



TECH UPDATE

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New Version of the CPS Curriculum in the Works

The National Highway Traffic Safety Administration (NHTSA) and the National Child Passenger Safety Board (CPSB) are always looking for ways to improve the curriculum. NHTSA updates the curriculum every few years. Right now, the CPSB and NHTSA are in the early steps of revising the current curriculum. They gave a preview of their ideas at the Lifesavers conference.

Here is a list of considerations:

- Improving the consistency of the text and wording throughout the course,
- Making the training manual a more valuable resource book,
- Creating videos that will show how to use less common seat belt systems,
- Refreshing the curriculum content with new photos and videos,
- Updating data and statistics on national misuse rates,
- Increasing the harmonization between curriculum and NHTSA and AAP best practice statements,
- Including information on new safety technology,
- Reorganizing the order of teaching vehicle restraint features from most to least common as found in the field,
- Making curriculum more colorful and inviting,
- Streamlining the book by moving some resource material online, and
- Revising the CPS renewal course content at the same time to keep the two classes similar

This exciting process is underway and may be completed as early as next year. Tech Update will keep you posted.

Inside this Issue:

Recent Research: Map of Head Strikes Gives Ideas for Keeping Kids Safer in Cars.....	2
Another Teachable Moment.....	2
Seat Check Smarts: Talking About Airbag Sensors	3
Seat Check Smarts: Talking About Side Airbags	3
Recent Research: Assessing Child Belt Fit with Boosters	4
New Product Update	4
Focus on Testing	5
Technician Spotlight	6
Help with Our Next Issue	6
Win Our Contest	6

Recent Research: Map of Head Strikes Gives Ideas for Keeping Kids Safer in Cars

The most common way children get hurt in car crashes is by hitting their heads on the inside of the vehicle. Proper restraint use can prevent some of these injuries, but even properly restrained kids can get hurt. Researchers at the Children's Hospital of Philadelphia (CHOP) studied what car parts kids' heads contact to help find out how to make the inside of the vehicle safer.

The CHOP team looked at forward-facing children aged 0 to 15 years in the national Crash Injury Research and Engineering Network (CIREN) crash database. This dataset includes only cases where people are seriously injured. Each case report contains detailed information about the crash and injuries. The study used cases that include vehicles with model years from 1985 to 2012. They chose frontal crashes where kids had a serious head injury and were restrained in forward-facing child restraints, booster seats, or lap and shoulder belts without gross misuse. Then they made a map of where kids' heads hit the inside of the car.

For the 21 crashes they studied, they found 28 head and 17 face injuries to restrained children. The head contact points depended on where the child was sitting. When children sat behind the driver, they mostly hit the B-pillar (bar between the left front and back windows). With these kids, their heads moved forward and to the left. This is a spot in the vehicle where a side curtain airbag could help reduce injury. For kids sitting behind the right-front passenger, their heads usually struck the seatback in front of them. The different contact points probably resulted from more crashes having damage to the left side of the vehicle.

For the kids in this study, the head and face injuries were the most severe and often the only injuries. This head contact map can provide guidance to vehicle manufacturers as they continue to make vehicles safer.

Take Home Messages:

- Following proper child passenger safety practices is important to reduce the chance of injury.
- Padded surfaces or clear space around of the child can help to reduce head injury.
- In some cases, side curtain airbags that come out of the roof over the side windows may reduce head injury to children.



Reference: Arbogast KB, Wozniak S, Locey CM, Maltese MR, Zonfrillo MR (2012) Head impact contact points for restrained child occupants. *Traffic Inj Prev.* 2012; 13(2):172-81.



Another Teachable Moment

In this picture, an aluminum carabiner is being used in place of the splitter plate to hold the straps together underneath the infant carrier.

Submitted by Kara Miller, Taney County Health Department, Branson, MO.

Seat Check Smarts: Talking About Airbag Sensors

Advanced airbag systems typically have sensors to detect the size, position and belt use of the right-front occupant. Depending on the crash severity, the occupant sensors may determine if the frontal airbag should deploy and at what power level. The occupant sensors primarily control the frontal impact airbags.

Vehicles model year 2006 and older come with advanced frontal impact airbags, but they can be in some vehicles as old as model year 2003. Some heavy vehicles (i.e. heavy-duty pickups) are not required to have advanced airbags. You can tell if a vehicle has advanced airbags two ways. First, the airbag warning on the visor begins “WARNING! Even with advanced airbags...”. Second, most vehicles have an indicator light telling when the frontal airbag for the right-front passenger is on or off.

Each advanced airbag system may behave differently. Some may suppress the airbag if a child is in the front seat. Others may deploy it at different power levels. You must check the vehicle owner’s manual to figure out how the airbag system is supposed to work.

At a seat check, remind parents that kids 12 years old and younger should sit in the back, even with advanced airbags. Ask if they ever might need to have a child ride in the front. If so, have the child sit in the front seat using the restraint system they would normally use. Turn on the vehicle ignition. Review the vehicle owner’s manual with the caregiver and make sure the airbag indicator light (if applicable) behaves like the manual says it should with the child occupant. If the light does not work, the child should not sit in front.

The advanced airbag occupant sensors are typically designed to detect the occupant sitting in the right-front seat. Sometimes, a rear-facing child restraint installed in the second row that contacts the right-front seat can affect the sensors. This can also happen with a bag of groceries or someone in the rear seat pulling on the front seatback. Review the vehicle owner’s manual for any guidelines about the sensors.

NHTSA provides more details at the following website or you can go to [safercar.gov](http://www.safercar.gov) and search for “Advanced Airbags.”: <http://www.safercar.gov/Vehicle+Shoppers/Air+Bags/Advanced+Frontal+Air+Bags/#6>

Take Home Messages:

- Figure out if the vehicle has an airbag sensor for the right-front seat.
- Review the vehicle owner’s manual to see how the sensor is supposed to work.
- If a child needs to ride in the front seat, check to see that the indicator light is working properly.
- Never place a rear-facing CRS in the front seat with an advanced airbag that is not turned off.



Seat Check Smarts: Talking About Side Airbags

Many vehicles now have airbags to improve protection in side impacts. They are used for occupants in the front and back seat. They work best when occupants are properly restrained. Side airbags help spread crash forces over a larger area of the body than a belt restraint. Some side airbags are mounted to the door, while others are in the vehicle seat. Curtain airbags are typically mounted to the roof rail (the structure above the windows) and deploy downwards towards the occupant. They can help protect the head in side impacts and some rollovers.

Vehicle manufacturers use voluntary test procedures to make sure side airbags pose a low risk of injury to small and out-of-position occupants. (See Focus on Testing section.) Based on real-world crashes with kids, the procedures seem to be working. Arbogast and Kallan (2007) used the Partners for Child Passenger Safety database to study kids in crashes where side airbags deployed. In side impacts severe enough to deploy the airbags, only 10 percent of kids were injured. None of the injuries were serious. These results support the use of child restraints in seating positions with side airbags.

Take Home Messages:

- Make sure caregivers know where side airbags are located.
- Even though they have been tested, tell kids not to lean against side airbags.
- The center seat is usually the safest because of side impacts, not side airbags.
- Do not tell caregivers that side airbags are dangerous.



Recent Research: Assessing Child Belt Fit with Boosters

Researchers at the University of Michigan Transportation Research Institute (UMTRI) studied how belt-positioning booster seats change seat belt fit on kids. Forty-four kids aged 5 to 12 were tested. They sat in four different models of high back boosters, a backless booster and on the vehicle seat without a booster. Four different lap and seven different shoulder belt anchor locations were simulated.

The lap belt fit better (lower on the kid's pelvis) with any booster compared to no booster at all. The boosters tested provided a large range of belt fit. Those with the worst fit for most kids let the lap belt sit too high on the pelvis and close to the abdomen.

The largest kids sitting without a booster had about the same lap belt fit as the smallest kids using the worst fitting booster. When sitting on the vehicle seat, a steeper lap belt angle relative to horizontal provided a much better lap belt fit.

However, when using a booster, lap belt angle did not change lap belt fit.

Changing the shoulder belt upper anchor location had a big effect on shoulder belt fit for kids not using a booster. The worst shoulder belt fit was with a high back booster. Its shoulder belt routing clip pulled the shoulder belt outboard, too far off the shoulder. Other high back boosters with adjustable shoulder belt routing clips provided the best shoulder belt fit.

They also compared the belt fit of the 6 and 10-year-old crash test dummies to the kids' results. The belt fit on the dummies could be used to predict how the seat belts would fit real kids. This means that the crash test dummies can be used to check belt fit using different boosters and seat belts.

Take Home Messages:

- Using a booster always provided better lap belt fit compared to sitting on the vehicle seat.
- If one booster doesn't provide a good belt fit in a vehicle, another product may work better.
- For children too large for boosters, seat belt anchor points in the vehicle can affect lap belt fit. One seating position may provide a better belt fit than another.

Reference: Reed M, Ebert-Hamilton S, Klinich K, Manary M, Rupp J (2012). *Effects of Vehicle Seat and Belt Geometry on Belt Fit for Children with and without Belt Positioning Booster Seats.* [Accid Anal Prev.](#)

New Product Update: Graco Highback TurboBooster with Safety Surround



TurboBooster with Safety Surround



Original TurboBooster

Graco has a new style of TurboBooster. Sold in the US, it has new technology for side impact protection. The backrest and headrest have larger side structures near the body and head. The side wings extend farther forward than the older TurboBooster and have added padding. The headrest can extend up as the child grows.

FMVSS 213 does not currently include side impact testing. Instead, Graco reports that they tested the new TurboBooster with Safety Surround using a version of a European side impact test. The new version of the TurboBooster has the same weight and height specifications as the older version. It can be used in highback booster mode for kids from 30-100 pounds and 38-57 inches tall. The backless booster mode can be used by kids 40-100 pounds and 40-57 inches tall.

Note: The new product update articles are not intended to endorse or recommend a product.

Focus on Testing: Making Airbags Safer for Kids

Frontal Airbags

FMVSS No. 208 covers occupant crash protection. It includes rules for testing advanced frontal impact airbags. With child occupants, advanced airbags have two options. One is to automatically shut off. The other is to deploy with a lower level of energy. Vehicle manufacturers choose the option for each vehicle model.

If the occupant sensors shut off the frontal airbag when there's a child occupant in the front seat, there are static tests to make sure the sensors meet minimum performance standards. The checks are run with newborn, 12-month-old, 3-year-old, and 6-year-old dummies. NHTSA keeps a list of child restraints that can be used for testing. Child restraints are tested when installed with a vehicle belt, installed with LATCH, and just sitting on the vehicle seat. Many "out-of-position" dummy conditions are also checked. They include kneeling on the seat or sitting on the front edge of the vehicle seat cushion. Real children can be positioned or seated in the vehicle seat to determine whether the display light registers properly.



Out of Position Test of a Frontal Airbag with 3-year-old Head Contacting the Airbag

If the vehicle is alternatively supposed to deploy the frontal airbag at a safe level, vehicle manufacturers must run tests where they deploy the airbag (but don't crash the car). These tests are run with the 12-month-old, 3-year-old, 6-year-old, and small female dummies. Some tests place the dummies in child restraints. Others check potentially at risk conditions, such as head or chest touching the airbag cover. The measurements from the dummies must be below levels associated with a low risk of injury.

Side Airbags

The initial problems with frontal airbags led to more caution with the development of side airbags. Many people were concerned about possible danger from side airbags to kids because they would be installed in the back seat. In 2003, a side airbag working group published test procedures to minimize risk of injury from side airbags. The voluntary test procedures are available here:

http://www.iihs.org/ratings/protocols/pdf/twg_final_procedures.pdf

The tests use 3-year-old, 6-year-old, and small female dummies, which are positioned to represent out-of-position occupants. The child dummies are positioned in as many as 15 different configurations, depending on what type of side airbag is present. Postures include a child leaning against the door, a child kneeling on the vehicle seat facing the rear, and a child lying on the seat with the head near the door. The working group recommended limits for the dummy measurements that would be associated with a low risk of injury caused by the airbag.



Out of Position Test of a 3-year-old Facing a Vehicle Seat-Mounted Side Airbag



Out of Position Test of a 3-year-old Lying with the Head near a Door-Mounted Side Airbag

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www.facebook.com/NCPSB2011

Technician Spotlight

This month's technician spotlight features Mandi Seethaler of Alaska. At Lifesavers in June 2012, Mandi was honored as the CPS Technician of the Year. Congratulations to Mandi!

- 1) **How long have you been a CPS Tech?** I was certified as a technician on 3/23/10, and as a CPS Instructor on 3/15/12.
- 2) **Where do you do most of your car seat checks?** The Alaska Injury Prevention Center. As of September, I have completed 314 seat checks. This does not include the seat checks that I have done at other car seat events.
- 3) **What prompted you to take the training?** It was a job requirement, but after taking the course, I fell in love with the program!
- 4) **What is your favorite CPS resource?** Our Alaska CPS Rack Card; I participated on the team that created it! It's specific to our state, but incorporates NHTSA's recommended actions. I also love the commercial that was made by our agency to tell parents that we are here to help! The ad is on our agency home page <http://www.alaska-ipc.org/>.
- 5) **What is your favorite installation hint?** The car seat doesn't need to be "man tight" or immobile. With appropriate pressure from your hand, any person can install a car seat tightly so it does not move more than 1 inch at the belt path.
- 6) **What is the worst weather you've ever experienced at a car seat check?** I have done lots of seat checks when it is below zero. It finally got so bad that I went to our local fire station for help. Many members of the Anchorage Fire Department are technicians and instructors so they were very willing to provide a warm space for car seat checks. Now if it's below 10 degrees outside, I do my seat checks in one of their indoor bays. It sure helps when your fingers aren't frozen and your teeth aren't chattering!
- 7) **What do you think is the best new feature among recent new child restraint products?** The higher weight limits. I love that you can keep kiddos in a harness until 50, 65 or 70 pounds. I just picked up a seat to study that has a 40-pound rear facing limit and a 70-pound forward facing limit with the 5-point harness! Hooray!!

Help with Our Next Issue

Do you have ideas for our next issue? Email us at CPSTechUpdate@umich.edu with suggestions for columns. These could include:

- Pictures of unusual child seat installations for the 'Another Teachable Moment' article
- Name and email of a CPS technician who you would like to see interviewed
- Research you heard about on the news
- New product features
- Issues that have come up at seat checks

Win Our Contest

Sign up to be notified via e-mail when future editions of Tech Update are published and whenever significant announcements or updates to the CPS Board website are made.

Signing up also makes currently certified CPS technicians and instructors eligible to WIN a free CPS recertification—a \$50 or \$60 value—from Safe Kids Worldwide. To read the rules for the drawing and sign up for the CPS Board e-mail list, visit www.cpsboard.org/elist.htm.



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