

Child Passenger Safety Forum

National Transportation Safety Board

December 9, 2010



Summary Report



**Child Passenger
Safety Forum**

in the Air and in Automobiles



Safety for our smallest travelers should not be considered optional or a luxury.

—Deborah A.P. Hersman,
Chairman

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INTRODUCTION

On December 9, 2010, the National Transportation Safety Board (NTSB) held a day-long forum devoted to child passenger safety. The primary purpose of the forum was to improve child safety in airplanes and in automobiles through education and advocacy aimed toward the caregivers of children and the transportation industry. Another purpose was to identify effective strategies to increase child seat and seat belt use rates. This report summarizes key points made by each speaker and discussions with the panel members following their presentations. The views expressed do not necessarily represent the official positions of the NTSB. Links to key NTSB statements concerning child occupant safety in aircraft and in automobiles are listed at the end of this summary.

AVIATION PANEL, PART I

Federal Aviation Administration and Flight Attendant Union Perspectives

Mr. Rick DeWeese, Civil Aerospace Medical Institute, Federal Aviation Administration (FAA)

Ms. Nancy Claussen, Federal Aviation Administration (FAA)

Ms. Patricia Friend, Association of Flight Attendants

Mr. DeWeese's Comments

- **Lap-held children: Not safe.** Children younger than age 2 are not safe during turbulence or in a crash while being held in laps on airplanes.
 - DeWeese about crashes: “if the child is trapped between the seat in front and the adult, it [the child] could be crushed.”
 - Persons holding a child “cannot react fast enough to counter an unanticipated and suddenly applied load as occurs during turbulence. They also just don’t have enough strength to hold onto a child during extreme loading conditions that can occur during a crash landing.”
- **Use government-approved child seats on airplanes (look for Red Letters on label):** This is the best way to ensure a child’s safety during turbulence or an emergency. Most automotive child seats (rear- or forward-facing) sold in stores are also approved for use in aircraft.
 - *The FAA strongly recommends, but does not mandate, this practice.*
- **Babies:** Infants should be in rear-facing child seats while flying.
 - Rear-facing child seats have a protective shell that distributes crash forces evenly and prevents the child from hitting surrounding objects.
- **Toddlers:** Children who are too large for rear-facing seats should fly in forward-facing child seats with internal harnesses.
 - Small children using only a lap belt can receive spinal cord injuries or hit their heads against seat frames. Using a forward-facing child seat reduces the risk of head injuries by reducing forward excursion.

- When are children ready to use lap belts?
 - There is no precise age at which it is safe for children to graduate from child seats to lap belts. The height and weight of the child determines this. Parents should look at the size limits marked on their child restraints to see if they are appropriate to use. FAA research has focused on child seats with internal harnesses for children weighing 40 pounds or less.

Information from the FAA's Website

Always follow the manufacturer's instructions when using a CRS [child restraint system]. FAA recommends that a child weighing:

- Less than 20 pounds use a rear-facing CRS
- From 20 to 40 pounds use a forward-facing CRS
- More than 40 pounds use an airplane seat belt
- A child may also use an alternative, such as a harness-type restraint, if it is approved by FAA. FAA has approved one restraint appropriate for children weighing between 22 and 44 pounds.”

Source: <http://www.faa.gov/passengers/fly_children/crs>.

- ***Belly belts and baby slings:*** Belly belts and similar devices (baby slings, vests, etc.) that fasten children to adults are prohibited by the FAA during takeoff, landing, and surface movement. They can help restrain a child during turbulence but do not provide protection during crash landings.
 - Lab tests show that, during crash landings, children in belly belts may be crushed between adults and seat backs or may be ejected from laps. They are not protected and may be injured or killed.
- ***Using child seats on airplanes:*** Child seats are attached to the airplane seat with the airplane seat's lap belt. Airplane seats do not have the LATCH¹ system, which is common in most motor vehicles.
 - FAA has a video on its website showing parents how to fasten forward-facing child seats in airplanes: <<http://www.faa.gov/tv/?mediaId=228>>
 - Website on flying with children: <http://www.faa.gov/passengers/fly_children/>
 - If child seat is less than 16 inches wide, it should fit into all airline seats, including commuter airlines.
 - Children may need to be moved to an airplane seat with more room between rows to accommodate seats, especially the larger rear-facing ones.
 - Rows behind walls, referred to as bulkhead seats, often have enough space to accommodate rear-facing child seats.

1. LATCH stands for Lower Anchors and Tethers for Children.

- ***Harness restraint systems approved by FAA (AmSafe CARES):*** FAA has approved a harness system that can be used with the lap belt to help restrain children.
- ***Airline seats:*** Placement of anchors also plays a role in how protective child seats are, and newer seats have better interfaces with child seats.
- ***Booster seats:*** Booster seats are prohibited on all airplanes (both general aviation and commercial airplanes) because they are designed to work with shoulder belts, which aren't present for passengers on commercial airplanes. Booster seats do not meet federal standards for use on aircraft.
- ***General aviation (non-commercial airplanes):*** DeWeese says that parents need to detach shoulder belts to use rear-facing and forward-facing child seats with internal harnesses.

Ms. Claussen's Comments

- ***Why the FAA does not require that children younger than 2 be restrained:*** The FAA has not mandated proper restraint for children younger than age 2 because they worry that some families may choose to drive instead of fly if required to purchase an additional seat. Because commercial aviation is safer than motor vehicle travel, this could result in more child deaths on the road.
- ***Enforcement:*** The FAA has taken few enforcement actions against airlines relating to whether they allowed children older than age 2 to be held in laps.
- ***Statistics on how many children younger than 2 fly in commercial aviation:*** The FAA estimates that one percent of all passengers are children younger than age 2 but does not have exact numbers.
- ***Statistics on how many children younger than 2 fly restrained:*** FAA does not have this information.

Ms. Friend's Comments

- ***Association of Flight Attendants:*** Wants a mandate to prohibit children from being held on laps.
 - Said that parents do not keep a tight grip on children during the entire flight.
 - Unexpected (clear air) turbulence can occur while the seat belt sign is not lit and parents will be unable to react quickly enough.
 - Quote from flight attendant: "I have to tell passengers that they cannot hold their laptop computer on their lap; however, a wiggly 20-pound human is allowed."
 - Children are used to riding in child seats in automobiles, so they may be resistant to being held on laps and may be more comfortable in their own child seats.
 - Flight attendants sometimes see children who appear to be older than age 2 (and without their own seat) held on laps during takeoff/landing; some attendants do not feel comfortable questioning parents about whether their children are younger than age 2.

- Disagrees with the FAA's concern that requiring all passengers to have their own seats will result in diversion to highway travel. Thinks that FAA's analysis did not take important factors into account.
 - Unless there is a mandate, parents will incorrectly perceive that it is safe to hold children on laps.
 - Friend stressed the need for more training for flight attendants regarding child restraints.
- *Ms. Friend pointed out that some airline websites make it difficult to buy tickets for children younger than 2:* Some airline websites assume parents will not want to buy tickets for children younger than age 2. To buy a ticket, parents may have to claim that their children are age 2 or older.

General Discussion

- There was discussion about whether the booster seat prohibition was appropriate for general aviation airplanes with shoulder belts.
- There was discussion about education for owners and pilots of general aviation aircraft concerning child passenger safety. The FAA has made some efforts to disseminate information to them.

AVIATION PANEL, PART II

Perspectives from Industry

Mr. John Meenan, Air Transport Association

Ms. Kathleen Vasconcelos, Aircraft Owners and Pilots Association Air Safety Foundation (AOPA)

Ms. Mary Gooding, Virgin Atlantic Airlines

Mr. Meenan's Comments

- Recommends that parents have a discussion with the airline when booking seats about the best places to put a child restraint.
- *Statistics on number of children flying:* The Transportation Security Administration has a Secure Flight advance passenger review system in which every passenger is required to be identified, including their birth date. It may be possible to get a more exact count of children from this database.
 - Flight manifest data are supposed to record all passengers but are not kept on a long-term basis. Nobody is using flight manifest data to track how many children, including lap-held children, are flying.

Ms. Vasconcelos's Comments

- AOPA has educational materials for private pilots about child safety and answers questions from both members and non-members.
- *Accidents*: There have been general aviation accidents where children appear to have survived because they were using a child seat. There have also been accidents where children have died because they were not restrained.
 - *NTSB Aviation Accident/Incident Database*: Does not consistently identify ages of passengers and their restraint status. These are not standard data fields.
 - *General aviation data*: Rear seat is safer for children than front seat, just as in automobiles.
 - Children are a distraction in the front seat and also can impede the full range of motion for the control yoke. Having them close to cockpit controls is a problem.
 - *General aviation challenge*: Some 4-point harnesses do not accommodate child seats; Vasconcelos thinks there is a need to look at this problem.

Ms. Gooding's Comments

- Virgin Atlantic Airlines has unique efforts to promote child passenger safety.
 - Since 1992, they have provided aviation-certified child seats to parents who buy seats for their children so that parents do not have to carry automotive child seats through airports.
 - Provides child seats that can be used rear-facing or forward-facing and carry a few on every airplane.
 - Does deep cleaning of child seats every eight weeks and more often as needed.
 - Offers discounted fares to infants.
 - Crew installs aviation child seats; parents do not install the devices. Encourages people traveling with young children to purchase seats for them. Reservation agents mention this possibility to people who want to travel with infants.
 - Collects data on how many children travel and whether they are using a child restraint provided by Virgin Atlantic.

HIGHWAY SAFETY PANEL

Mr. Alexander Sinclair, National Highway Traffic Safety Administration (NHTSA)

Dr. Kristy Arbogast, Children's Hospital of Philadelphia (CHOP)

Dr. Anne T. McCartt, Insurance Institute for Highway Safety (IIHS)

Dr. Stephen Rouhana, Ford Motor Company

Mr. Sinclair's Comments

- In the last decade, crash-related child fatalities have decreased; however, automobile crashes are still the leading cause of death of children ages 3–14.

- In 2009, there were 322 passenger vehicle occupant fatalities among children ages 4 and younger and over 30% of these children were totally unrestrained.
- On average, 490 children a day (ages 14 or younger) were injured in highway crashes in 2009.
- Car seats saved an estimated 309 lives in 2009; they could have saved 63 more lives if 100% of children used them.
- Younger children (i.e., infants and toddlers) are the most likely to be in the correct restraint type, and as children age, the rates of appropriate restraint use decline.
 - For children younger than age 4, 98–99% of them are in an appropriate restraint.
 - Booster seat use for children ages 4–7 is much lower. It is 41% and has been about that level for years.
 - There are also lower usage rates in general for low-income families, Hispanics, and African Americans.
 - The percentage of children seated in back, the safest place for them, has risen; although, not every state requires children to be seated in the back.
- As of 2010, 47 states and the District of Columbia now require booster seat use. State laws vary quite a bit in terms of age requirements for booster seat use.
- NHTSA recommended practices:
 - Children should be seated in the back.
 - Keep infants in rear-facing seats up to the maximum weight requirement for the seat (minimum of age 12 months and 20 pounds).
 - Next step is graduating to forward-facing child seats, which they should stay in until they reach the upper height or weight limits of the rear-facing seat.
 - Next step is graduating to booster seats, which they should use until vehicle seat belts fit them properly.
 - Older children should wear lap/shoulder belts and stay in the back seat.
- Every trip is a potentially dangerous trip, including short trips. Parents need to hear this message.
- NHTSA incentives for states to strengthen seat belt laws and booster seat laws have been effective.

Dr. Arbogast's Comments

- With assistance from State Farm Insurance, CHOP collected and analyzed child-specific crash data from 1998–2007, and those data informed much of what we know about child safety in autos today.

- Such data are useful because they can guide the use of limited resources. The following findings have guided state laws for booster seats and policy recommendations:
 - *Children in rear-facing seats*: 44% lower risk of moderate/severe injury than among children in forward-facing seats.
 - *Children in forward-facing seats*: 28% lower risk of moderate/severe injury than among children in seat belts.
 - *Children in booster seats*: 45% lower risk of moderate/severe injury than children in seat belts.

- CHOP will have a partnership with NHTSA to explore how they can use the National Automotive Sampling System (NASS) infrastructure to create a national resource for child crash data. It will be called the National Child Occupant Special Study (NCOSS). Pilot studies are being funded by industry and IIHS.
 - Such studies may be able to evaluate recent technologies such as higher weight limits for child restraint systems (CRS), vehicle side impact structure improvements, and booster seat use.

- Child occupant protection is more than child restraints, especially for older children.
 - “Why should those 8- to 12-year-olds and 13- to 15-year-olds have a higher risk of injury than their younger siblings?”

- Arbogast said there is a need to keep conducting public health surveillance on children involved in crashes to understand emerging trends and problems.

- Arbogast said that the rear seat environment should be optimized for all occupants, including children.

- The Kohl’s Safety Center at CHOP has been a good resource for the people of southeastern Pennsylvania. People can purchase child seats and learn how to use them as well as other safety devices.

Dr. McCartt’s Comments

- Too many children are still not restrained at all.

- Many children are not riding in restraints that are best for their age. For example, too many 4- to 8-year-old children are riding with seat belts alone when they should be using booster seats.

- State laws vary in terms of ages for booster seats, and there is room for improvement in these laws.

- IIHS worked with the University of Michigan Transportation Research Institute (UMTRI) to develop a system for evaluating booster seats in terms of lap/shoulder belt fit using a dummy representing a 6-year-old child. They use the system to rate boosters and publish the results for parents/consumers. Dr. McCartt believes it has led to better designs by booster seat manufacturers.
- Using a top tether is a simple way to keep children in forward-facing seats safer, but tether use is low. A NHTSA study found that tethers were being used in only about half of seats with tethers and anchors. When tethers were used, they were often too loose. A recent IIHS study found that for 2001 model year or newer cars, the tether was used 47% of the time and was adjusted tautly 43% of the time.
- The IIHS observed lower use rates for tethers in pickup trucks than cars.
- Many parents are not getting the message about the importance of using tethers and do not necessarily understand that they should use the tether even when using the seat belt to attach the child seat to the vehicle.
- IIHS is currently working with UMTRI to evaluate the usability of LATCH systems.
- Belt use rates decrease among older children and pre-teens; McCartt says there is a need to work on this problem.
- McCartt thinks NHTSA regulations for boosters should include criteria for goodness-of-fit.
- McCartt suggested that aggressive belt-reminder systems may be a promising technology for increasing seat belt use among older children who have graduated from booster seats.

Dr. Rouhana's Comments

- For many years, Ford has been looking for ways to improve occupant protection in the rear seats of motor vehicles.
- Ford has worked for a decade to develop inflatable belt systems for rear seats, and they are just beginning to offer them as an option on new Ford Explorers in March 2011.
- Inflatable belts are designed to be used with, not to replace, existing child restraint systems. They are designed to reduce occupant head excursion, help limit occupant neck loads (reduce neck injury), and distribute belt loads over more of the chest (reduce chest injury).
- Inflatable belts are expected to benefit all occupants, especially children, smaller occupants, and elderly people.

- Many 8-year-old children are too small for seat belts, although state laws typically do not mandate booster seats for children who are age 8 or older. Many children do not properly fit into seat belts until they are much older than age 8.

General Discussion

- Laws that are enforced are very effective at changing behavior and getting the message out to parents.
- The NTSB has investigated catastrophic accidents in which children in child seats survived but adults were fatally injured as well as accidents where children were fatally injured because they were not in child seats or seat belts.
- No current government rating systems expressly focus on vehicle rear seat safety or child seat compatibility with automobiles (NHTSA evaluates ease of use but not safety or compatibility).
 - Manufacturers may lack incentives to improve rear seats in the absence of rating systems or consumer information programs. One difficulty in implementing such a program is the fact that there are so many auto/child restraint system variations to consider.
- Currently, there is no known relationship between booster seat fit and safety in a crash. The NHTSA/CHOP effort could shed some light on this. Police-reported data on types of child restraints used are not reliable.
- One challenge is that child restraint laws are typically based on children's ages, whereas the best practices for child restraint use ideally should be based on the fit of the restraints. However, it is difficult to write regulations based on fit. Regulations based on height/weight would be difficult to enforce.
- The presenters thought that it would be desirable to have an integrated vehicle restraint solution for older children instead of boosters, which were referred to as a "band-aid approach."
 - Such systems were once available, but were not commercially successful.
- There are still improvements that could be made in standardizing and making it easier to install child safety seats (e.g., LATCH standardization).
- Tether anchors are not standardized and are in a variety of different locations on the vehicle. They sometimes are hard to use, which may reduce use rates.
- There is a movement to improve safety communication to groups with lower child seat use rates including low-income Hispanic and African American populations. For example, research has suggested that using word of mouth, faith-based organizations, and short fotonovelas might be a good means of communicating with Hispanic populations.

- Economic issues may influence the choices of some parents. That is, they may not be able to afford child safety seats, especially a succession of child seats for different ages. Medicaid does not fund child safety seats unless the child has a defined medical need. Some programs for distributing child safety seats to low income families have been successful.
- One panelist suggested that a more portable child safety seat would be helpful for families that rely on public transport or transport from friends. It's hard for families who do not own a car to carry a 30–40 pound seat and one or more children.
- U.S. Department of Transportation Secretary Ray LaHood has publicly announced his intention for NHTSA to develop and implement a correct fit program that would assess how a particular child seat fits into a certain vehicle because that is the “number one dilemma for parents.”
- Another area for future research is the long-term outcomes of children involved in crashes as opposed to only focusing on fatalities and acute injuries.
- The large proportion of children who are being restrained properly now is a success story, but there are still areas that need improvement.

MOVING FORWARD: SOLUTIONS THAT WORK

Dr. Grant Baldwin, Centers for Disease Control and Prevention

Dr. Dennis Durbin, American Academy of Pediatrics

Mr. Lawrence Decina, TransAnalytics

Ms. Lorrie Walker, Safe Kids Worldwide

Mr. David Campbell, Juvenile Products Manufacturers Association

Dr. Baldwin's Comments

- *Public health model*: valuable framework for problem-solving.
 - Involves multiple stages:
 1. Surveillance,
 2. Risk and protective factor identification,
 3. Development of programs and policies, and
 4. Evaluation and implementation of evidence-based interventions on larger scale.
- *Need to consider social ecology*: address factors that encourage or discourage child seat use (e.g., costs, parental knowledge, social norms, burden of carrying car seats through airport, etc.). Need to broaden view of points of intervention and learn lessons from previous behavior change initiatives.

- Important to apply behavioral and social science theory to public health problems. Health Belief Model points to perceived threat, perceived susceptibility, perceived benefits, and perceived barriers. There also are other useful theories (Theory of Planned Behavior, Social Cognitive Theory).
- Multiple factors influencing behavior means there are multiple opportunities to intervene.
- Dr. Baldwin's list of ten approaches to changing behavior:
 1. Tailor message to audience (e.g., young parents).
 2. Be sensitive to cultural differences and literacy.
 3. Avoid fear appeals.
 4. Employ multiple channels of communication (era of brochure is over); use Internet, texting, blogs.
 5. Address a problem at multiple levels, including the social environment.
 6. Use theory to inform program.
 7. Develop an evaluation: needed before, during and after a program to identify what works and what does not work.
 8. Perform a Needs Assessment. It is wise to involve people who are the targets of the messages in the design of messages.
 9. Share knowledge: need to impart it, but it is not sufficient to change behavior.
 10. Recognize latency: changing social norms over time.
- Evaluation of program outcomes is essential. Centers for Disease Control and Prevention mandates that evaluation be included in any funded programs.
 - Evaluating process, such as web hits, as described by FAA, is useful, but it is not sufficient.
- *Other high-risk groups for vehicle occupant deaths and injuries:* Native Americans and Alaskan Natives.
- Unfortunate that children in states with less stringent laws are exposed to higher risks than children in states with stronger child restraint laws.
- Mass media campaigns may not be an effective method to reach the people who are not yet using child seats and seat belts. Improved laws and enhanced enforcement may be more effective.
- Currently, parents have to opt in to buy an airplane seat for their children younger than age 2. Baldwin said that use rates might increase if the default option is buying a seat for children unless parents choose to opt out.

Dr. Durbin's Comments

- Best practices as recommended by the American Academy of Pediatrics:
 - Children should ride in rear-facing child seats until they reach the maximum height/weight limits for their particular child seat. Riding in rear-facing child seats until one year of age and 20 pounds is a minimum standard; extending that period of time is desirable.
 - Many rear-facing child seats can now accommodate children up to 35 pounds (larger than most 24-month-olds).
 - Caregivers should keep toddlers in forward-facing child seats until they reach height and weight limits for that seat before graduating them to booster seats.
 - Many forward-facing child seats can now accommodate children up to 50 pounds (larger than most 5-year-olds).
 - Use belt-positioning booster seats until vehicle seat belts fit child properly.
 - All children younger than 13 should be seated in rear seats.
 - All older passengers should use both lap and shoulder belts.
- The American Academy of Pediatrics has an online car seat guide to help caregivers select seats; it's updated annually and highlights the wide variety of available products (<<http://www.aap.org/healthtopics/carseatsafety.cfm>>).
- Pediatricians need to convince parents to be firm with children and not make use of booster seats negotiable.
 - CHOP did a parent survey and was stunned to find out that most parents let children start making decisions about how to sit in cars at age 4.
- The American Academy of Pediatrics recommends that all young children flying, including those younger than age 2, be restrained in an appropriate child safety seat during takeoff, landing and turbulence.
- Substantial efforts are being made to disseminate information to pediatricians so that their advice to parents is up to date. These efforts include publications, conferences, online materials, and continuing medical education. Pediatricians are asked to counsel parents/caregivers about automotive safety at every health checkup.
 - There is variation among pediatric practices in the extent to which they follow this recommendation.
- To promote child health and development, the American Academy of Pediatrics launched <<http://www.healthychildren.org>>, a website for parents and the general public. Child passenger safety is the most visited part of the website.

- Durbin: The United States needs to have effective surveillance systems for identifying problems, developing and disseminating programs, and evaluating interventions. Adequate quality and quantity of data to monitor child motor vehicle safety is necessary.
- A mass media campaign with a simple message is often ineffective because it does not target the right people in the right circumstances to get them to do the right thing.
- Lessons learned from automotive safety that can be applied to airplane safety: need to have better data on child safety in aircraft. It is easier to make good decisions when good data are available; should know how many children are flying. If smart people are drawing opposite conclusions from the same data, that points to a problem with the data. Example: NHTSA and automobile manufacturers were able to respond quickly to the airbag-induced deaths because they had good data.
- Durbin suggests that Medicaid could cover child seats as durable medical equipment for families with very low incomes. There is evidence that if you make the seat available, people will use it.

Mr. Decina's Comments

- Misuse of child seats still is common, about 72%.
- Some population groups are less likely to use child restraints. Usage rates are influenced by income, race, ethnicity, driver age and sex, child age, whether driver uses seat belts, perception of risk, awareness of best practices, type of vehicle (pickup occupants have lower use rates).
- Stronger laws and stronger enforcement increase use rates. Enforcement is key component.
- Seat giveaways work.
- Faith-based organizations' efforts to disseminate information about child safety seats appear to increase child seat use rates.
- *Decina*: One means to address nonuse of child restraints in automobiles is to designate child restraint enforcement teams. These police officers do not need to go through the four-day child passenger safety technician course, but they do need supplemental training and allotted time to devote to enforcing child restraint laws.
- Pre-schools and elementary schools are good resources for reaching caregivers of booster seataged children.
- NHTSA's funding of state programs has been successful in improving motor vehicle occupant safety.

Ms. Walker's Comments

- Advocates that parents use car seats to and from airport so they get used at destination.
- Pointed out many benefits for parents when children use child seats on airplanes: children are more comfortable, do not stand up in seats, do not pull people's hair, less chances for misbehavior.
- Technicians observe many errors at fitting stations; parents pick seats that do not fit their automobile.
- Childbirth education classes and hospitals are both good places for parent education.
- Child seat fitting stations have changed their focus from installing child seats for caregivers to teaching caregivers how to install child seats correctly. Caregivers will need these skills when using cars other than the ones in the fitting station.
- Safe Kids has deployed mobile child seat fitting stations as one method to increase the correct use of child seats.
- Safe Kids has started programs for older children (Cub Scout Patch for ages 7–10, Safest Generation for ages 11–12, Countdown2Drive for ages 13–14).
- *Walker said:* Need to work with parents so they take back the reins in terms of laying down rules with children on motor vehicle safety. Parents can be reached at places such as pediatricians' offices, Department of Motor Vehicles, and shopping malls.
- *Walker:* Shortages of child passenger safety technicians are a problem.

Mr. Campbell's Comments

- Recommended SAE practice, J1819, is designed to address known compatibility issues between vehicles and child seat designs.
- Child seat manufacturers have raised the weight limits so that children can remain rear-facing longer and stay in forward-facing child seats with internal harnesses longer. Children are now heavier, so needed to raise minimum weight for rear-facing child seat to 30 pounds.
- Child seat manufacturers have responded to a broad range of anchorage systems in different passenger vehicles.
- Self-adjusting harness systems have become more common to tighten harnesses.
- Energy-absorbing materials are being used by some manufacturers to improve protection of children in side impacts.

- Innovative seats rotate so that parents can place the children in them more easily.
- Another innovation is that some manufacturers are testing child seats at more severe impacts, using 35-mph speeds instead of 30-mph speeds, as are used for NHTSA's NCAP tests.
- Some advances have been made to make it easier to select and install the seats, such as stay-in-car bases, adjusters to get the right angle for reclining, color-coding of different types of seats, indicators of correct tension lockoffs for shoulder belts, and connectors with automatic retractors that tighten belts used in LATCH systems.
- Increasing use of LATCH system to secure booster seat to vehicles.
- Working on problem of different alignments between LATCH and adult seating positions.
- Continuing efforts are required to reach and educate new parents.

General Discussion

- Some presenters said there was a need for better data to address known problems and to identify new problems.
- Some participants suggested a need for discussions among all the various segments (government, industry, and other stakeholders) to arrive at solutions. Some advocated having vehicle manufacturers and child seat manufacturers work together to make it easier to correctly install child seats. Chairman Hersman, alluding to the child passenger safety technician course, provided the following comment: it should not take a four-day course to learn how to properly install a child seat.
- Safety should not be negotiated between parents and children.
- Presenters said that parents who are flying with children need help to do the right thing. It is very difficult for them to maneuver through airports with children and car seats and other belongings in tow.
- Education must be carefully designed and evaluated and needs to be a continuing effort. It cannot be a one-shot deal.
- Presenters emphasized the need for vigorous enforcement of vehicle child restraint laws.
- One suggestion was that FAA should take a look at what NHTSA has done and make educating parents a high priority.

EXCERPT OF CLOSING REMARKS FROM CHAIRMAN DEBORAH HERSMAN



“We can’t do a public service announcement and assume that everyone has received the message. We can’t put up a website and assume that people will visit it. We need to tap into all of the sources of education: pediatricians, mass media, as well as industry and public service organizations since thousands of babies are born each day in the United States.

Some of the best ways to get out the message are programs that deal not only with perceptions, but address the barriers that get in the way of people doing the right thing every time. We need vigorous enforcement of child seat laws in vehicles, particularly since we know that these laws improve child seat use rates and they influence behavior.

NHTSA has done an impressive job of implementing and then evaluating child safety interventions. We encourage the FAA to be similarly proactive to take a look at what NHTSA has done, consider what the speakers have said today and make educating parents about child safety a high priority. Safety for our smallest travelers should not be considered optional or a luxury.”

LINKS TO KEY NTSB STATEMENTS FOR CHILD OCCUPANT SAFETY IN AUTOMOBILES AND IN AIRCRAFT

Automobiles: See <<http://www.nts.gov/Surface/highway/childseat.htm#safetyseats.htm>> and <http://www.nts.gov/alerts/SA_002.pdf>.

1. Be sure all children in your vehicle are properly restrained for their age, height, and weight.
2. Children under age 13 should sit in a rear seat, if one is available.
3. Have your child safety seat inspected at a fitting station by a trained technician (see <<http://www.seatcheck.org>> for locations).
4. The NTSB recommends that all states pass laws requiring child seats, including booster seats, until age 8. The NTSB also has called upon states to enact laws that require transporting children age 12 years and younger in a rear seat of a passenger vehicle if a rear seating position is available.

Aviation: See <<http://www.nts.gov/Aviation/aviation.htm>> and <http://www.nts.gov/alerts/SA_015.pdf>.

1. Purchase a ticket for all children younger than 2 years and restrain them in a child restraint system certified for use on aircraft.
2. Ensure that infants and small children are restrained in a child restraint appropriate to their size.
3. Ensure that all children are properly restrained during takeoff, landing, and turbulent conditions or when the seat belt sign is illuminated.
4. The NTSB has recommended that the FAA require each person who is less than 2 years of age to be restrained in a separate seat position by an appropriate child restraint system during takeoff, landing, and turbulence. Also, the NTSB has called upon the FAA to require that all infants and small children be restrained in a manner appropriate to their size.