Security; February 12, 1997
3. Legislation to Require the Use of Child Safety Restraint Systems Aboard Aircraft. Hearings before the Subcommittee on Aviation of the Senate Committee on Transportation and Infrastructure, 104th Congress, 2nd Session (1996) (testimony of Barry Sweedler, Director, Office of Safety, Recommendations)
4. Hall J. Safety recommendation. [Letter to the Federal Aviation Administration]. Washington, DC: National Transportation Safety Board; May 16, 1995
5. Association of Flight Attendants. Position on Child Restraint Seats. Washington, DC: Association of Flight Attendants; 1997
6. National Transportation Safety Board. NTSB recommendations to the FAA with FAA responses 4/24/98. Washington, DC: Federal Aviation Administration, Office of System Safety; 1998
7. 14 CFR $\S 121$ (2000)
8. Federal Motor Vehicle Safety Standards and Regulations. 49 CFR §571.213 (1998)
9. Air Transportation Association. Year 2000 Annual Report. Washington, DC: Air Transportation Association; 2000
10. Barksdale BC. Child safety restraints: a controversy over safe infant air travel. J Air Law Commerc. 1991;57:201-255
11. US Department of Transportation, Federal Aviation Administration. Aviation safety data [database]. Available at: http://nasdac.faa.gov/ internet/. Accessed October 1, 2001
12. US Department of Transportation, Bureau of Transportation Statistics. Aviation safety data [database]. Available at: http://www/bts.gov/ ntda/sdfaa/. Accessed October 1, 2001
13. Fife D, Rosner B, McKibben W. Relative mortality of unbelted infant passengers and belted non-infant passengers in air accidents with survivors. Am J Public Health. 1981;71:1242-1246
14. Li G, Baker SP. Injury patterns in aviation-related fatalities. Implications for preventive strategies. Am J Forens Med Pathol. 1997;18:265-270
15. Federal Aviation Administration. Facts about turbulence. Available at: http://www.faa.gov/apa/TURB/Facts/fact.htm. Accessed August 8, 2001
16. Mohan D, Schneider LW. An evaluation of adult clasping strength for restraining lap-held infants. Hum Factors. 1979;21:635-645
17. Agran PF, Winn DG, Castillo DN. On-lap travel: still a problem in motor vehicles. Pediatrics. 1992;90:27-29
18. Agran PF, Anderson CL, Winn DG. Factors associated with restraint use of children in fatal crashes. Pediatrics. 1998;102(3). Available at: http:// www.pediatrics.org/cgi/content/full/102/3/e39
19. National Transportation Safety Board. Continental Airlines Flight 1713, McDonnell Douglas DC-9-14, Stapleton International Airport, Denver, Colorado, November 15, 1987. Washington, DC: NTSB Report No. AAR-88-09; September 27, 1988
20. National Transportation Safety Board. United Airlines Flight 232, McDonnell Douglas DC-10-10, Sioux Gateway Airport, Sioux City, Iowa, July 19, 1989. Washington, DC: NTSB Report No. AAR-90-06; November 1,1990
21. National Transportation Safety Board. Flight into terrain during missed approach, US Air Flight 1016, DC-9-31, N954VJ, Charlotte/Douglas International Airport, Charlotte, North Carolina, July 2, 1994. Washington, DC: NTSB Report No. AAR-95-03; April 4, 1995
22. US Department of Transportation, Federal Aviation Administration, Office of Aviation Medicine, Civil Aeromedical Institute. The Performance of Child Restraint Devices in Transport Airplane Passenger Seats. Washington, DC: Civil Aeromedical Institute; 1994
23. US Department of Transportation, Federal Aviation Administration, Office of Aviation Medicine, Civil Aeromedical Institute. Final Report to Congress on CSR Performance and Cost Effectiveness. Washington, DC: Civil Aeromedical Institute; 1995
24. Society of Automotive Engineers. Aerospace Standard 5276/1. Warrendale, PA: Society of Automotive Engineers; November 2000
25. Federal Aviation Administration. Child Restraint Roundtable. Arlington, VA; December 15-16, 1999. Available at: http://www.faa.gov/apa/ speeches/1215spjg.htm. Accessed September 25, 2001
26. National Transportation Safety Board. Uncontained Engine Failure/ Fire, Valujet Airlines Flight 597, Douglas DC-9-32, N908VJ, Atlanta, Georgia, June 8, 1995. Washington, DC: NTSB Report No. AAR-96-03; July 30, 1996
27. American Academy of Pediatrics, Committee on Injury and Poison Prevention. Selecting and using the most appropriate car safety seats for growing children: guidelines for counseling parents. Pediatrics. 1996;97: 761-763
28. US Department of Transportation, Federal Aviation Administration. Tips for Safe Air Travel with Children. Washington, DC: Federal Aviation Administration. Pamphlet available from the FAA Consumer Hotline at 1-800-322-7873 or at http://www.faa.gov/apa/TURB/CRSTips/ FRCRS. Accessed August 8, 2001

## ERRATUM

In the policy statement "Human Embryo Research," published in the September issue of Pediatrics (2001;108:813-816), 2 errors occurred. In the first paragraph under "Introduction," the second sentence should read:
"Pluripotent stem cells are a specialized subpopulation of cells capable of developing into most (ectoderm, mesoderm, and endoderm), but not all, human tissue and may be derived from human embryos."
On the roster for the Committee on Bioethics, one of the liaison's credentials were listed erroneously. His name should read "Ernest F. Krug III, MDiv, MD, American Board of Pediatrics."

For Immediate Release
Release No. AOC 26-06, September 6, 2006, Contact: Alison Duquette, Phone: (202) 267-3883

## FAA Approves New Child Safety Device Government Gives Parents More Options for Safe Air Travel with Children

WASHINGTON, DC - Air travelers have a new option for securing their children on commercial flights now that the U.S. Department of Transportation's Federal Aviation Administration (FAA) has approved a new type of child safety device, the AmSafe Aviation CARES.

CARES uses an additional belt and shoulder harness that goes around the seat back and attaches to the passenger lap belt to provide restraint for the upper part of the body. It is designed for children weighing between 22 and 44 pounds. The device provides a smaller and lighter alternative to using forward-facing child safety seats. CARES is not approved for use in motor vehicles.
"We want to provide parents with options so they can make the right decision for their children when they travel by air," said FAA Administrator Marion C. Blakey. "We're encouraging child seat manufacturers to design new types of devices that meet the FAA's stringent standards."

Unlike hard-backed child safety seats that are approved for use in airplanes and motor vehicles, CARES is designed and tested specifically for safe use in airplanes only. Previously, the FAA had allowed only airlines to provide these types of additional child safety devices, but no U.S. airlines presently provide them.

According to the FAA, the safest place for a child on an airplane is in an approved child safety device, not on a parents lap. The agency encourages but does not mandate the use of child safety devices on airplanes because of the increased safety risk to families who, if forced to purchase an extra airline ticket, might choose to drive. The risk to families is significantly greater on the roads than in airplanes, according to FAA and National Highway Traffic Safety Administration (NHTSA) statistics.

For additional information go to www.faa.gov/passengers/fly_children.

## The Do＇s and Don＇ts of Transporting Children in an Ambulance



Emergency Medica Services for Children ${ }_{\text {＊}}$

Approximately six million children are transported by emer－ gency medical services （EMS）vehicles each year in the United States．There are risks of injury associated with transport that can be minimized．An ambulance is NOT a standard passenger vehi－ cle．Unlike the well－developed and publicized child passenger safety standards and guide－ lines，specifications for the safe transport of ill and injured children in ambulances are still under development．Standard automotive safe－ ty practices and techniques cannot be applied directly to EMS vehicle environments due to biomechanical and practical differences．Cau－ tion is encouraged in the application of passen－ ger vehicle principles to ambulances and in the utilization of new and unproven products．

The Emergency Medical Services for Children （EMSC）Program supports efforts to improve the safety of pediatric patients being trans－ ported in EMS vehicles．Through an EMSC grant，the Division of Pediatric Emergency Medicine at Johns Hopkins Children＇s Center is working to fill critical knowledge gaps and developing standards for pediatric EMS trans－ port safety．Project results should be available in the year 2000.

A national consensus committee，sponsored by the EMSC Program，is reviewing current EMS child transportation safety practices． The group，which includes representatives from EMS national organizations，Federal government agencies，and transportation safety engineers，is developing preliminary recommendations for EMS providers until scientific research is completed．

There are certain practices that can significant－ ly decrease the likelihood of a crash，and in the event of a crash or near collision，can
significantly decrease the potential for injury． These practices are listed below．Importantly，as is mandated in several states，the NHTSA Emergency Vehicle Operating Course（EVOC），National Standard Curriculum or its equivalent is an integral part of this transport safety enhancement．

Pending research and consensus outcomes，the fol－ lowing guidelines for good practice should be ob－ served when transporting children in EMS vehicles．

## DO＇s

$\checkmark$ DO drive cautiously at safe speeds observing traffic laws．
」 DO tightly secure all monitoring devices and other equipment．
\ DO ensure available restraint systems are used by EMTs and other occupants， including the patient．
\ DO transport children who are not patients，properly restrained，in an alternate passenger vehicle，whenever possible．
$\checkmark$ DO encourage utilization of the DOT NHTSA Emergency Vehicle Operating Course（EVOC）， National Standard Curriculum．

## DON＇Ts

X DO NOT drive at unsafe high speeds with rapid acceleration，decelerations， and turns．
X DO NOT leave monitoring devices and other equipment unsecured in moving EMS vehicles．
X DO NOT allow parents，caregivers， EMTs or other passengers to be unrestrained during transport．
X DO NOT have the child／infant held in the parent，caregiver，or EMT＇s arms or lap during transport．
X DO NOT allow emergency vehicles to be operated by persons who have not completed the DOT EVOC or equivalent．

的三雨


# CRASH PROTECTION FOR CHILDREN IN AMBULANCES Recommendations and Procedures* 

Marilyn J. Bull, M.D., Kathleen Weber, Judith Talty, Miriam Manary<br>A joint project of the Indiana University School of Medicine and the University of Michigan Medical School and Transportation Research Institute

Safe transportation of children in ambulances presents special challenges for emergency medical service providers and child passenger safety advocates. Effective restraint is dependent not only on the child restraint equipment used but also on the platform to which it is attached. Although research concerning the ambulance crash environment is limited, fundamental principles of occupant restraint can still be used to develop useful and effective procedures in the field.

The federally funded Emergency Medical Services for Children (EMSC) Program acknowledges the special circumstances of ambulance transport and the gap that exists between occupant restraint practices in ambulances vs. other highway vehicles. In the near term, they have concentrated on crash prevention and the general concept of restraint of all occupants and equipment to minimize the risk of injury. They also recommend that children who are not ill or injured be transported in a vehicle other than the ambulance whenever possible.

## Restraint Considerations in Ambulances

Providing effective restraint for children in ambulances is a complex problem with many unique and unresolved issues. The occupant requiring transport may be acutely ill or injured, the vehicle has special characteristics for its function, and the crash environment and exposure are different from that of a family car. The ambulance environment is specifically designed for emergency treatment of passengers. Although there are variations in design, the patient compartment is typically equipped with a captain's chair that faces the rear of the ambulance, bench seats along one side of the ambulance, a cot, and storage for equipment and medical supplies. There are no forwardfacing vehicle seats in the patient compartment upon which child restraints can be installed according to the manufacturers' instructions.

When determining the best restraint of a child in an ambulance, consideration must be given to the reason the child is being transported (patient vs. accompanying passenger), the medical stability of the patient, and the available locations where the child can be restrained. If not ill or injured, the child should be transported in another vehicle if at all possible, as recommended by EMSC. A police vehicle, however, is not usually a good alternative, because of the presence of prisoner screens, plastic seats, and special equipment that may compromise child restraint performance.

When transporting a child with an acute medical problem that requires constant monitoring, a current practice is to restrain the child directly to the cot with chest and hip

[^4]belts, even though this provides virtually no crash restraint, especially in the forward direction. Whenever possible, a restraint system designed specifically for a child should be used, but the difficult problem is determining the most appropriate restraint location and method of securement in the ambulance.

Rear-facing captain's chairs, or technician seats, can provide a good platform for some types of child restraints, and special instructions can be obtained from some child restraint manufacturers for installation of their convertible models (normal installation being either rear- or forward-facing) on an ambulance captain's chair. It is also becoming increasingly common to equip these technician seats with a built-in child restraint, suitable for use with an accompanying child or a less critical patient, but not a small infant. Use of this seat by a child, however, in either a portable or a built-in child restraint, precludes use of the captain's chair by an EMS technician.

Placement of a child restraint on a side bench seat is not recommended, because this usage applies the severity of a frontal impact to the less protected side-facing child. Such installations are specifically prohibited, with good reason, by all child restraint manufacturers.

Some types of child restraint systems can be attached to the ambulance cot. At present, most cots used in the field are anchored to the ambulance floor with a three-point "antler" positioning system along with a single friction clamp at the foot end that allows quick and easy loading of the patient. These cots do not have positive lock-in mechanisms, and they need only meet static loading requirements.

## Research Methods and Results

The objectives of this study were to determine the most effective and reliable means of restraining children on an ambulance cot and to develop recommended field procedures for emergency medical service providers. A series of crash tests at 30 mph was conducted using convertible child restraints, car beds, and harness systems tested with 3-year, infant, and 6-year size dummies. Belt configuration and backrest position were varied, and it was determined that a two-belt attachment with elevated cot backrest was the method with the least performance variability for securing either a convertible child restraint or a car bed. In addition, a new cot and slide-in track fastener system significantly improved restraint performance over the older antler systems previously tested.

The test sequences in Figures 1 and 2 illustrate acceptable crash performance for a convertible child restraint and a car bed. Each restraint is held to the cot by two pairs of belts, and the elevated backrest provides additional support. Installation details are provided under Recommendations.

Unfortunately, none of the harness configurations tested proved to be satisfactory for both ease of use and effective restraint. The test sequence in Figure 3 illustrates the excessive ramping, or the movement of the dummy up the backrest in the direction of the impact, observed in most tests. A confounding factor was the thick, soft, and loose cot cushion that compressed and shifted during impact, making the job of the harness all the more difficult. Guidelines for designing better harness systems are given under Recommendations.

## Using Your New Skills

## Prepared by the National Child Passenger Safety Board <br> March 30, 2007

## Congratulations on completing the CPS certification course! Your journey has just begun!

## Role After Class

- Do NOT go beyond what you have learned
- Improve your know-how by working with skilled technicians
- Recruit new technicians
- Keep updated
- It is better to work with a partner with more experience when possible.
- Keep updated on new CPS changes.
- Go to the CPS Certification Web site (www.safekids.org/certification).


## Stay Updated in CPS

- Use national resources
- Learn about State/local CPS committees/ groups
- Read and discuss newsletters and studies
- Attend CPS workshops and activities
- Browse stores to become familiar with different seats, products, and equipment
- Ask your State CPS contact, instructor, and other technicians for new information
- Log into your CPS online profile to check your certification status, update your contact information, enter information needed for recertification, and place your information on the FIND A TECHNICIAN/INSTRUCTOR search engine.
- If you do not have your username or password, please contact CPS Customer Service at 877-366-8154 or cps.certification@safekids.org.
- If you are interested in becoming an instructor, please review "What Makes A Good Instructor and Mentor" in the Appendix and the Instructor Candidacy section at www.safekids.org/certification.


## Be Active and Educate Your Community

- Answer questions and make referrals
- Develop and provide community presentations
- Participate in health and safety fairs
- Provide current, culturally sensitive materials/information
- Set up an inspection station
- Hold a checkup event


## Using Your New Skills

## Getting Started

- You don't need much to get started! This is your toolkit. In the future, you may choose to have a full-scale CRS checkup event. You may need more materials.
- NHTSA's "A Guide to Implementing Child Passenger Safety Inspection Stations" is available at http://www.nhtsa.dot.gov/people/injury/childps/CPSInspectionStation/.
- Start off learning how other technicians set up and run their events (e.g. scheduling, materials, traffic flow). 1
- Basic supplies
- Child restraint instructions
- Tether manual
- Manufacturer contact information
- CPS Workbook
- Standard checklist
- Updated recall list
- Good communication skills
- The tether manual is available from Safe Ride News (www.saferidenews.com).
- CRS Manufacturer's Instruction CD is available from Safety Belt Safe (carseatsafety.org).


## Online Resources*

- American Automobile Association: www.aaa.com/.
- American Academy of Pediatrics: http://www.aap.org/.
- CPS Certification Program: www.safekids.org/certification.
- Child restraint manufacturers:
http://www.nhtsa.dot.gov/people/injury/childps/csr2001/csrhtml/csManufacturers.html.
- Children's Hospital of Philadelphia: http://www.chop.edu/.
- Insurance Institute for Highway Safety: www.iihs.org.
- National Center for Safe Transportation of Children With Special Needs: http://www.preventinjury.org/index.asp.
- National CPS Board: www.cpsboard.org.
- National Highway Traffic Safety Administration: http://www.nhtsa.dot.gov/.
- State CPS contacts: http://www.nhtsa.dot.gov/CPS/Training/ContactList.cfm.
- Safe Kids Worldwide: www.usa.safekids.org.
- Safe Ride News: www.saferidenews.com.
- SafetyBeltSafe: www.carseat.org.
- Vehicle manufacturers: http://www.indexoftheweb.com/Automobile/Manufacturers.htm. *This list is not meant to be exhaustive. Refer to the websites and publications listed here for referral to additional sources of reliable information.


## Children with Special Healthcare Needs and CRS

- All children deserve to ride safely. Some children with certain medical conditions require special support for safe transportation. You need to know where to go to get more information if needed.
- National Center for the Safe Transportation of Children With Special Healthcare Needs (575 West Drive, Room 004; Indianapolis, IN 46202)
1-800-755-0912 Fax: 317-278-0399 www.preventinjury.org/index.asp
- Safe Travel for All Children curriculum (2-day)
- Database of technicians who have taken a course on special needs transportation.


## Additional Training

- Special needs: National Center for the Safe Transportation of Children With Special Healthcare Needs: http://www.preventinjury.org/index.asp.
- School buses: Contact your local school district for your pupil transportation director or State CPS training contact.
- Safe Native American Passengers (SNAP) training for transporting children: http://www.nhtsa.dot.gov/CPS/Training/CPSCourses/pages/SNAP.html.
- Child care provider: Course information available from your State CPS training contact.
- State CPS training contact: http://www.nhtsa.dot.gov/CPS/Training/ContactList.cfm.
- Tech Update: e-mailed to CPS-certified individuals and available at www.cpsboard.org.
- CPS Express: e-mailed to CPS-certified individuals and available at www.safekids.org/certification (Resources).
- National CPS Board: www.cpsboard.org
- National Association of State Directors of Pupil Transportation Services: www.nasdpts.org.
- Lifesavers annual traffic safety conference: www.Lifesaversconference.org.


## National Certification And Liability

- No cases have brought a CPST before a judge.
- As a CPST, you may have increased protection supported by "good Samaritan" or other liability protection laws in place in some jurisdictions.
- If a legal challenge occurs and you are practicing within the requirements of the certification, the CPST community will support you.
- It is important to use a checklist form correctly.
- You may buy individual liability insurance. Contact your homeowner or renter policy insurance provider for information.


## CPS INSPECTIONS AND CHECK UP EVENTS

Prepared by the National Child Passenger Safety Board April $2007^{1}$

## Introduction

Child passenger safety (CPS) inspection stations (also known as "fitting stations") are appearing in communities all across the United States. Although the concept of an inspection station for child safety seats is relatively new to this country, CPS professionals have been conducting such inspections for many years: every time a child safety seat is 'checked' by a CPS professional, a "CPS inspection" has occurred. The hard work and years of dedication by many CPS professionals has lead to the successful expansion of CPS inspection stations in communities throughout the United States.

## Setting The Stage

Whether the inspection station is held at an indoor or outdoor setting, it is important to remember that safety is the number one priority for staff and participants. And to the extent possible, all CPS inspection station facilities should be accessible to individuals with disabilities in accordance with the Americans with Disabilities Act (ADA).

## Indoor Setting

An indoor setting provides many benefits, especially protection from the weather - rain, snow, sleet, wind, and hot and cold temperatures. However, there are still precautions that must be taken when setting up an indoor CPS inspection station:

- Designate where the vehicle(s) will wait in line prior to the inspection. Be sure to have the driver turn the engine off to prevent any accidental acceleration of the car. Have a clearly designated path for the vehicle to follow at the conclusion of the inspection - ideally the vehicles will enter in one side of the facility and exit from the other side to avoid driving in reverse.
- Check that there are no safety hazards anywhere in the vicinity.
- Make certain the location is safe for families. A designated waiting area should be made available for other family members/young children while the inspection takes place. Staff or a responsible volunteer should be assigned to the waiting area to insure that no child is lost or injured. If possible, clean, age-appropriate toys in good condition should be made available to occupy young children.

[^5]- Keep the area as clean as possible.
- Bathrooms should be easily accessible to the waiting area. Be sure they are clean and operational before each scheduled inspection event.
- Designate an area to keep equipment and a place where unsafe seats can be stored prior to destruction or other appropriate disposal.
- If the inspection locations is at a dealership, fire department or auto repair shop, be certain that ALL employees are notified that children will be in the area at various times.
- Have clearly written signs set up as appropriate.


## Outdoor Setting

An outdoor setting provides unique advantages (usually more space) and disadvantages (i.e. traffic and weather considerations), for the operation of a CPS inspection station. In addition to the above safety considerations, the following precautions should be taken when hosting an outdoor inspection station:

- Be sure the inspection area can be set up out of the flow of routine traffic.
- Have clear Enter and Exit areas designated by signs and traffic cones.
- If there is not an indoor waiting area available, create a clearly defined 'safe area' with rope, tape and/or traffic cones.
- Be sure to have a traffic coordinator available to direct waiting vehicles safely in and out of the inspection site.
- The inspection teams should be set up at well-spaced and clearly marked designations.
- Be sure to have sufficient equipment available to staff at each inspection area in order to minimize the amount of foot-traffic around the inspection site.


## Staffing The CPS Inspection Station

The experienced and certified CPS technician has a central role in conducting child safety seat inspections. However, there are other duties and responsibilities that are very important to the successful operation of an inspection station and must be handled efficiently and professionally. In an ideal situation, people would be assigned separate roles in operating the CPS inspection station, but in most cases, one person may have several roles to play.

## Coordinator

The Coordinator is responsible for all the administrative needs essential to the smooth, efficient operation of a CPS inspection station. The duties of the Coordinator may include responding to calls from the public, scheduling and confirming inspection appointments, securing experienced and certified CPS technicians, ordering supplies, gathering the data collected from the inspection forms, filing the inspection forms, maintaining current education materials and a current child safety seat recall list. The Coordinator should always have access to the inspection station's written operating policies. The Coordinator may also be responsible for many of the marketing and publicity activities. The Coordinator does not have to be a certified CPS technician, but
should have some formal CPS training, be knowledgeable about current CPS issues and display a sincere commitment to promoting CPS initiatives within the community.

## Greeter

Depending upon the level of activity at an inspection station, the coordinator may also serve as the "Greeter." The Greeter helps to ensure the smooth operation of the inspection station. If there is waiting time involved, the Greeter can provide general CPS information, talk to the parent/caregiver about the inspection process, distribute the inspection form and direct vehicles to the next available CPS technicians.

## Scribe/Recorder

Using the inspection station's approved data collection form, the Scribe gathers information about the vehicle and its passengers from the vehicle driver, checks for child safety seat recalls, records information regarding seating positions, misuse, corrections made, seats installed and education information provided to the driver by the certified CPS technician. The Scribe insures that all forms are signed and dated by the driver, the certified CPS technician and the lead CPS technician, and deposits the completed form in the designated location. If a new child safety seat is installed, the Scribe also insures that the driver completes the manufacturer's recall information card. (The coordinator may choose to mail the completed cards on behalf of the parents to insure that the cards reach the child safety seat manufacturers.)

## Certified CPS Technician

It is recommended that experienced and certified CPS Technicians perform the actual seat inspections and installations. Certifications for all participating CPS Technicians must be current.

The Technician's main role is as an educator. The Technician is responsible for the inspection of the child safety seat, demonstrating to the parent or caregiver how to properly install the seat and secure the child, and deciding whether or not to replace a seat. In addition, the Technician should also insure that any replaced seats are properly disposed of so as to prevent further use (unless used in a training course).
It is generally considered to be a good idea to identify additional certified CPS technicians and/or instructors who can serve as a "second pair of eyes" for reviewing the installation of child safety seats before the parent or caregiver leaves the inspection station and assure that the CPS checklist form is correctly completed.

## Traffic Coordinator

Traffic Coordinators are typically law enforcement officials, as they usually have the expertise directing vehicles and insuring the public's safety. This position is most appropriate to inspection stations held at outside locations. However, depending upon the volume of traffic, it could be necessary to have a traffic coordinator at any CPS inspection site.

## Role of the Parent/Caregiver

Important Reminder: Although many people play significant roles in the operation of a CPS inspection station, the most critical role is that of the parent/caregiver. The knowledge gained from the CPS inspection experience is meant to empower the parent/caregiver to properly install
and use an appropriate child safety seat for his or her child. For this reason, the parent/caregiver should always have a "hands-on" role in the inspection process and should always be the last person to touch the child safety seat before the vehicle leaves the CPS inspection station.

## Outfitting The CPS Inspection Station

## Equipment/Materials

The following are basic supplies used to operate a CPS inspection station. Items marked with an asterisk* are primarily used for outdoor settings.

- Current recall list
- Child safety seats for use as loaners or give-a-ways in the event that a seat must be replaced
- Manufacturers' instructions
- CPS education materials
- List of nearby stores where new seats can be purchased if necessary
- Inspection forms
- Locking clips (regular and belt shortening)
- Clipboards
- Pens and pencils
- Foam swim 'noodles,' thin towels, slip guard (i.e. rubber shelf liner)
- Latex gloves
- First aid kits
- Anti-bacterial soap/lotion
- Waste receptacles
- Demo dolls for use when the child is not present to show correct use
- Tape
- Storage bins
- Traffic cones*
- Barricades*
- Chalk to mark lanes*
- Tents*


## A Note About Liability Concerns

The following considerations may provide some assistance in crafting a liability prevention protocol for the CPS inspection station. However, it is advisable to consult with an attorney and insurance carrier knowledgeable and experienced in liability/risk-reduction issues for specific guidance. If the CPS inspection station is part of a larger network of inspection stations, be sure that every station is following the same written procedures.

- Provide Accurate and Current Information: All information distributed at CPS inspection stations should come from credible sources and reflect current traffic safety issues and technologies. Contact the state occupant protection coordinator to determine what materials are recommended for distribution. There are also tools available to review and evaluate CPS materials:
- NHTSA and the National Safety Belt Coalition (1997; revision in progress) - Is this child on the road to danger? Child passenger safety materials review and evaluation tool. Washington, DC: NHTSA. [Contact the NHTSA Regional Office, Appendix C]
- AAA Foundation for Traffic Safety (2002) - Seated for Safety Evaluation Tool. Newton, MA: Education Development Center, Inc., as prepared for AAA Foundation for Traffic Safety (www.aaafoundation.org).
- Teach Correct Installation and Use of Child Restraint Systems: The most critical role at a CPS inspection is played by the parent/caregiver. Parents and caregivers that attend an inspection event want to be sure that their children are properly restrained and well protected. The objective of every CPS inspection service should be to teach parents and caregivers how to safely transport their children using the appropriate child safety seat or safety belt correctly. The inspection should include a one-on-one tutorial by a certified CPS technician that provides hands-on instruction on the proper us and installation of child restraints. The parent/caregiver should always be the last person to touch the child safety seat before the vehicle leaves the CPS inspection station.
- Certified CPS technicians should encourage parents to consult their vehicle owner's manual and the child safety seat instructions to help answer specific questions. Technicians should check each seat for possible recalls using the most current recall list available. An updated recall list can always be downloaded from the NHTSA website www.nhtsa.dot.gov. Technical questions can also be referred to the Department of Transportation's Auto Safety Hotline (1-888-DASH-2-DOT, or 1-888-327-4236).
- Be Consistent with All Inspection Procedures: Inspection station staff should be clear about their roles prior to each inspection event. The coordinator will insure that all roles are covered and that all necessary materials and equipment are readily accessible. When possible, a lead CPS technician should be responsible for quality control of the inspections conducted. The lead CPS technician should check each seat and review and approve each data collection form before a family leaves the inspection station. Consistent use of a standardized CPS checklist will help insure the quality of every CPS inspection. Most standardized checklists require that the parent/caregiver sign the form to acknowledge the advice, education and information they have received. Most standardized forms include a waiver/release of liability that has been carefully crafted by a knowledgeable attorney. Completed forms should be collected and retained by the coordinator.
- Have a Clear Written Policy About Replacement Seats: All staff should be aware of the written policy for replacing child safety seats and disposing of old, damaged or recalled seats. The policy should specify whether replacement seats would be provided without charge, with a requested donation or for a purchase price, and describe the process for disposing of damaged or unsafe seats. The coordinator should insure that there are a variety of child safety seats available as replacement seats. If a replacement seat is provided, the parent or caregiver should complete the product recall registration card before leaving the inspection station. The coordinator should mail all completed cards immediately so that, in the event of a recall, the child safety seat manufacturer can notify the parent or caregiver. If replacement seats are not supplied, it is advisable to provide an accurate list of community resources that offer child safety seats for families in need.
- Make Safety a Priority: The traffic coordinator should ensure that vehicles and people are able to move safely in and around the CPS inspection station. The safety of young children should be a top priority.

The sponsoring organization or site host may have additional considerations to insure that CPS inspections are conducted in a safe, consistent and professional manner. Be sure to communicate all requirements and procedures to every staff member (paid and volunteer) participating in CPS inspection activities.
Liability Coverage: There are several options for obtaining liability insurance to cover CPS inspection stations. Again, it is advisable to first consult the sponsoring organization to determine how liability protection will be addressed. The following are the most common types of coverage used by CPS inspection stations:

- State Law: Many states have a "Good Samaritan" law that may cover the type of services provided by the CPS inspection station. In addition, several states have enacted "CPS services immunity" laws to specifically cover certified CPS Technicians. Consult the state occupant protection coordinator to determine whether such laws exist in your state.
- General Policy: The activities of the CPS inspection station may be covered under the general insurance policy (or through an additional rider) of the sponsoring organization. Consult with the sponsoring organization about specific terms and conditions.
- Special Policies for National Organizations: Some national organizations that conduct a large amount of CPS inspections have secured special liability coverage for their members. If the CPS inspection station is being sponsored by a national organization, it may have liability protection under such a policy. Consult with the sponsoring organization about specific terms and conditions.


# 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



## Child Passenger Safety Glossary of Terms

Active Protection: Protection features that require action by the occupant. These features include lap belts, lap and shoulder belts, and child restraint systems.

Anchor: A common short alternative for anchorage; often used to refer specifically to the hardware installed at the anchorage, either factory-installed or in a retrofit shoulder-belt or tether kit.

Anchorages: See anchor.
Anti-Rebound Bar: Bars help control rebound and decrease the possibility of head contact. Rebound is the "bounce" after initial impact has occurred.

Shield Booster: A type of booster, as defined by FMVSS 213, that has a seating platform and a structure in front of the child for restraint, but which is subject to crash testing using only a lap belt and to the head excursion limit of only 813 mm .

Belt-positioning booster seat (BPB): A crash-tested device that raises the child so that the required lap and shoulder belts fit correctly. All BPBs act as pre-crash positioning devices and must be used with lap and shoulder belts. BPB models may have high backs, or be backless.

Belt sensitive: Refers to a type of emergency locking retractor, which locks when the belt is pulled quickly.

Belt path: The path that the manufacturer is required to create so that the safety belt passes around or through the CR. Some seats have multiple belt paths. For example, convertible car seats have one belt path for rear-facing use and a separate one for forward-facing use.
Belt shortening clip: A heavy duty clip intended for use to shorten lap belts around a child restraint. Not to be confused with the standard locking clip that comes with a child safety seat. Must be purchased or ordered from vehicle manufacturer.

Buckle: The locking mechanism of the vehicle belt or child safety seat. The latchplate fits (clicks) into the buckle, which must have a red button.

Caregiver: A person responsible for a child's well-being and safety.
CPS: Child passenger safety

Car bed: a restraint, usually for small, premature, or medically fragile infants who should ride prone or supine. In most cases, the infant lies flat. The vehicle seat belt is used to anchor the car bed perpendicular to the direction of travel. The infant's head is placed toward the center of the vehicle and not next to the door. An internal harness secures the child in the car bed. Read instructions as there may be other methods of securing allowed for certain car beds.

Car seat: See Child Restraint
Child restraint (CR), child restraint system (CRS), child restraint device (CRD): A crashtested device or system that is specially designed to provide infant/child crash protection. General term for systems including child safety seats, boosters, vests or car beds that meet FMVSS 213.

Children with special transportation needs: Children whose physical or behavioral conditions makes the use of particular, often specially designed, restraint systems necessary.
Combination seat: A type of forward-facing child restraint that is used with an internal harness system to secure a child. With removal of the internal harness, it is used as a beltpositioning booster (BPB).
Compartmentalization: Refers to the type of passive occupant protection seen in school buses, due to the narrow seat spacing and energy absorbent high back seats.

CR: See Child Restraint
Convertible seat: A child restraint that "converts" from rear-facing for infants and smaller children to forward-facing for older and larger children.

Crash Dummies: Full-scale replicas of human beings, weighted and articulated to simulate the behavior of a human body in a vehicle mishap, and instrumented to record as much data as possible on numerous variables during a collision.
Crumple Zone: The zone of a car that absorbs energy upon impact. The purpose of a crumple zone is to increase the amount of time it takes the car to come to a complete stop in comparison to object the car hits. By increasing the time it takes for the car to come to a stop after hitting an object, the force is spread over a longer period of time.

Dead Zone: This occurs when an automatic locking retractor does not lock until the belt is extended a certain length. Locking will not occur in the dead zones until this length has been reached.

Detachable Base: A separate base for a child restraint system that can be installed in the vehicle. The restraint (car seat) portion can be removed from the base, and used as an infant carrier.

Emergency locking retractor (ELR): A retractor on a safety belt system that locks in response to rapid deceleration of the vehicle. ELRs respond to rapid extraction of the belt or the sudden deceleration of the vehicle or both.

Excursion: The distance traveled by an occupant or test dummy in the direction of impact during a crash.

Forward-facing: A restraint that is intended for use only in the forward-facing position for a child at least age one and at least 20 pounds up to the specified limits of the seat, set by the manufacturer.

Harness: A system of straps that keep the child within the shell, distributes crash forces, and helps the child "ride down" the crash.

Harness retainer clip: A plastic tie or clasp that holds the shoulder straps together over the child's chest at armpit level; a pre-crash positioning device intended to keep harness straps in position on the shoulders. It can also be referred to as a "chest clip."

Harness adjuster: Used to tighten or loosen the harness the internal harness of a child restraint system.

Harness slots: The part of the CR where the harnesses pass through from the front to the back of the restraint. Seats come with at least one and as many as four sets of slots

High Back Booster Seats: see Belt Positioning Booster
Infant-only seat: A child restraint system designed for use only by a baby in a semi-reclined rear-facing position.

Inspection Station: A dedicated location staffed and stocked with equipment needed to regularly perform child restrain checks and installations.

Integrated child seat: A child-sized forward-facing restraint and/or BPB built into a vehicle seat. Some have a full harness. Others are belt-positioning boosters for use with lap and shoulder belts.

Labels: These are located on the seat, and indicate the following: 1) NHTSA certification of conformation to all applicable FMVSS 2) Weight and height guidelines for the specific seat 3) Basic outline of the installation procedures 4) Manufacturing data, including data of manufacture, the manufacturers name and address, and a model number 5) Air bag warning and 6) FAA certification for use in an aircraft.

Learn, Practice, Explain: The philosophy of the CPS curriculum promotes learning the latest in CPS, staying updated and active in the field, and teaching people how to safely transport children.

LATCH: Lower Anchors and Tethers for CHildren.
Latch plate: The part of the buckle mechanism that locks or connects into the buckle.
Level Indicator: Helps parents and caregivers identify the manufacturer's recommended correct angle for rear-facing restraints.

Lockability: Refers to the ability of the latch plate to prevent the webbing to slide back through the latch plate, causing the belt to loosen.
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.

Locking clip: A flat H-shaped metal item intended to clip lap and shoulder belt webbing together at a free-sliding latch plate in order to prevent the webbing from sliding through. A pre-crash positioning device only. Not to be used as a belt shortening clip.

Lower anchorage attachments: A piece of belt webbing that anchors to the lower anchorage on the vehicle structure. It secures the CR to the vehicle. These attachments are used in place of the vehicle safety belt.

Passive occupant protection: Features of the vehicle that lessen the injury to the occupant without any action taken by the occupant.

Rebound: Reactive motion in the opposite direction after initial impact has occurred.
Rear-facing: Refers to the position where the child's child restraint is turned to face the rear of the vehicle. The rear-facing position supports the entire head, neck, and back; cradles and moves with the child to reduce stress to the neck and spinal cord in a crash.

Recalls: Voluntary or required actions taken to correct problems or deficiencies once products have been distributed or sold. Manufacturers must offer free repairs or replacement for products recalled for violations of safety standards.

Recline Adjustor: Allows convertible restraints to be reclined for rear-facing and semi-reclined or upright for forward-facing use.

Registration card: A postage-paid return card that comes with every child restraint; should be returned to the manufacturer so owners can be notified of any recalls.

Retractor: A mechanism that rolls up the webbing of the safety belt when it is not in use and takes up slack around the user.

Retrofitted: Installing, fitting, or adapting a device or system for use with something older. An example of this would be to retrofit seatbelts to a school bus without them.

Ride Down: Ride down is the extension of time when the forces are felt by the occupant during a crash. A quick change in speed is what causes injury.

Safety belt: The webbing, anchor, and buckle system that restrains the occupant in the vehicle. Also known as a seat belt.

Seat Belt Syndrome: Separation of the lumbar vertebrae and associated paralysis, due to the effects of a crash where only a lap belt was used.

Seat bight: The intersection between the bottom vehicle seat cushion and the back cushion.
Seat Padding: The cushioning attached to a child restraint, on which the child sits.
Shell/frame: The molded plastic structure of the CR. In some models, the shell is attached to or reinforced by a metal frame.
"Smart" Air Bags: An air bag system that will detect when a child is present and automatically deactivate the air bag or enable it to deploy safely. Manufacturers who do not
provide a qualifying smart system would be required to have new and more prominent air bag warning labels inside the vehicle. They would also be permitted to install cutoff switches so parents can deactivate the passenger-side air bag when a child is seated in front of it

Snug safety belt or lower anchors: Tight enough that the child restraint cannot move more than 1 inch in any direction from the belt path.

Snug harness: Harness straps do not allow any slack; It lies in a relatively straight line without sagging yet does not press into the child's shoulders making an indentation. You should not be able to pinch the webbing vertically.

Special Needs: Refers to children with medical or physical conditions that prevent them from traveling normally in a standard child restraint. Alternative options for a safe ride are available for children with special needs.

Splitter Plate: Metal plate that connects the two ends of the shoulder harnesses to a single piece of webbing used for adjustment.
Technician: A person who successfully completes the National Highway Traffic Safety Administration's (NHTSA) standardized child passenger safety certification program.
Tether: See Tether Strap
Tether anchor: The kit or installed hardware bracket used to secure the tether hook and strap at the designated anchor point in the vehicle. The tether strap and hook attach directly to the anchor bracket.

Tether strap: A piece of belt webbing that anchors the top of the CR to the vehicle structure. It keeps the restraint from tipping forward on impact and can provide an extra margin of protection. Can be optional or factory installed.
Webbing: The fabric of the safety belt that holds the occupant or a CR in place.

## Child Passenger Safety English-Spanish Translation of Terms

| English | Spanish |
| :--- | :--- |
| 4 Steps for Kids | 4 Pasos para niños |
| Active protection | Protección activa |
| Acute exposure | Transferencia aguda |
| Additional Padding | Relleno adicional |
| Advanced air bag | Bolsa de aire moderna |
| Advocates | Defensores, Activistas |
| Advocacy skills | Destrezas de abogacía |
| Affordability | Cuando el precio está dentro de los medios del comprador, <br> con el precio que usted puede pagar |
| After market products | Accesorios adicionales |
| Agreement form | Forma de común acuerdo |
| Air bags, "smart" air bags | Bolsas de aire, bolsas de aire "inteligentes", bolsas de aire <br> modernas |
| Air bag on-off switches | Interruptores para activar y desactivar las bolsas de aire |
| Air bag deployment | Despliegue de la bolsa de aire, cuando la bolsa de aire se infla |
| Aircraft | Avión |
| Aircraft safety issues | Asuntos sobre la seguridad de los aviones |
| Airway | Vía respiratoria |
| Anchor | Ancla |
| Anchor bracket | Soporte para el ancla |
| Anchor point | Punto de anclaje |
| Anchor strap | Correa del anclaje |
|  |  |


| English | Spanish |
| :---: | :---: |
| Anchorage system | Sistema de anclaje |
| Armpit level | Al nivel de la axila |
| Armrest | Apoyo para el brazo |
| As tightly as possible | Lo más apretado posible |
| Assessment tool | Instrumento de evaluación |
| Auto safety | Seguridad del auto |
| Auto Safety Hot Line | Línea de Información Sobre la Seguridad del Auto |
| Automatic Locking Retractor (ALR) | Retractor que se inmoviliza automáticamente |
| Automatic restraint system | Sistema de seguridad automático |
| Automobile manufacturer | Autoturer Fabricante de vehículos |
| Back support | Espaldar, apoyo para la espalda, respaldo |
| Backless booster | Asiento elevado "booster" sin espaldar, respaldo |
| Being thrown out of the car | Ser expulsado del vehículo |
| Belt path | Ruta o trayectoria del cinturón de seguridad |
| Belt-positioning "booster" seat, (BPB) | Asiento elevado "booster" con ajuste para el cinturón de seguridad |
| Belt pretensioner | Cinturón de seguridad con carrete retractable |
| Belt shortening clip | Sujetador (broche) para acortar el tejido del cinturón de seguridad |
| Bench seat | Asiento del vehículo tipo banco |
| Best practices | Practicas modelo, criterio que se usa para hacer las cosas de una manera mejor |
| Bight | Donde se une el respaldo y el asiento |
| Blanket | Manta, frazada |
| Booster seat | Asiento elevado "booster", asiento que eleva al niño |
| Bounty program | Programa de subvención |
| Brain injury | Lesión cerebral |
| Bucket seat | Asiento del vehículo tipo deportivo |
| Buckle | Hebilla |
| Buckle up | Abrocharse el cinturón |
| Built-in lock-off locking clips | Sujetadores (broches) incorporados sin cierre |
| Built-in locking clips | Sujetadores (broches) incorporados |
| Built into | Incorporado mobile manufac |
| Bumper | Parachoques, defensa amortiguador de choques |


| English | Spanish |
| :--- | :--- |
| C-Spine | Espina dorsal |
| Car bed | Asiento de seguridad tipo cama para infantes |
| Caregivers | Personas que cuidan niños |
| Cargo areas | Zonas de carga |
| Center front seat position | Posición central del asiento delantero |
| Check-up event | Evento en donde se revisan los asientos de seguridad para <br> niños |
| Child Passenger Safety (CPS) | Seguridad del Niño Pasajero |
| Child Passenger Safety Programs | Programas sobre la Seguridad del Niño Pasajero |
| Child Passenger Safety Technician | Técnico en la Seguridad del Niño Pasajero |
| Child restraints, (CR) | Asientos de seguridad para niños, sistemas de seguridad para <br> niños |
| Child Restraint (CR) anchorage | Sistema de anclaje para el asiento de seguridad |
| Child restraint crash tests | Pruebas de choque del asiento de seguridad para niños |
| Child restraint harness straps | Correas del arnés del asiento de seguridad para niños |
| Child restraint industry | Industria de asientos de seguridad para niños |
| Child restraint label | Etiqueta del asiento de seguridad para niños |
| Child restraint lower attachments | Conectadores inferiores del asiento de seguridad |
| Child restraint manual | Manual para el uso del propietario del asiento de seguridad <br> para niños |
| Child restraint systems (CRS) | Sistemas o asientos de seguridad para niños, sistemas de <br> protección para niños |
| Child restraint system (CRS) <br> checkups | Revisiones de los asientos de seguridad para niños |
| Child restraint system (CRS) <br> checkups event | Evento en donde se revisan los asientos de seguridad para <br> niños |
| Child safety | Seguridad del niño |
| Childhood injury | Lesión sostenida durante la niñez choque |
| Children with Special Health Needs | Niños con necesidades especiales de salud |
| Cinching | Ajustar, apretar |
| Collapsible steering columns | Columnas del volante plegables para Productos de Consumo |
| Collar bone | Clavícula |
| Cafenilisions | Coty |


| English | Spanish |
| :--- | :--- |
| Compartmentalization | Compartamentalización |
| Compatibility Issues | Asuntos sobre la compatibilidad |
| Compliance testing | Pruebas de cumplimiento |
| Community Outreach | Alcance Comunitario |
| Continuous loop belt | Cinturón que usa un sólo pedazo de tejido continúo para el <br> cinturon de hombro y regazo/falda. Empieza en el punto de <br> anclaje y el otro extremo termina en el retractor. |
| Conventional Child Restraint | Asiento de seguridad convencional para niños |
| Convertible restraints | Asientos de seguridad convertibles |
| Course overview | Resumen del curso |
| CPS | Seguridad del Niño Pasajero |
| Cracks | Rajaduras |
| Crash | Choque |
| Crash dynamics | Dinámica de choques |
| Crash forces | Fuerzas del choque |
| Crash phase | Etapa durante el choque |
| Crash sensor | Sensor de choques |
| Crash testing | Pruebas de choque simulado |
| Crushable frame | Estructura o, marco comprimible |
| Dashboard | Panel o, tablero de instrumentos |
| Dealerships | Distribuidores, concesionarios |
| Deceleration | Disminución de la velocidad, deceleración |
| Defect investigation form | Formulario para la investigación de defectos |
| Defect monitoring | Control de defectos |
| Department of Motor Vehicles etapas de despliegue/inflado <br> (DMV) | Departamento de Vehículos de Motor |
| Department of Transportation (DOT) | Departamento de Transporte |
| Detachable base | Base removible |
| Devices | Mecanismos, aparatos |
| Dissecting Child Restraint Systems <br> (CRS) | Analizar minuciosamente y desmontar (desarmar) los <br> asientos de seguridad para niños <br> Driver |
| Dual-stage air bag | Conductor bag module |

## Spanish

| Dummy | Maniquí |
| :--- | :--- |
| Easter Seal Program: "Kids are Riding <br> Safe Program" (KARS) | Programa de Easter Seal "Los niños viajan seguros" |
| Enforcement | Aplicación de la ley |
| Ejection | Expulsión |
| Emergency Medical Service (EMS) | Servicios de Emergencias Médicas |
| Emergency braking | Frenar de emergencia |
| Emergency locking retractor (ELR) | Retractor de cierre de emergencia |
| Energy management loops | Procedimiento utilizado en la manufacturación del tejido del <br> cinturón para reforzar y controlar la energía |
| Energy management retractor | Retractor para controlar la energía |
| Environmental conditions | Condiciones ambientales |
| E-Z-On Vest | Chaleco "E-Z-On" (Fácil de Ponerse) |
| Fatal Analysis Reporting System <br> (FARS) | Sistema de información de análisis fatales |
| Features | Accesorios o rasgos distintivos, características o accesorios <br> adicionales |
| Federal Aviation Administration <br> (FAA) | Administración Federal de Aviación |
| Federal Motor Vehicle Safety <br> Standards (FMVSS) | Normas Federales de Seguridad para Vehículos de Motor |
| Federal Role | Bolsas de aire delanteras |
| 5 - Point harness | Función del gobierno federal |
| Flame retardant padding | Arnés de 5 puntos |
| Flexible latch system seat | Relleno resistente al fuego, relleno que retarda el fuego |
| Flexible 2-point lower attachment | Conexión inferior flexible de dos puntos |
| Forward-facing child restraint | Asiento de seguridad que se instala mirando hacia el frente |
| Forward-facing only child restraint | Asiento de seguridad que solamente se instala mirando hacia <br> el frente |
| Frame | Estructura, marco |
| Fray | Deshilachar |
| Free-sliding latch plate | Front air bags |

English

## Spanish

| Front passenger seat | Asiento delantero del pasajero |
| :---: | :---: |
| Frontal crash | Choque frontal |
| Fuel system | Sistema de combustible |
| Guard rails | Barandas, rieles, barreras de seguridad |
| Guidelines | Guías, pautas, principios |
| Hand-me down seat | Asiento de segunda mano |
| Handouts | Materiales impresos, comunicados, folletos |
| Hands-on exercises | Ejercicios prácticos |
| Hardware | Piezas, partes, materiales |
| Harness | Arnés |
| Harness Adjuster Bar | Varilla para ajustar el arnés |
| Harness retainer clip | Retenedor del arnés, broche retentivo del arnés |
| Harness slots | Ranuras para el arnés |
| Harness snug | Arnés ajustado |
| Harness straps | Correas del arnés |
| Harness system | Sistema de arnés |
| Head excursion | Movimiento de la cabeza |
| Head Injury Criterion (HIC) | Criterios sobre lesión cerebral, criterios de traumatismo cerebral |
| Head restraint | Cabecera, respaldo para la cabeza |
| Heavy duty tape | Cinta engomada extra fuerte |
| High back booster seat | Asiento elevado "booster" con espaldar, respaldo |
| Highway | Carretera, autopista |
| Highway safety | Seguridad en las carreteras |
| Host variables | Variables humanas |
| Hot Line | Ver "Auto Safety Hot Line", Línea Telefónica Gratuita |
| Household carrier | Portador para bebés de uso doméstico |
| Human collision | Colisión del cuerpo |
| Human error | Error humano |
| Improper installation in vehicles | Instalación incorrecta en los vehículos |
| Incompatibility | Incompatibilidad |
| Infants | Infantes, bebés |
| Inflatable curtain (IC) | Cortina inflable |
| Inflatable tubular air bags Injury | Bolsa de aire inflativa en forma de tubo Lesión |

## Spanish

| Injury facts | Datos sobre las lesiones |
| :--- | :--- |
| Injury outcome | Consecuencias de las lesiones |
| Injury prevention | Prevención de lesiones |
| Integrated seat | Asiento integrado |
| Integrated child restraint | Asiento de seguridad integrado al asiento del vehículo |
| Intentional injuries, | Lesión intencional |
| Interactive discussion | Conversaciones interactiva |
| Interactive questioning | Interrogatorio interactivo, platica, diálogo |
| Internal harness | Arnés interno |
| Issues | Situaciones, asuntos, problemas |
| Jump seat | Asiento plegable |
| Juvenile Products Manufacturers | Asociación de Fabricantes de Productos para Niños |
| Association (JPMA) | Soporte para la rodilla |
| Knee bolster | Movimiento de la rodilla |
| Knee excursion | Cinturón de regazo y hombro |
| Lap/Shoulder belt (L/S belt) | Etiqueta |
| Label | Cinturones de regazo/falda |
| Lap belts | Cinturones de regazo solamente |
| Lap only belts | Requisitos de la etiqueta |
| Label requirements | Parra de agarre |
| LATCH, Lower Anchors and Tethers <br> for Children | Sistema de anclaje inferior superior LATCH |
| LATCH attachments | Conexiones para el sistema de anclaje LATCH |
| Latch plate | Placa de cierre |
| LATCH System | Sistema de anclaje LATCH |
| Lateral crash | Choque lateral |
| Law enforcement vehicle (LE vehicle) | Vehículo de la policía, patrulla de seguridad |
| Liability | Responsabilidad legal por daños y perjuicios, obligación legal |
| Light pickup truck | Lightweight locking latch plate |
| Load limiter | Lobby |
| Locking bar | Papre de agarre liviano |

## English

## Spanish

| Locking clip | Sujetador (broche) que se usa para fijar el cinturón de seguridad |
| :---: | :---: |
| Locking latch plate | Placa de cierre con agarre |
| Log sheet | Hoja de registro |
| Long-term disability | Discapacidad prolongada |
| Lower anchors | Anclas de la parte inferior |
| Manual adjusting lap belt | Cinturón de seguridad con ajuste manual |
| Manual lap belt | Cinturón de regazo manual |
| Manufacturer | Fabricante, manufacturador |
| Manufacturer's labels | Etiquetas del fabricante |
| Minivan | Mini-autobús "minivan" |
| Misuse | Uso incorrecto |
| Module Content | Contenido del Módulo |
| Motor vehicle crash (MVC) | Choque de vehículo motorizado |
| Motorized shoulder belt | Cinturón de hombro automático |
| National Academy of Sciences, (NAS) | Academia Nacional de las Ciencias Junta Directiva |
| National Child Passenger Safety Board (NCPSB) | Nacional de Seguridad del Niño Pasajero |
| National Highway Traffic Safety Administration (NHTSA) | Administración Nacional de Seguridad del Tráfico en las Carreteras |
| National Safety Council (NSC) | Consejo Nacional de Seguridad |
| Newborn | Recién nacido |
| Newton's Law of Motion | Ley del Movimiento de Newton |
| Occupant ejections | Expulsión de los ocupantes |
| Occupant protection | Protección del ocupante |
| Occupant Protection Programs | Programas de Protección al Ocupante |
| Occupant Protection System (OPS) | Sistema de seguridad para el ocupante |
| On/off switch | Interruptor para activar o desactivar |
| Outboard position | Posición lateral en la parte trasera del vehículo (al lado de la puerta) |
| Outboard passenger seat | Asiento lateral para el pasajero en la parte trasera del vehículo |
| Outside force | Fuerza externa |
| Overhead infrared sensors | Sensores de rayos infrarrojos de techo |
| Overhead ultrasound sensors | Sensores de ultrasonido del techo |


| English | Spanish |
| :--- | :--- |
| Padding | Relleno |
| Parts | Partes, piezas |
| Passenger air bag | Bolsa de aire para el pasajero |
| Passenger vehicles | Vehículos de pasajeros |
| Passive protection | Protección pasiva |
| Pedestrian | Peatón |
| Peer | Individuo semejante, compañero |
| Performance standards | Normas de funcionamiento |
| Phases of a crash | Etapas (fases) de un choque |
| Physical environment variables | Variables del ambiente físico |
| Pickup truck | Camioneta, camioneta de carga, camioneta extendida, <br> camion tipo "pick up" |
| Post-crash phase | Etapa/fase después del choque |
| Pre-crash phase | Fase antes del choque |
| Pre-crash speed | Velocidad antes del choque |
| Pretentioner | Carrete retractable |
| Product life | Posición reclinada |
| Prone | Tarjeta de inscripción, registro |
| Ratchet | Acostado boca abajo |
| Rear bench seats | Mecanismo de engranaje, trinquete |
| Rear- end crash | Asientos traseros tipo banco |
| Rear facing CR | Chotal |
| Rear seat position | Asiento de seguridad que se instala mirando hacia atrás |
| Rear window | Posición en el asiento trasero |
| Rear-end collisions | Ventana trasera |
| Rear-end impacts | Choques traseros |
| Recalls | Productos con avisos de retiro del mercado a causa de <br> defectos <br> Regular locking clip |
| Recline adjustment mechanism | Recline indicator |

English

## Spanish

| Retainer | Retenedor |
| :---: | :---: |
| Retainer clip | Broche retenedor del arnés |
| Retainer snug | Arnés bien ajustado |
| Rescue workers | Personal de rescate |
| Research | Investigación, análisis |
| Restrained | Asegurado al sistema de seguridad |
| Restraint base | Base del asiento de seguridad |
| Restraining force | Fuerza limitadora |
| Restraining straps | Correas del sistema de seguridad |
| Restraint systems | Sistemas de seguridad |
| Retractor | Retractor |
| Retrofit lap belts | Cinturones de seguridad que se han añadido después |
| "Ride down" | Disminución de las fuerzas del choque, disminuir/amortiguar el impacto del choque |
| Rigid attachments | Conexiones rígidas, conectadores rígidos |
| Rigid Latch System Seat | Asiento de seguridad con sistema de anclaje rígido |
| Role | Papel, función |
| Role play exercises | Ejercicios de ensayo improvisados |
| Rollover | Vuelco, volcarse |
| Rotation | Vueltas |
| Routing | Ruta |
| Rubber mat | Tapete o alfombra de goma, hule, caucho |
| Safety | Seguridad |
| Safety belt | Cinturón de seguridad |
| Safety issues | Problemas de seguridad |
| Safety rationale | Fundamento de seguridad |
| Safety seat harness | Arnés del asiento de seguridad |
| Safety standards | Normas de seguridad |
| School bus seats | Asientos del autobús escolar |
| School buses | Autobuses escolares |
| Scribes | Escribientes, redactores |
| Seat | Asiento |
| Seat back | Respaldo/espaldar del asiento |
| Seat belt | Cinturón de seguridad |

## English

## Spanish

| Seat belt configuration | Tipo de cinturón de seguridad |
| :--- | :--- |
| Seat belt features | Atributos distintivos del cinturón de seguridad |
| Seat belt pretensioner | Carrete retractable del cinturón de seguridad |
| Seat belt system | Sistema de cinturones de seguridad |
| Seat bight | Recodo del asiento |
| Seat cushion contour | Contorno del asiento |
| Seat frame | Estructura, marco del asiento |
| Seat's padding | Relleno del asiento |
| Seat slope | Inclinación del asiento |
| Seat weight sensor | Sensor de peso dentro del asiento |
| Second hand child seat | Asiento de seguridad de segunda mano |
| Self-certify | Auto-certificar |
| Self-study module | Módulo de estudio independiente |
| Service Station | Estación de servicio |
| Sewn - on latch plate | Placa de cierre cosida |
| Shell | Armazón |
| Shield booster seat | Asiento elevado "booster" con escudo protector |
| Shoulder belt positioners Shoulder | Ajustadores para el cinturón de hombro Cinturones de <br> hombro <br> belts |
| Shoulder restraint | Cinturón de hombro |
| Side-facing jump seat | Asiento plegable lateral que mira hacia el interior del vehículo |
| Side-facing seat | Asiento plegable que miran hacia el lado |
| Side impact air bag (SIAB) | Bolsa de aire contra impacto lateral |
| Side impact crash | Choque lateral, con impacto por el lado |
| Side impact protection system niños con necesidades especiales |  |
| Side window | Sistema de seguridad contra impacto lateral |
| Skid | Ventana lateral |
| Slack in the seat belt | Patinazo |
| Sled testing | Prueba de trineo, mecanismo que se utiliza en pruebas de |
| choques |  |
| Sliding latch plate | Special needs CRS |

English

## Spanish

| Spinal cord | Médula espinal, espina dorsal |
| :---: | :---: |
| Spine | Columna vertebral |
| Spins | Dar vueltas, girar |
| Splitter plate | Placa de separación |
| Standardization | Uniformación, normalización, estandarización |
| Standardized bench seat | Asiento estándar tipo banco |
| Standardized Child Passenger Safety Training Program | Programa Nacional Uniforme de Adiestramiento en Sistemas de Seguridad del Niño Pasajero |
| Standardized CR anchorage | Anclaje uniforme para el asiento de seguridad |
| Steering wheel | Volante, timón |
| Sun visor | Parasol, visera |
| Supine | Inclinado |
| Supplemental Inflatable Restraint (SIR) | Sistema de Seguridad Inflamable Suplementario |
| Supplemental Restraint System (SRS) | Sistema de Seguridad Suplementario |
| Swerves | Desviarse bruscamente de lado a lado |
| Switchable | Intercambiable |
| Switchable latch plates | Placas de cierre intercambiable |
| Switchable retractor | Retractor intercambiable |
| T-Shield | Escudo en forma de T |
| Test Criteria | Criterio de prueba |
| Tether | Correa de sujeción del sistema de anclaje LATCH |
| Tether anchor | Punto de conexión para la correa anclaje |
| Tether anchor strap | Correa del anclaje |
| Tether hook | Ganchos para la correa del sistema de LATCH |
| Tether strap kit | Conjunto de correas de sujeción para el sistema de anclaje LATCH |
| The retractor locks | El retractor se cierra, se agarra |
| Thread it through | Pasar a través |
| Three-point restraint | Cinturón de seguridad de tres puntos |
| To record | Anotar, documentar |
| Toddler | Niño pequeño |
| Top tether | Correa de sujeción en la parte superior del sistema de anclaje |
| Tough choices | Decisiónes difíciles |

## English

## Spanish

| Traffic crashes | Choques automovilísticos |
| :--- | :--- |
| Traffic Injury Control | Programas de Control de Lesiones de Programs Tráfico |
| Trapped | Atrapado |
| Tray Shield | Protector tipo bandeja/charola |
| "TREAD Act", Transportation Recall <br> Enhancement, Accountability and <br> Documentation Act | Acta de Documentación, Responsabilidad y Realce de <br> Productos de Transportación con Aviso de Retiro del <br> Mercado |
| Two-point seat belt | Cinturón de seguridad de dos puntos |
| Unintentional damage/injuries | Lesiónes no - intencionales |
| Unrestrained occupants | Pasajeros que no utilizan el cinturón de seguridad |
| Unsurvivable crashes | Choques sin sobrevivientes |
| Up-to-date information | Información al día, actualizada |
| Upper tether anchorage | Anclaje de la parte superior |
| Upper thighs | Parte de arriba de los muslos |
| Upright forward-facing position | Posición vertical orientada hacia el frente |
| Upright position | Posición vertical, posición erguida |
| Upward | Hacia arriba |
| Vaults | Volteretas |
| Vehicle anchoring system | Sistema de anclaje del vehículo |
| Vehicle compatibility | Compatibilidad del vehículo |
| Vehicle design | Sistemas de advertencia |
| Vehicle features | Diseño del vehículo |
| Vehicle occupant protection system | Sistema de seguridad para los ocupantes del vehículo |
| Vehicle owner's manual de seguridad |  |
| Vehicle restraint systems | Manual del vehículo para el propietario |
| Vehicle seat bight | Sistemas de seguridad en los vehículos |
| Vehicle systems ID | Sistemas de identificación en los vehículos |
| Vouchers | Comprobantes |
| Waiver of liability of claim | Declaración de renuncia al derecho de reclamo |
| Warning labels | Warning lights |


| English | Spanish |
| :--- | :--- |
| Weight of the object struck | Peso del objeto golpeado |
| Weight of the occupant | Peso del ocupante |
| Whiplash | Lesión de Latigazo en el cuello |
| Windshield | Parabrisas |

## Traducción de Términos de Español a Inglés Sobre la Seguridad del Niño Pasajero

| Español | English |
| :--- | :--- |
| 4 Pasos para niños | 4 Steps for Kids |
| Abrocharse el cinturón | Buckle up |
| Academia Nacional de las Ciencias | National Academy of <br> Sciences, (NAS) |
| Accesorios adicionales | After market products |
| Accesorios o rasgos distintivos, características accesorios adicionales | Features |
| Acostado boca abajo | Prone |
| Acta de Documentación, Responsabilidad y Realce de Productos de |  |
| Transportación con Aviso de Retiro del Mercado | "TREAD Act", <br> Transportation <br> Recall Enhancement, <br> Accountability and <br> Documentation Act |
| Administración Federal de Aviación | Federal Aviation <br> Administration (FAA) |
| Administración Nacional de Seguridad del Tráfico en las Carreteras | National Highway <br> Traffic Safety <br> Administration <br> (NHTSA) |
| Ajustador de reclinación | Recline adjustment <br> mechanism |
| Ajustadores para el cinturón de hombro | Shoulder belt <br> positioners |


| Español | English |
| :---: | :---: |
| Ajustar, apretar | Cinching |
| Al nivel de la axila | Armpit level |
| Alcance Comunitario Community | Outreach |
| Analizar minuciosamente y desmontar (desarmar) los asientos de seguridad para niños | Dissecting Child Restraint Systems (CRS) |
| Ancla | Anchor |
| Anclaje de la parte superior | Upper tether anchorage |
| Anclaje uniforme para el asiento de seguridad | Standardized CR anchorage |
| Anclas de la parte inferior | Lower anchors |
| Angulo de reclinación | Recline angle |
| Anotar, documentar | To record |
| Aplicación de la ley | Enforcement |
| Apoyo para el brazo | Armrest |
| Armazón | Shell |
| Arnés | Harness |
| Arnés ajustado | Harness snug |
| Arnés bien ajustado | Retainer snug |
| Arnés de 5 puntos | 5 - Point harness |
| Arnés del asiento de seguridad | Safety seat harness |
| Arnés interno | Internal harness |
| Asegurado al sistema de seguridad | Restrained |
| Asiento | Seat |
| Asiento de seguridad con sistema de anclaje flexible | Flexible latch system seat |
| Asiento de seguridad con sistema de anclaje rígido | Rigid Latch System Seat |
| Asiento de seguridad convencional para niños | Conventional Child Restraint |
| Asiento de seguridad de segunda mano | Second hand child seat |
| Asiento de seguridad integrado al asiento del vehículo | Integrated child restraint |
| Asiento de seguridad que se instala mirando hacia atrás | Rear facing CR |
| Asiento de seguridad que se instala mirando hacia el frente | Forward-facing child restraint |
| Asiento de seguridad que solamente se instala mirando hacia el frente | Forward-facing only child restraint |
| Asiento de seguridad tipo cama para infantes | Car bed |


| Español | English |
| :---: | :---: |
| Asiento del vehículo tipo banco | Bench seat |
| Asiento del vehículo tipo deportivo | Bucket seat |
| Asiento delantero | Front seat |
| Asiento delantero del pasajero | Front passenger seat |
| Asiento elevado "booster" con ajuste para el cinturón de seguridad | Belt-positioning "booster" seat, (BPB) |
| Asiento elevado "booster" con escudo protector | Shield booster seat |
| Asiento elevado "booster" con espaldar, respaldo | High back booster seat |
| Asiento elevado "booster" sin espaldar, respaldo | Backless booster |
| Asiento elevado "booster", asiento que eleva al niño | Booster seat |
| Asiento estándar tipo banco | Standardized bench seat |
| Asiento integrado | Integrated seat |
| Asiento lateral para el pasajero en la parte trasera del vehículo | Outboard passenger seat |
| Asiento plegable | Jump seat |
| Asiento plegable lateral que mira hacia el interior del vehículo | Side-facing jump seat |
| Asiento plegable que miran hacia el lado | Side-facing seat |
| Asientos de seguridad convertibles | Convertible restraints |
| Asientos de seguridad para niños, sistemas de seguridad para niños | Child restraints, (CR) |
| Asientos del autobús escolar | School bus seats |
| Asientos traseros tipo banco | Rear bench seats |
| Asociación de Fabricantes de Productos para Niños | Juvenile Products <br> Manufacturers <br> Association (JPMA) |
| Asuntos sobre la compatibilidad | Compatibility issues |
| Asuntos sobre la seguridad de los aviones | Aircraft safety issues |
| Atrapado | Trapped |
| Atributos distintivos del cinturón de seguridad | Seat belt features |
| Autobuses escolares | School buses |
| Auto-certificar | Self-certify |
| Avión | Aircraft |
| Barandas, rieles, barreras de seguridad | Guard rails |
| Barra de agarre | Locking bar |
| Base del asiento de seguridad | Restraint base |
| Base removible | Detachable base |


| Español | English |
| :---: | :---: |
| Bien ajustado | Snugly |
| Bolsa de aire con dos etapas de despliegue/inflado | Dual-stage air bag |
| Bolsa de aire contra impacto lateral | Side impact air bag (SIAB) |
| Bolsa de aire inflativa en forma de tubo | Inflatable tubular air bags |
| Bolsa de aire moderna | Advanced air bag |
| Bolsa de aire para el pasajero | Passenger air bag |
| Bolsas de aire delanteras | Front air bags |
| Bolsas de aire, bolsas de aire "inteligentes", bolsas de aire modernas | Air bags, "smart" air bags |
| Broche retenedor del arnés | Retainer clip |
| Cabecera, respaldo para la cabeza | Head restraint |
| Camioneta de carga ligera, carga liviana | Light pickup truck |
| Camioneta, camioneta de carga, camioneta extendida, camion tipo "pick up" | Pickup truck |
| Características o accesorios distintivos del vehículo | Vehicle features |
| Carrete retractable | Pretentioner |
| Carrete retractable del cinturón de seguridad | Seat belt pretensioner |
| Carretera, autopista | Highway |
| Cinta engomada extra fuerte | Heavy duty tape |
| Cinturón de hombro | Shoulder restraint |
| Cinturón de hombro automático | Motorized shoulder belt |
| Cinturón de regazo manual | Manual lap belt |
| Cinturón de regazo y hombro | Lap/Shoulder belt (L/S belt) |
| Cinturón de seguridad | Safety belt |
| Cinturón de seguridad | Seat belt |
| Cinturón de seguridad con ajuste manual | Manual adjusting lap belt |
| Cinturón de seguridad con carrete retractable | Belt pretensioner |
| Cinturón de seguridad de dos puntos | Two-point seat belt |
| Cinturón de seguridad de tres puntos | Three-point restraint |
| Cinturón de seguridad flojo | Slack in the seat belt |


| Español | English |
| :---: | :---: |
| Cinturón que usa un sólo pedazo de tejido continúo para el cinturon de hombro y regazo/falda. Empieza en el punto de anclaje y el otro extremo termina en el retractor. | Continuous loop belt |
| Cinturones de hombro | Shoulder belts |
| Cinturones de regazo solamente | Lap only belts |
| Cinturones de regazo/falda | Lap belts |
| Cinturones de seguridad que se han añadido después | Retrofit lap belts |
| Clavícula | Collar bone |
| Colisión del cuerpo | Human collision |
| Colisión, choques | Collision/collisions |
| Columna vertebral | Spine |
| Columnas del volante plegables | Collapsible steering columns |
| Comisión de Seguridad para Productos de Consumo | Consumer Products Safety Commission |
| Compatibilidad del vehículo | Vehicle compatibility |
| Comprobantes | Vouchers |
| Condiciones ambientales | Environmental conditions |
| Conductor | Driver |
| Conectadores inferiores del asiento de seguridad | Child restraint lower attachments |
| Conexión inferior flexible de dos puntos | Flexible 2-point lower attachment |
| Conexiones para el sistema de anclaje LATCH | LATCH attachments |
| Conexiones rígidas, conectadores rígidos | Rigid attachments |
| Conjunto de correas de sujeción para el sistema de anclaje LATCH | Tether strap kit |
| Consecuencias de las lesiones | Injury outcome |
| Consejo Nacional de Seguridad | National Safety Council (NSC) |
| Contenido del Módulo | Module Content |
| Contorno del asiento | Seat cushion contour |
| Control de defectos | Defect monitoring |
| Conversaciones interactiva | Interactive discussion |
| Correa de sujeción del sistema de anclaje LATCH | Tether |
| Correa de sujeción en la parte superior del sistema de anclaje | Top tether |


| Español | English |
| :--- | :--- |
| Correa del anclaje | Anchor strap |
| Correa del anclaje | Tether anchor strap |
| Correas del arnés | Harness straps <br> Child restraint harness <br> straps |
| Correas del arnés del asiento de seguridad para niños | Restraining straps |
| Correas del sistema de seguridad | Inflatable curtain (IC) |
| Cortina inflable | Test Criteria |
| Criterio de prueba | Head Injury Criterion <br> (HIC) |
| Criterios sobre lesión cerebral, criterios de traumatismo cerebral | Affordability |
| Cuando el precio está dentro de los medios del comprador, con el precio <br> que usted puede pagar | E-Z-On Vest |
| Chaleco "E-Z-On" (Fácil de Ponerse) | Crash |
| Choque | Motor vehicle crash <br> (MVC) |
| Choque de vehículo motorizado | Frontal crash |
| Choque frontal | Lateral crash |
| Choque lateral | Side impact crash |
| Choque lateral, con impacto por el lado | Rear- end crash |
| Choque trasero | Traffic crashes |
| Choques automovilísticos | Unsurvivable crashes |
| Choques sin sobrevivientes | Rear-end collisions |
| Choques traseros | Spins |
| Dar vueltas, girar | Injury facts |
| Datos sobre las lesiones | Tough choices |
| Decisiónes difíciles | Waiver of liability of <br> claim |
| Declaración de renuncia al derecho de reclamo | Advocates |
| Departamentils | Department <br> Transportation (DO |
| Defensores, Activistas de le la bolsa de aire, cuando la bolsa de aire se infla | Departamento de Transporte |
|  | Motor Deshilachar |


| Español | English |
| :---: | :---: |
| Desviarse bruscamente de lado a lado | Swerves |
| Dinámica de choques | Crash dynamics |
| Dirección del sitio web | Web site address |
| Discapacidad prolongada | Long-term disability |
| Diseño del vehículo | Vehicle design |
| Disminución de la velocidad, deceleración | Deceleration |
| Disminución de las fuerzas del choque, disminuir/amortiguar el impacto del choque | "Ride down" |
| Distribuidores, concesionarios | Dealerships |
| Donde se une el respaldo y el asiento | Bight |
| Ejercicios de ensayo improvisados | Role play exercises |
| Ejercicios prácticos | Hands-on exercises |
| El retractor se cierra, se agarra | The retractor locks |
| Error humano | Human error |
| Escribientes, redactores | Scribes |
| Escudo en forma de T | T-Shield |
| Espaldar, apoyo para la espalda, respaldo | Back support |
| Espina dorsal | C-Spine |
| Estación de servicio | Service station |
| Estructura o, marco comprimible | Crushable frame |
| Estructura, marco | Frame |
| Estructura, marco del asiento | Seat frame |
| Etapa durante el choque | Crash phase |
| Etapa/fase después del choque | Post-crash phase |
| Etapas (fases) de un choque | Phases of a crash |
| Etiqueta | Label |
| Etiqueta del asiento de seguridad para niños | Child restraint label |
| Etiquetas de advertencia, etiquetas con avisos | Warning labels |
| Etiquetas del fabricante | Manufacturer's labels |
| Evento en donde se revisan los asientos de seguridad para niños | Check-up event |
| Evento en donde se revisan los asientos de seguridad para niños | Child restraint system (CRS) checkups event |
| Expulsión | Ejection |
| Expulsión de los ocupantes | Occupant ejections |


| Español | English |
| :---: | :---: |
| Fabricante de vehículos | Automobile manufacturer |
| Fabricante, manufacturador | Manufacturer |
| Fase antes del choque | Pre-crash phase |
| Forma de común acuerdo | Agreement form |
| Formulario para la investigación de defectos | Defect investigation form |
| Frenar de emergencia | Emergency braking |
| Fuerza externa | Outside force |
| Fuerza limitadora | Restraining force |
| Fuerzas del choque | Crash forces |
| Función del gobierno federal | Federal Role |
| Fundamento de seguridad | Safety rationale |
| Ganchos para la correa del sistema de LATCH | Tether hook |
| Guías, pautas, principios | Guidelines |
| Hacia arriba | Upward |
| Hebilla | Buckle |
| Hoja de registro | Log sheet |
| Hundimiento leve | Slight indentation |
| Impactos traseros | Rear-end impacts |
| Inclinación del asiento | Seat slope |
| Inclinado | Supine |
| Incompatibilidad | Incompatibility |
| Incorporado | Built into |
| Indicador de reclinación | Recline indicator |
| Individuo semejante, compañero | Peer |
| Industria de asientos de seguridad para niños | Child restraint industry |
| Infantes, bebés | Infants |
| Información al día, actualizada | Up-to-date information |
| Instalación incorrecta en los vehículos | Improper installation in vehicles |
| Instrumento de evaluación | Assessment tool |
| Intercambiable | Switchable |
| Interior que provee protección adicional | Friendly interior |


| Español | English |
| :---: | :---: |
| Interrogatorio interactivo, platica, diálogo | Interactive questioning |
| Interruptor para activar o desactivar | On/off switch |
| Interruptores para activar y desactivar las bolsas de aire | Air bag on-off switches |
| Investigación, análisis | Research |
| Junta Directiva Nacional de Seguridad del Niño Pasajero | National Child Passenger Safety Board (NCPSB) |
| Lesión | Injury |
| Lesión cerebral | Brain injury |
| Lesión de Latigazo en el cuello | Whiplash |
| Lesión intencional | Intentional injuries, |
| Lesión sostenida durante la niñez | Childhood injury |
| Lesiónes no - intencionales | Unintentional damage/ injuries |
| Ley del Movimiento de Newton | Newton's Law of Motion |
| Limitador de carga | Load limiter |
| Línea de Información Sobre la Seguridad del Auto | Auto Safety Hot Line |
| Lo más apretado posible | As tightly as possible |
| Luces de advertencia de emergencia | Warning lights |
| Maniquí | Dummy |
| Manta, frazada | Blanket |
| Manual del vehículo para el propietario | Vehicle owner's manual |
| Manual para el uso del propietario del asiento de seguridad para niños | Child restraint manual |
| Materiales impresos, comunicados, folletos | Handouts |
| Mecanismo de engranaje, trinquete | Ratchet |
| Mecanismos, aparatos | Devices |
| Médula espinal, espina dorsal | Spinal cord |
| Mini-autobús "minivan" | Minivan |
| Módulo de estudio independiente | Self-study module |
| Módulo de la bolsa de aire para el conductor | Driver's air bag module |
| Movimiento de la cabeza | Head excursion |
| Movimiento de la rodilla | Knee excursion |
| Niño pequeño | Toddler |


| Español | English |
| :---: | :---: |
| Niños con necesidades especiales de salud | Children with special health needs |
| Normas de funcionamiento | Performance standards |
| Normas de seguridad | Safety standards |
| Normas Federales de Seguridad para Vehículos de Motor | Federal Motor Vehicle Safety Standards (FMVSS) |
| Panel o, tablero de instrumentos | Dashboard |
| Papel, función | Role |
| Parabrisas | Windshield |
| Parachoques, defensa amortiguador de choques | Bumper |
| Parasol, visera | Sun visor |
| Parte de arriba de los muslos | Upper thighs |
| Partes, piezas | Parts |
| Pasajeros que no utilizan el cinturón de seguridad | Unrestrained occupants |
| Pasar a través | Thread it through |
| Patinazo | Skid |
| Peatón | Pedestrian |
| Personal de rescate | Rescue workers |
| Personas que cuidan niños | Caregivers |
| Peso del objeto golpeado | Weight of the object struck |
| Peso del ocupante | Weight of the occupant |
| Piezas, partes, materiales | Hardware |
| Placa de cierre | Latch plate |
| Placa de cierre con agarre | Locking latch plate |
| Placa de cierre cosida | Sewn - on latch plate |
| Placa de cierre de agarre liviano | Lightweight locking latch plate |
| Placa de cierre deslizable | Free-sliding latch plate |
| Placa de cierre deslizable o corrediza | Sliding latch plate |
| Placa de separación | Splitter plate |
| Placas de cierre intercambiable | Switchable latch plates |
| Portador para bebés de uso doméstico | Household carrier |
| Posición central del asiento delantero | Center front seat position |


| Español | English |
| :--- | :--- |
| Posición en el asiento trasero | Rear seat position |
| Posición lateral en la parte trasera del vehículo (al lado de la puerta) | Outboard position |
| Posición reclinada | Reclined position |
| Posición vertical orientada hacia el frente | Upright forward-facing <br> position |
| Posición vertical, posición erguida | Upright position |
| Practicas modelo, criterio que se usa para hacer las cosas de una manera <br> mejor | Best practices |
| Prevención de lesiones | Injury prevention |
| Problemas de seguridad | Safety issues |
| Procedimiento utilizado en la manufacturación del tejido del cinturón para <br> reforzar y controlar la energía | Energy management <br> loops |
| Procurar, promover la aprobación de una ley, cabildear | Lobby |
| Productos con avisos de retiro del mercado a causa de defectos | Recalls |
| Programa de Easter Seal "Los niños viajan seguros" | Easter Seal Program: <br> "Kids are Riding Safe <br> Program" (KARS) |
| Programa de subvención | Bounty program |
| Programa Nacional Uniforme de Adiestramiento en Sistemas de | Standardized Child <br> Passenger Safety <br> Segaining Program |
| Punto de anclaje | Choque simulado |
| Programas de Control de Lesiones de Tráfico | Traffic Injury Control <br> Programs |
| Programas de Protección al Ocupante | Child restraint crash <br> tests |
| Protección activa | Programs Protection |
| Protección del ocupante | Child Passenger Safety <br> Programs |
| Protección pasiva | Active protection |
| Protector tipo bandeja/charola | Occupant protection |
| Prueba de trineo, mecanismo que se utiliza en pruebas de choques | Passive protection |
| Tray Shield |  |
| Sled testing |  |
| Prompliance testing |  |
| Pramplimiento | Seguridad del Niño Pasajero |


| Español | English |
| :---: | :---: |
| Punto de conexión para la correa anclaje | Tether anchor |
| Rajaduras | Cracks |
| Ranuras para el arnés | Harness slots |
| Recién nacido | Newborn |
| Recodo del asiento | Seat bight |
| Recodo del asiento del vehículo | Vehicle seat bight |
| Relleno | Padding |
| Relleno adicional | Additional Padding |
| Relleno del asiento | Seat's padding |
| Relleno resistente al fuego, relleno que retarda el fuego | Flame retardant padding |
| Requisitos de la etiqueta | Label requirements |
| Respaldo/espaldar del asiento | Seat back |
| Responsabilidad legal por daños y perjuicios, obligación legal | Liability |
| Resumen del curso | Course overview |
| Retenedor | Retainer |
| Retainer Retenedor del arnés, broche retentivo del arnés | Harness retainer clip |
| Retractor | Retractor |
| Retractor de cierre de emergencia | Emergency locking retractor (ELR) |
| Retractor intercambiable | Switchable retractor |
| Retractor para controlar la energía | Energy management retractor |
| Retractor que se inmoviliza automáticamente | Automatic Locking Retractor (ALR) |
| Revisiones de los asientos de seguridad para niños | Child restraint system (CRS) checkups |
| Ruta | Routing |
| Ruta o trayectoria del cinturón de seguridad | Belt path |
| Seguridad | Safety |
| Seguridad del auto | Auto safety |
| Seguridad del niño | Child safety |
| Seguridad del Niño Pasajero | Child Passenger Safety (CPS) |
| Seguridad del Niño Pasajero | CPS |
| Seguridad en las carreteras | Highway safety |


| Español | English |
| :---: | :---: |
| Sensor de choques | Crash sensor |
| Sensor de peso dentro del asiento | Seat weight sensor |
| Sensores de rayos infrarrojos de techo | Overhead infrared sensors |
| Sensores de ultrasonido del techo | Overhead ultrasound sensors |
| Ser expulsado del vehículo | Being thrown out of the car |
| Servicios de Emergencias Médicas | Emergency Medical Service (EMS) |
| Sistema de anclaje | Anchorage system |
| Sistema de anclaje del vehículo | Vehicle anchoring system |
| Sistema de anclaje inferior superior LATCH | LATCH, Lower Anchors and Tethers for Children |
| Sistema de anclaje LATCH | LATCH System |
| Sistema de anclaje para el asiento de seguridad | Child Restraint (CR) anchorage |
| Sistema de arnés | Harness system |
| Sistema de cinturones de seguridad | Seat belt system |
| Sistema de combustible | Fuel system |
| Sistema de información de análisis fatales | Fatal Analysis Reporting System (FARS) |
| Sistema de seguridad automático | Automatic restraint system |
| Sistema de seguridad contra impacto lateral | Side impact protection system (SIPS) |
| Sistema de Seguridad Inflamable Suplementario | Supplemental Inflatable <br> Restraint (SIR) |
| Sistema de seguridad para el ocupante | Occupant Protection System (OPS) |
| Sistema de seguridad para los ocupantes del vehículo | Vehicle occupant protection system |
| Sistema de seguridad para niños con necesidades especiales | Special needs CRS |
| Sistema de Seguridad Suplementario | Supplemental Restraint System (SRS) |
| Sistemas de advertencia | Warning systems |
| Sistemas de identificación en los vehículos | Vehicle systems ID |


| Español | English |
| :---: | :---: |
| Sistemas de seguridad | Restraint systems |
| Sistemas de seguridad en los vehículos | Vehicle restraint systems |
| Sistemas o asientos de seguridad para niños, sistemas de protección para niños | Child restraint systems (CRS) |
| Situaciones, asuntos, problemas | Issues |
| Soporte para el ancla | Anchor bracket |
| Soporte para la rodilla | Knee bolster |
| Sujetador (broche) para acortar el tejido del cinturón de seguridad | Belt shortening clip |
| Sujetador (broche) que se usa para fijar el cinturón de seguridad | Locking clip |
| Sujetador regular de clip metal | Regular locking |
| Sujetadores (broches) incorporados | Built-in locking clips |
| Sujetadores (broches) incorporados sin cierre | Built-in lock-off locking clips |
| Tapete o alfombra de goma, hule, caucho | Rubber mat |
| Tarjeta de inscripción, registro | Registration card |
| Técnico en la Seguridad del Niño Pasajero | Child Passenger Safety Technician |
| Tejido del cinturón de seguridad | Webbing |
| Tipo de cinturón de seguridad | Seat belt configuration |
| Transferencia aguda | Acute exposure |
| Uniformación, normalización, estandarización | Standardization |
| Uso incorrecto | Misuse |
| Variables del ambiente físico | Physical environment variables |
| Variables humanas | Host variables |
| Varilla para ajustar el arnés | Harness Adjuster Bar |
| Vehículo de la policía, patrulla de seguridad | Law enforcement vehicle (LE vehicle) |
| Vehículos de pasajeros | Passenger vehicles |
| Velocidad antes del choque | Pre-crash speed |
| Ventana lateral | Side window |
| Ventana trasera | Rear window |
| Vía respiratoria | Airway |
| Vida útil del producto | Product life |
| Volante, timón | Steering wheel |


| Español | English |
| :--- | :--- |
| Volteretas | Vaults |
| Vuelco, volcarse | Rollover |
| Vueltas | Rotation |
| Zonas de carga | Cargo areas |

## Index

## \#

4 Steps for Kids,, 149

## A

Active protection, 135-136
Adjustable base, 197
Aftermarket products, 52, 55, 217
Air bags, 5, 40, 46-49, 133-135, 139-145, 194, 224, 225, 291, 299
labels, 143, 184
on-off switch, 133, 145, 194, 299
side, 139
Ambulance, 297, 308
Anchor, 49, 61, 75, 117-131, 162, 165, 170, 177, 195, 198-200, 206-208, 213, 217, 222
Anchorages, 49, 198
Anti-rebound bar, 168
Armrest, 160

## B

Belt sensitive, 88
Belt shortening clip, 81, 98-99, 102-103, 110
Best practice, 16-17, 20, 106, 141, 177-180, 217-218, 227, 235, 256, 279, 285, 295
Bight, 49, 121, 197, 200
Booster, 16-17, 52, 157, 176, 202, 235-239, 254-256, 261, 269-270
backless, 277, 281
belt positioning, 274-276, 282, 290, 312
shield, 279

Buckle, 24, 41, 49, 61-69, 73-75, 83-85, $91-95,100-108,111-112,137-139,155,160$, 186, 198, 200, 242, 248, 257, 265, 281
Buckle release pressure, 49

## C

Car beds, 213-214
Cargo area, 299
Carrying handle, 47, 175, 206, 207
Certification, 6, 9-10
Children with special needs, 176, 210-214, 225, 231-234, 249-251, 305, 309
Cleaning CRs, 174
Collisions, 31-38, 294
frontal, 34, 49, 51, 139, 245
human, 31
internal, 31
rear-end, 36
side impact, $31,35,51,140$
vault, 37
vehicle, 31, 239
Compartmentalization, 301-302
Compliance tests, 46
Convertible CR, 177, 183-185, 190-191, 200, 208-209, 224-225
Crash Dummies, 51
Crash dynamics, 22
Crash forces, $32,39,42,119,144,161,176,182$, 293, 300

D
Detachable base, 166, 183, 190

## E

Ease-of-use rating, 190
Ejection, 38, 184
Emergency vehicles, 309

## F

FAA recommendations, 297, 306-307
FMVSS 208, 49, 55
FMVSS 213, 49-51, 55
FMVSS 225, 49-51, 55
Frame, 161, 288

## H

Harness, 31, 39, 120, 128-129, 160-164, 174-176
adjuster, 161, 177, 191, 204, 227, 228, 243
pre-crash positioning, 164
slots, 161, 186, 204, 224, 242-243, 269
Head excursion, 119, 131, 278
Head restraint, 36, 130, 276, 281
Head Start Transportation, 304

## I

IEP (Individual Education Plan), 305
IFSP, 305
IIHS (Insurance Institute of Highway Safety), 25, 28
integrated seat, 228, 239

## J

JPMA, 171, 202
jump seats, 299

LATCH, 49-50, 115-131
incorrect use, 206
Latch plate, 59, 101, 113
locking, 57-58, 61-64, 68, 83-90, 102-103, 106
sewn, 102
sliding, 80-83, 86-88, 91-93, 102-103, 108
switchable, 65, 68
Learn, Practice, Explain, 1, 8, 18, 81
Level Indicator, 166
Liability, 16
Locking clip, 79-80, 95-98, 108, 161-164, 201, 260, 265
built-in (lock offs), 161
incorrect placement, 91

## M

Myths, 39, 41

## N

Newton's Theory, 30
NHTSA, 10-11, 25-28, 43-46, 86, 100, 117,
133-134, 145, 149, 154, 159, 170-173, 175-178, 190, 212, 218, 228, 235, 274, 291, 300, 303, 306, 308
Noodles, 178, 197, 248, 265

## P

Premature infants, 216

## R

Rebound, 168
Recall, 10, 46-47, 55-56
Recline adjuster, 162, 166
Recline angle, 166, 195-198, 206, 248, 299
Registration card, 159

Reinforcement, 235, 241
Replacing CRs, 239
Retractor, 57-60, 69-76
automatic Locking (ALR), 69, 72-78
emergency Locking (ELR), 80, 86-93, 98, 100-103, 108-113
switchable, 73-75, 86, 103, 137, 201
Retrofit, 121-122, 129, 303
Rule of thumb, 197

## S

Seat belt parts, 61, 95
Seat belt syndrome, 294
Seat belt tightening tools, 52, 56
Seat Padding, 161
Second hand CRs, 202
Shell, 160-161, 182-184, 192-194, 204, 220, 232-235

Shoulder belt behind back, 293
Shoulder belt positioners, 276-277
Special needs, 176, 210-214, 225, 249-251, 305, 309
Splitter plate, 161-162, 204
Switchable, 65, 68, 73-75, 86, 103, 137, 201, 261

Symbols, 121, 125

## T

T-shield, 160, 183, 216
Tether, 49, 61-62, 75, 115-119, 165, 170, 178, 199, 206, 218, 228, 245, 246-248, 257, 269-270, 301-303
Tethering, 257
tough choices, 16-20, 177, 217-218
Tray shield, 160, 183, 216
Twists in belts, 107

Upright, 139, 162, 196, 200, 219, 234, 246, 269
Used CRs, 202
Used seats, 143
V
Vehicle Manufacturer Contacts, 2, 9, 149
W
Wheelchair, 304-305
windshield, 32

www.nhtsa.gov


National Child Passenger Safety Board



[^0]:    ${ }^{1}$ Please note that this list is not meant to be all inclusive.

[^1]:     wants an on-off switch for the same air bag (e.g., juat the pasenger air bag) in moee thas one vethicke and for the same reawo does not need to wabmit a separste form for each velicle. Insucal, the ownet or lesser may liut the make, model, model yeas, and velicie ideneification number for each of thoie vechicles and amach the list to a copy of this form. Each page of the list must be signed and dated by the owner of lessec. A list may aloo be attached so a single copy of this form if the owner or lesere wishes to request aurhorization for oa-off wewieches for boch air bogs in multiple vehicles.
    Please soer that an agency may not condect or spoesor, and a person is mot required to ropond to, a collection of information unless it displap a currently valid OMB control aumber. Thas number appeas above.

[^2]:    The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.
    PEDIATRICS (ISSN 0031 4005). Copyright © 1999 by the American Academy of Pediatrics.

[^3]:    Committee on Injury and Poison Prevention, 2001-2002
    Marilyn J. Bull, MD, Chairperson
    Phyllis F. Agran, MD, MPH
    H. Garry Gardner, MD

    Danielle Laraque, MD
    Susan H. Pollack, MD

[^4]:    * The complete research paper is published in Association for the Advancement of Automotive Medicine, $45^{\text {th }}$ Annual Proceedings, pp. 353-367. Barrington, IL, AAAM, 2001.

[^5]:    ${ }^{1}$ Adapted from "A Guide to Implementing CPS Inspection Stations" National Highway Safety Administration, DOT HS 809 627, December 2003. www.nhtsa.dot.gov/people/injury/childps/CPSInspectionStation/index.html

