CSN Children's Safety Network

EDC Education Development Center

October 18, 2023

1:00PM – 2:00PM ET

Protecting Kids in Cars: Approaches to Child Passenger Safety

Funding Sponsor

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This session is being recorded

You are muted

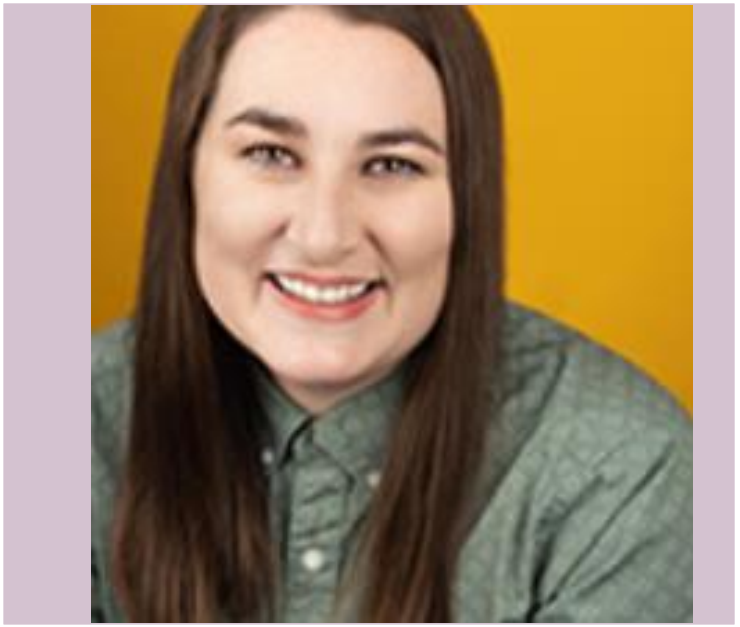
Click the more (•••) icon, then the Captions (CC) icon at the bottom of your screen to turn on automatic captions

Resource files and links will be shared in the chat

Presenters

Joe Colella

Juvenile Products Manufacturers Association



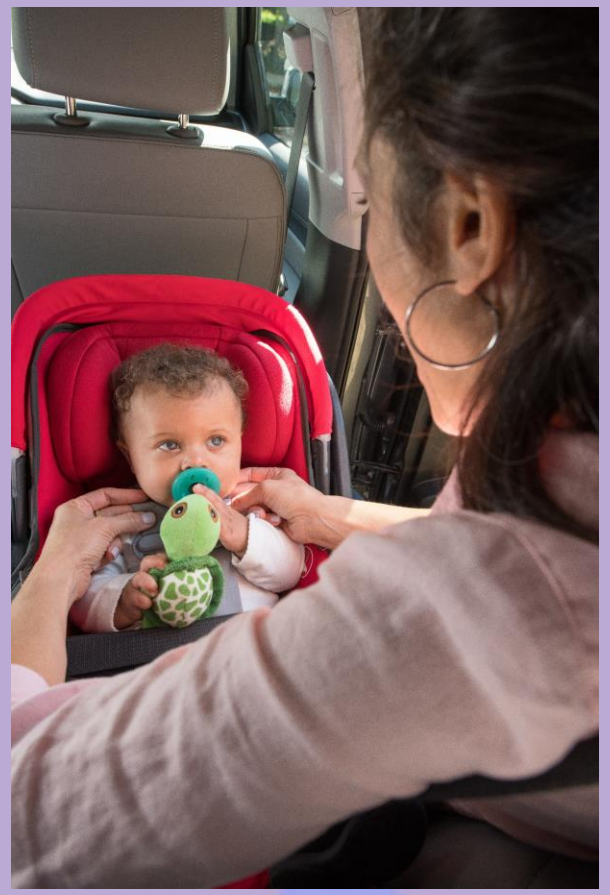
Cassandra Herring

Safe Kids Worldwide

Moderator

Morag MacKay

Safe Kids Worldwide



Protecting Kids in Cars:

Approaches to Child Passenger Safety

Cass Herring, Director of Occupant Protection

Safe Kids Worldwide

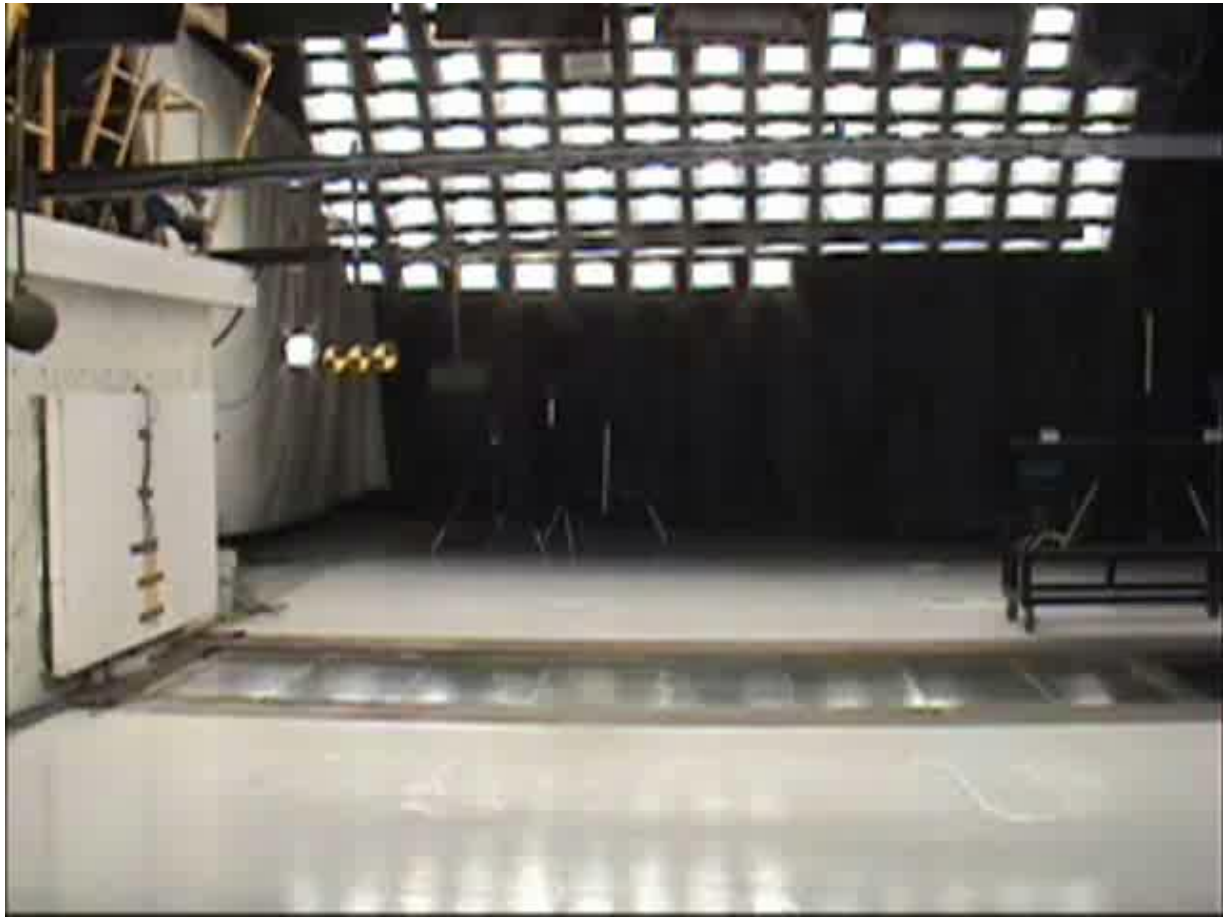
Joe Colella, Director of Child Passenger Safety

Juvenile Products Manufacturers Association

Morag MacKay, Chief Research and Network Officer

Safe Kids Worldwide

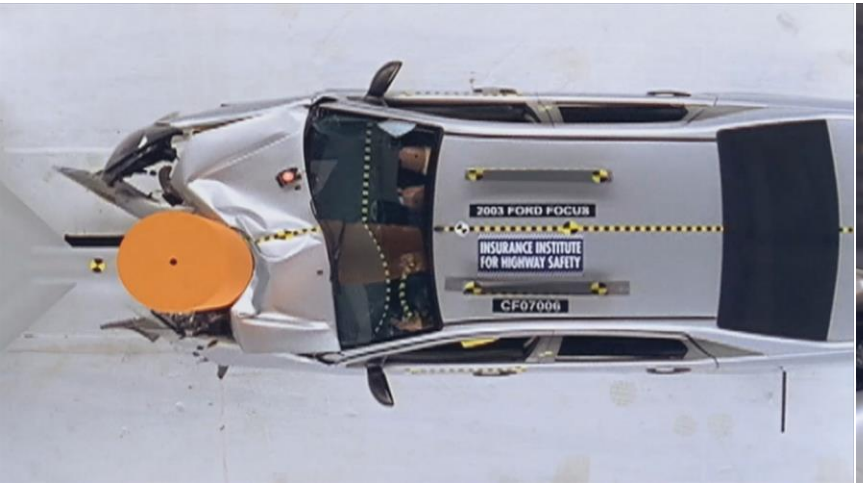
Crash Forces – Real Time



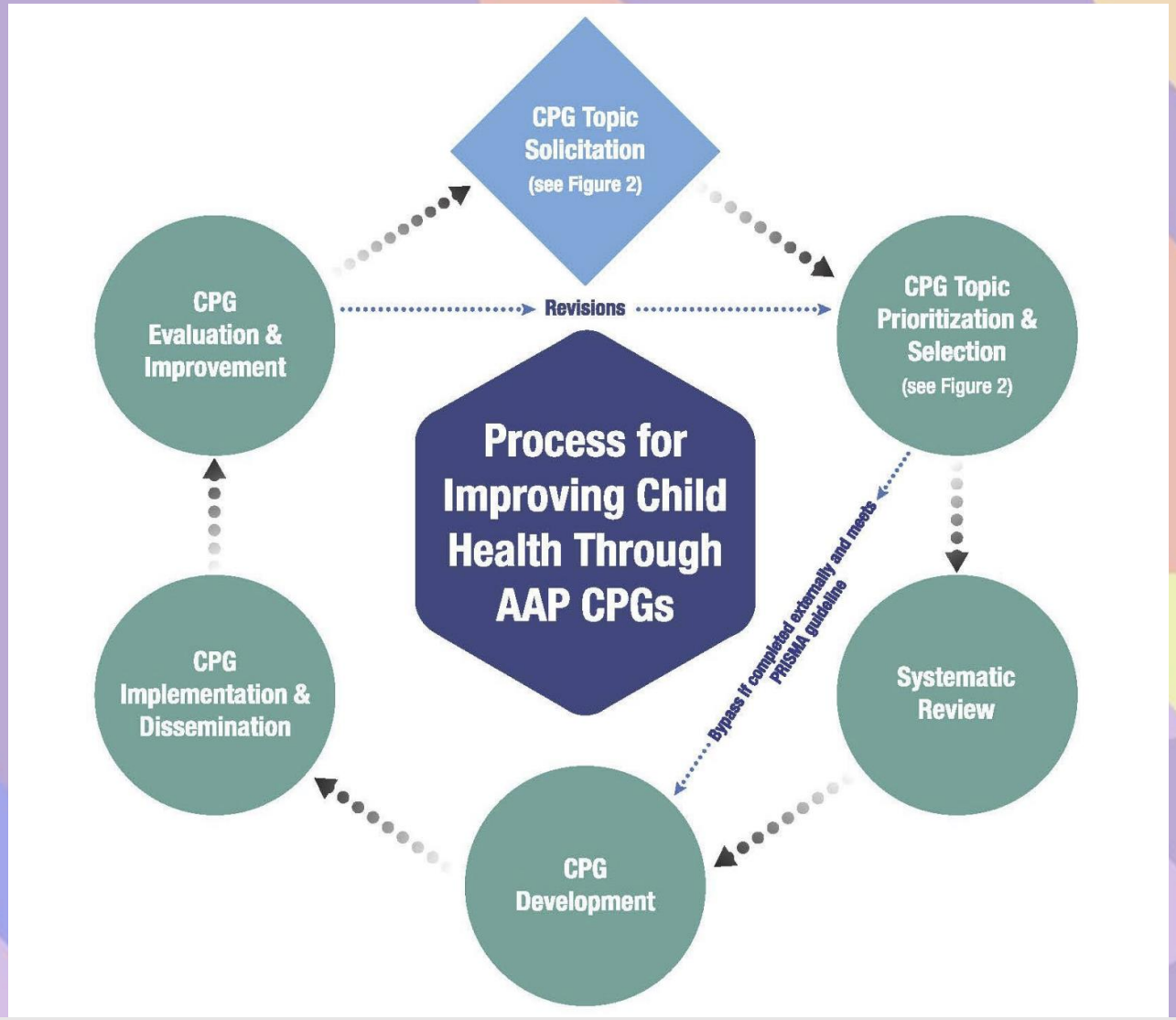
Crash Forces – Real Time

Stages of a Crash

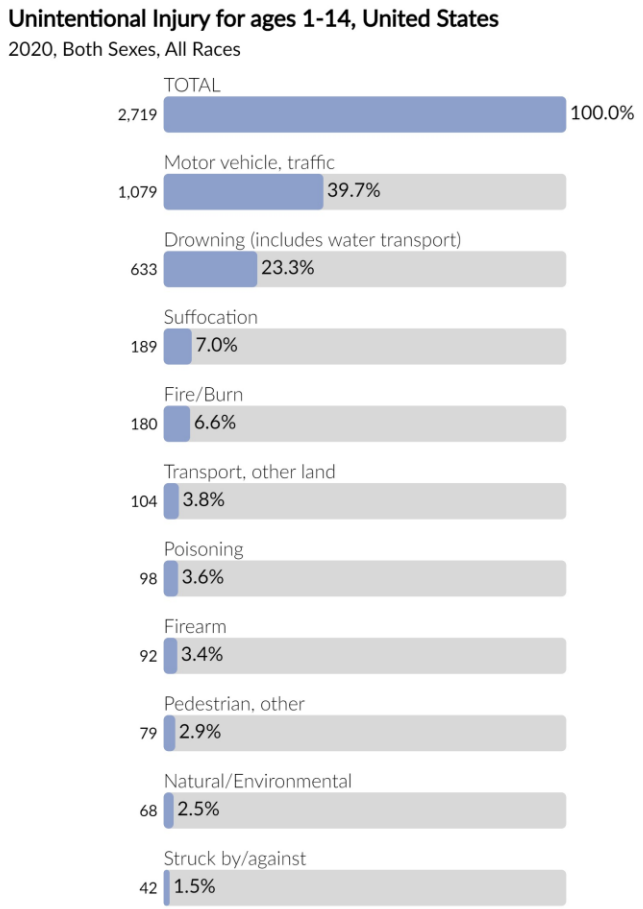
The vehicle crash	The human crash	The internal crash



Evidence


CPG Topic Solicitation
(see Figure 2)
CPG Topic Prioritization & Selection
(see Figure 2)
Systematic Review
CPG Development
CPG Implementation & Dissemination
CPG Evaluation & Improvement
Revisions
Process for Improving Child Health Through AAP CPGs
Bypass if completed externally and meets PRISMA guideline

CPS: A Public Health Priority



According to NHTSA:

2021 Overall Fatalities and Injuries (birth-14)

- Fatalities increased 8% from 2020 (1,101) to 2021 (1,184)
- Nonfatal injuries increased by 17% from 2020 (139,058) to 2021 (162,298)
- 863 of those killed were occupants (73%)

- On average 3 children killed and 445 injured each day
- 36%-40% of children killed were unrestrained
- Nearly half of car seats are critically misused
- Overall misuse rates are much higher

CDC WISQARS - https://wisqars.cdc.gov/data/lcd/home

NHTSA Traffic Safety Facts 2021 Data: Children - 2021 Data - Children (dot.gov)

Table 3. Children Killed in Passenger Vehicles in Traffic Crashes, by Type of Restraint and Age Group, 2021

Type of Restraint	Age Group										Total	
	<1		1–3		4–7		8–12		13–14			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	26	31%	35	25%	89	36%	76	31%	82	54%	308	36%
Child Restraint	**51**	**61%**	**88**	**63%**	**75**	**30%**	**10**	**4%**	**0**	**0%**	**224**	**26%**
Forward Facing	*8*	*10%*	*45*	*32%*	*25*	*10%*	*1*	*0%*	*0*	*0%*	*79*	*9%*
Rear Facing	*22*	*26%*	*9*	*6%*	*0*	*0%*	*0*	*0%*	*0*	*0%*	*31*	*4%*
Booster Seat	*1*	*1%*	*8*	*6%*	*27*	*11%*	*5*	*2%*	*0*	*0%*	*41*	*5%*
Unknown Child Restraint	*20*	*24%*	*26*	*19%*	*23*	*9%*	*4*	*2%*	*0*	*0%*	*73*	*8%*
Seat Belt	**0**	**0%**	**5**	**4%**	**51**	**21%**	**121**	**50%**	**54**	**36%**	**231**	**27%**
Shoulder Belt Only	*0*	*0%*	*0*	*0%*	*1*	*0%*	*2*	*1%*	*1*	*1%*	*4*	*0%*
Lap Belt Only	*0*	*0%*	*0*	*0%*	*14*	*6%*	*11*	*5%*	*3*	*2%*	*28*	*3%*
Shoulder and Lap Belt	*0*	*0%*	*5*	*4%*	*36*	*15%*	*108*	*45%*	*50*	*33%*	*199*	*23%*
Restraint Used - Type Unknown	0	0%	1	1%	1	0%	2	1%	2	1%	6	1%
Unknown	7	8%	10	7%	30	12%	33	14%	14	9%	94	11%
Total	**84**	**100%**	**139**	**100%**	**246**	**100%**	**242**	**100%**	**152**	**100%**	**863**	**100%**

Source: FARS 2021 ARF

Evidence Evolves

ORIGINAL ARTICLE

Car safety seats for children: rear facing for best protection

B Henary, C P Sherwood, J R Crandall, R W Kent, F E Vaca, K B Arbogast, M J Bull

Injury Prevention 2007;13:398–402. doi: 10.1136/ip.2006.015115

Objective: To compare the injury risk between rear-facing (RFCS) and forward-facing (FFCS) car seats for children less than 2 years of age in the USA.

Methods: Data were extracted from a US National Highway Traffic Safety Administration vehicle crash database for the years 1988–2003. Children 0–23 months of age restrained in an RFCS or FFCS when riding in passenger cars, sport utility vehicles, or light trucks were included in the study. Logistic regression models and restraint effectiveness calculations were used to compare the risk of injury between children restrained in RFCSs and FFCSs.

Results: Children in FFCSs were significantly more likely to be seriously injured than children restrained in RFCSs in all crash types (OR = 1.76, 95% CI 1.40 to 2.20). When considering frontal crashes alone, children in FFCSs were more likely to be seriously injured (OR = 1.22), although this finding was not statistically significant (95% CI 0.95 to 1.59). In side crashes, however, children in FFCSs were much more likely to be injured (OR = 5.53, 95% CI 3.74 to 8.18). When 1 year olds were analyzed separately, these children were also more likely to be seriously injured when restrained in FFCSs (OR = 5.32, 95% CI 3.43 to 8.24). Effectiveness estimates for RFCSs (93%) were found to be 15% higher than those for FFCSs (78%).

Conclusions: RFCSs are more effective than FFCSs in protecting restrained children aged 0–23 months. The same findings apply when 1 year olds are analyzed separately. Use of an RFCS, in accordance with restraint recommendations for child size and weight, is an excellent choice for optimum protection up to a child's second birthday.

See end of article for authors' affiliations

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Accepted 28 August 2007

In the USA, the rate of vehicle occupant deaths for children less than 3 years old has decreased by over 50% in the last 30 years,[1] largely due to increased use of child restraint systems. Despite these impressive declines, however, motor vehicle crashes remain the leading cause of death for children 1–2 years of age.[2]

Although current child restraint systems have been shown to be effective, further reductions in child passenger injuries may be achieved by improving car seat features and designs. In particular, the orientation of car seats (rear facing or forward facing) probably plays a significant role in car seat effectiveness. By supporting the entire posterior torso, neck, head, and pelvis, a rear-facing car seat (RFCS) distributes crash forces over the entire body, rather than focusing them only at belt contact points. In contrast with a forward-facing car seat (FFCS), an RFCS supports the child's head, preventing the relatively large head from loading the proportionately smaller neck with relatively weak neck musculature.[3] The primary question regarding car seat orientation is at what age children should make the transition to an FFCS, given that both biomechanical and practical considerations have to be taken into account.

In the USA, the American Academy of Pediatrics and the National Highway Traffic Safety Administration (NHTSA) have developed guidelines stating that a child should be at least 1 year of age and weigh at least 20 pounds before transitioning from an RFCS to an FFCS.[4 5] The age of the child, in particular, is an important factor which correlates with the material properties of the child's anatomy, such as muscular development and ossification of the cervical spine. Although the policy of the American Academy of Pediatrics states "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", a common interpretation of these guidelines by parents and caregivers has been that children should be automatically switched to an FFCS when they are 1 year old or 9.2 kg (20 pounds). For this reason, few children in the USA remain rear facing past their first year of age, despite the fact that there are currently many RFCSs that have maximum weight limits beyond 9.2 kg. In fact it has been reported that more than 30% of children are turned forward facing before they reach 1 year of age.[6]

In Sweden, children remain in RFCSs up to the age of 4 and transition directly from the RFCS to a booster seat. Swedish researchers have used data from a Volvo crash study to compare the effectiveness of these restraints,[7 8] although the lack of widespread FFCS usage only allows comparison between RFCSs and forward-facing booster seats. Their most recent study found that RFCSs had an effectiveness of 90%, relative to unrestrained children, and the authors supported the policy of children remaining in an RFCS up to the age of 4 years.

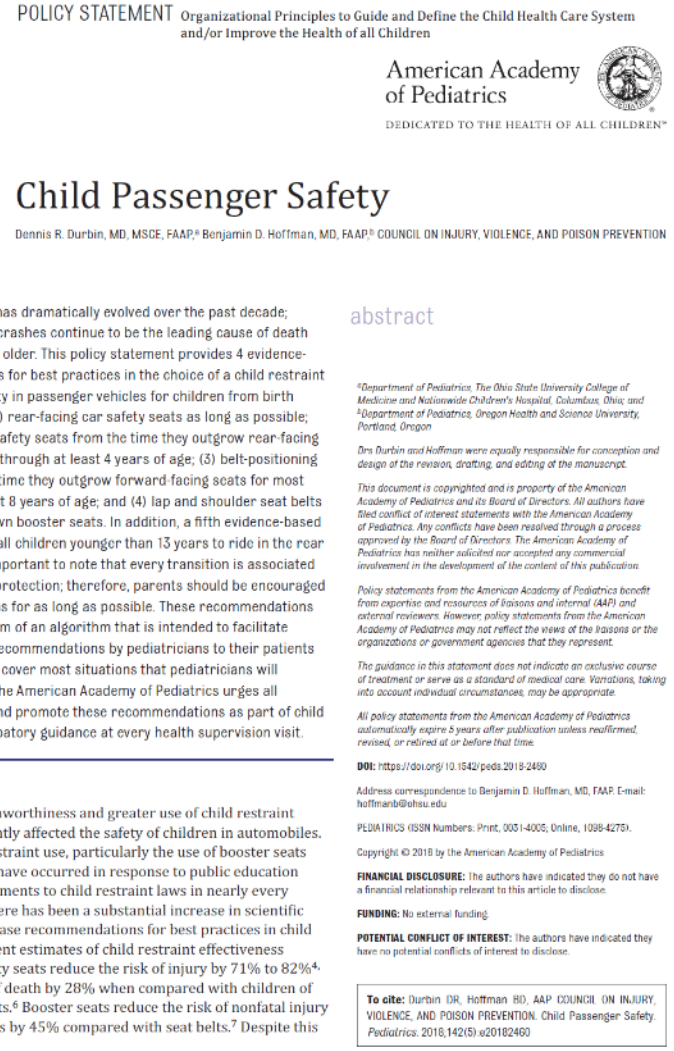
The objective of this paper is to quantitatively compare the ability of RFCSs and FFCSs to protect child occupants aged 0–23 months, with a particular focus on those 12–23 months of age, when involved in motor vehicle crashes, using US data.

METHODS

The National Automotive Sampling System Crashworthiness Data System (NASS-CDS) is a nationwide motor-vehicle crash data collection program operated by the NHTSA. This ongoing survey provides a representative database of fatal and non-fatal motor vehicle crashes in the USA. The NASS-CDS design, sampling, and weighting process permits crash estimates to be extrapolated to provide national estimates.[9]

As few children in the USA use an RFCS past their second birthday, child passengers under the age of 2 years were selected from the NASS-CDS for calendar years 1988–2003. For

Abbreviations: FFCS, forward-facing car seat; ISS, Injury Severity Score; NASS-CDS, National Automotive Sampling System Crashworthiness Data System; NHTSA, National Highway Traffic Safety Administration; RFCS, rear-facing car seat



POLICY STATEMENT Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of all Children

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

Child Passenger Safety

Dennis R. Durbin, MD, MSCE, FAAP,[a] Benjamin D. Hoffman, MD, FAAP,[b] COUNCIL ON INJURY, VIOLENCE, AND POISON PREVENTION

Child passenger safety has dramatically evolved over the past decade; however, motor vehicle crashes continue to be the leading cause of death for children 4 years and older. This policy statement provides 4 evidence-based recommendations for best practices in the choice of a child restraint system to optimize safety in passenger vehicles for children from birth through adolescence: (1) rear-facing car safety seats as long as possible; (2) forward-facing car safety seats from the time they outgrow rear-facing seats for most children through at least 4 years of age; (3) belt-positioning booster seats from the time they outgrow forward-facing seats for most children through at least 8 years of age; and (4) lap and shoulder seat belts for all who have outgrown booster seats. In addition, a fifth evidence-based recommendation is for all children younger than 13 years to ride in the rear seats of vehicles. It is important to note that every transition is associated with some decrease in protection; therefore, parents should be encouraged to delay these transitions for as long as possible. These recommendations are presented in the form of an algorithm that is intended to facilitate implementation of the recommendations by pediatricians to their patients and families and should cover most situations that pediatricians will encounter in practice. The American Academy of Pediatrics urges all pediatricians to know and promote these recommendations as part of child passenger safety anticipatory guidance at every health supervision visit.

Improved vehicle crashworthiness and greater use of child restraint systems have significantly affected the safety of children in automobiles. Major shifts in child restraint use, particularly the use of booster seats among older children, have occurred in response to public education programs and enhancements to child restraint laws in nearly every state.[1–3] In addition, there has been a substantial increase in scientific evidence on which to base recommendations for best practices in child passenger safety. Current estimates of child restraint effectiveness indicate that child safety seats reduce the risk of injury by 71% to 82%[4, 5] and reduce the risk of death by 28% when compared with children of similar ages in seat belts.[6] Booster seats reduce the risk of nonfatal injury among 4- to 8-year-olds by 45% compared with seat belts.[7] Despite this

abstract

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Drs Durbin and Hoffman were equally responsible for conception and design of the revision, drafting, and editing of the manuscript.

Policy statements from the American Academy of Pediatrics benefit from expertise and resources of liaisons and internal (AAP) and external reviewers. However, policy statements from the American Academy of Pediatrics may not reflect the views of the liaisons or the organizations or government agencies that they represent.

The guidance in this statement does not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

All policy statements from the American Academy of Pediatrics automatically expire 5 years after publication unless reaffirmed, revised, or retired at or before that time.

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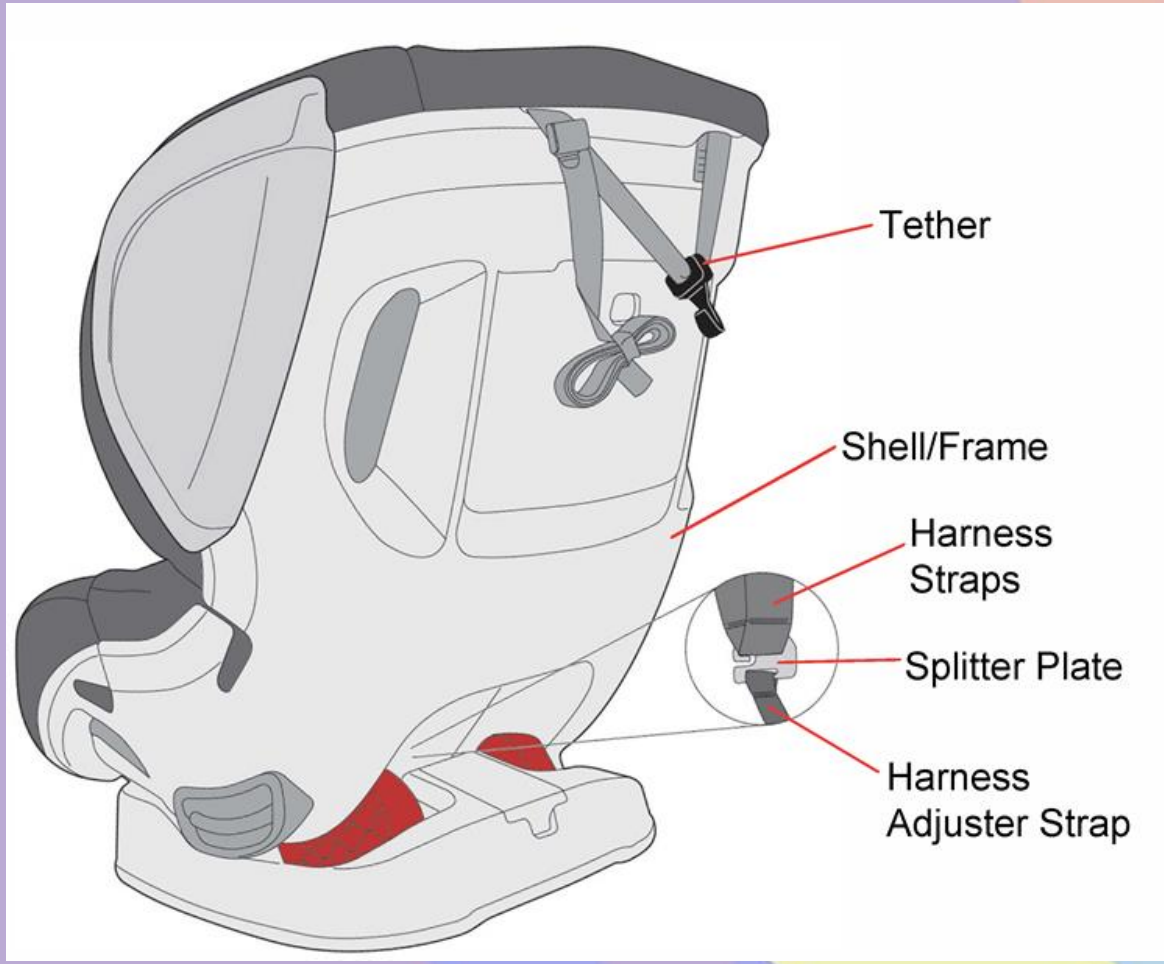
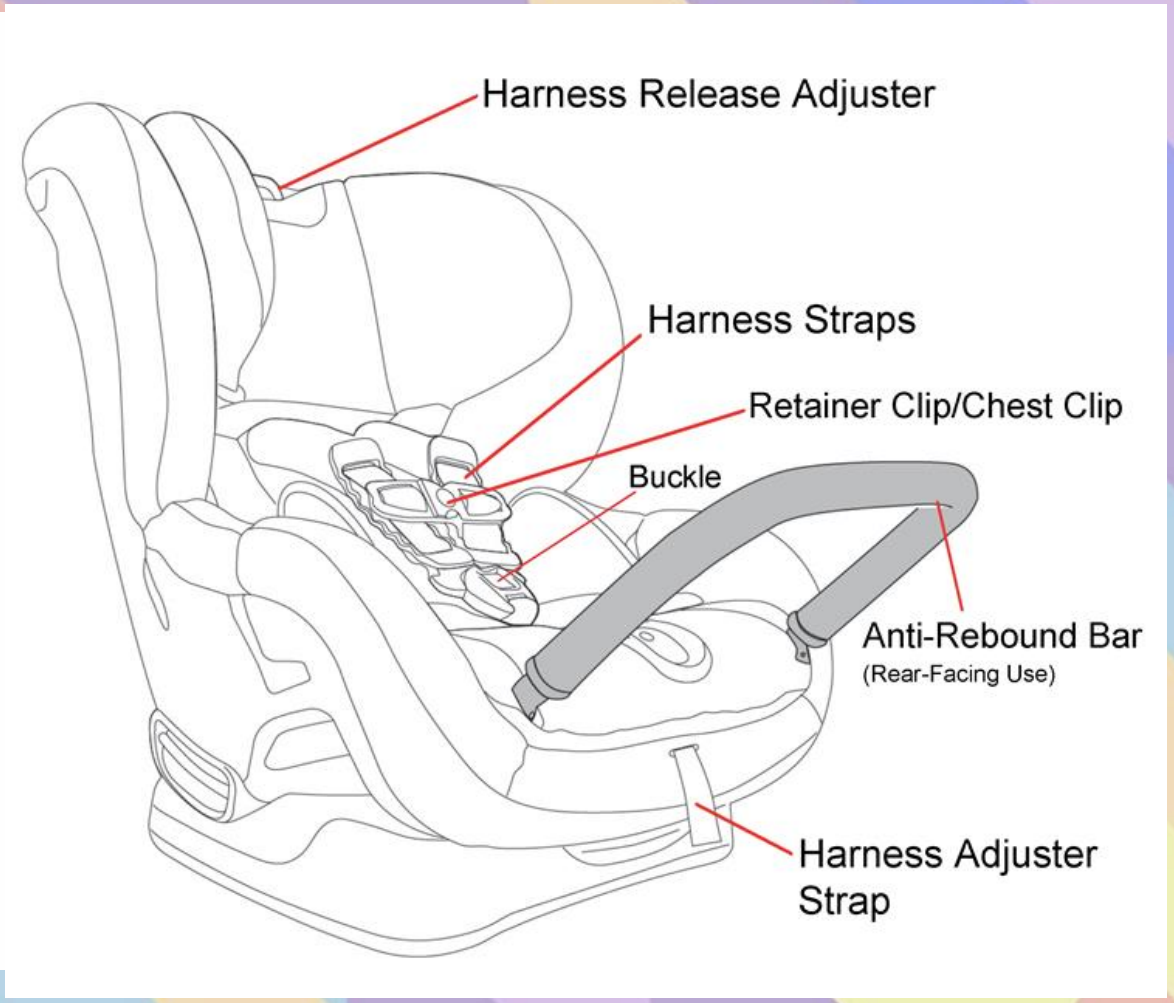
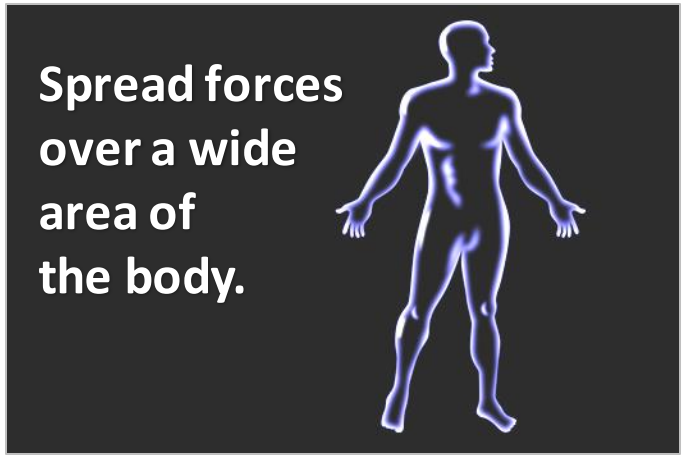
Engineering

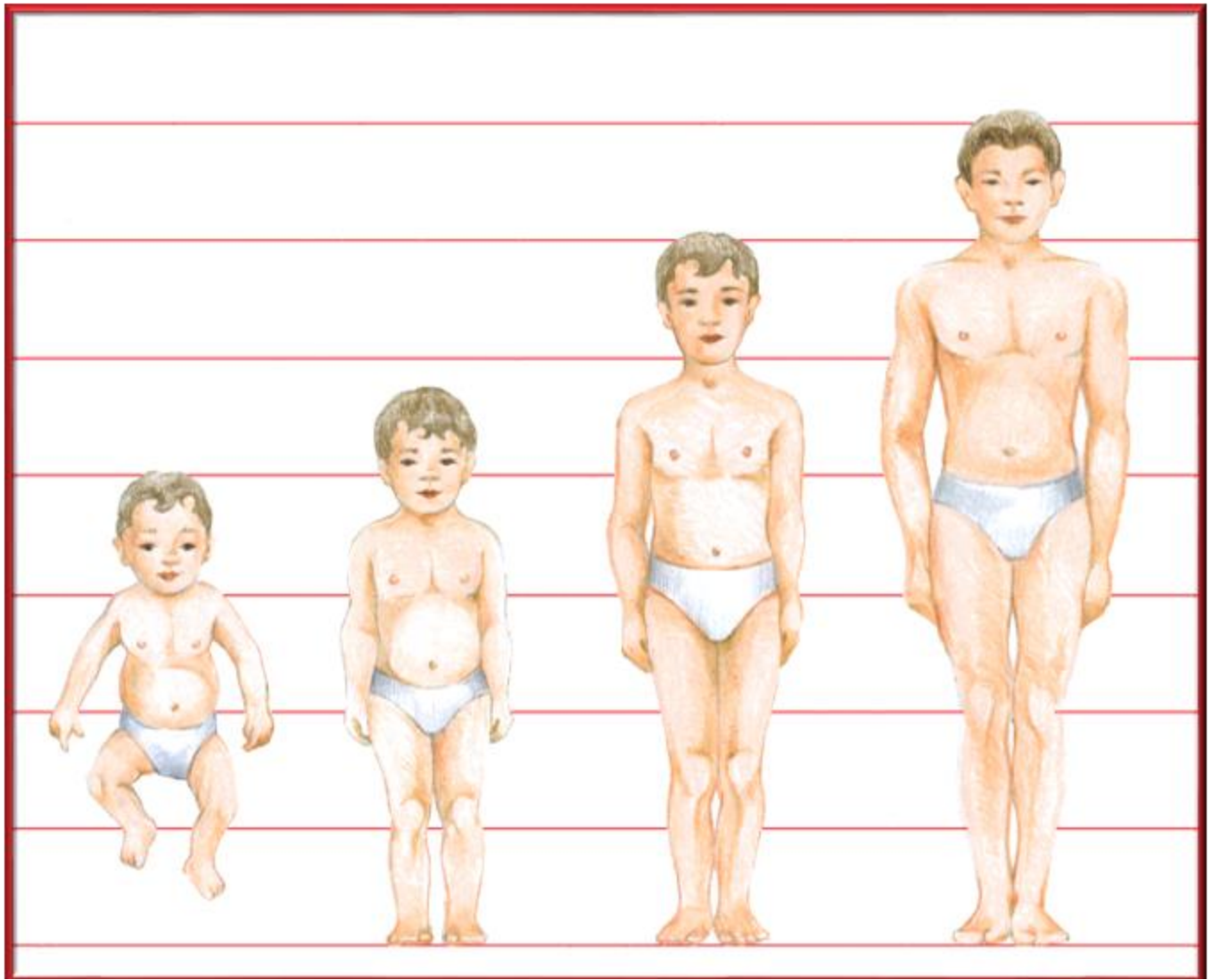




Managing Crash Forces to Mitigate Injury



Children are NOT Small Adults



Rear-Facing

Forward-Facing

Booster Seat

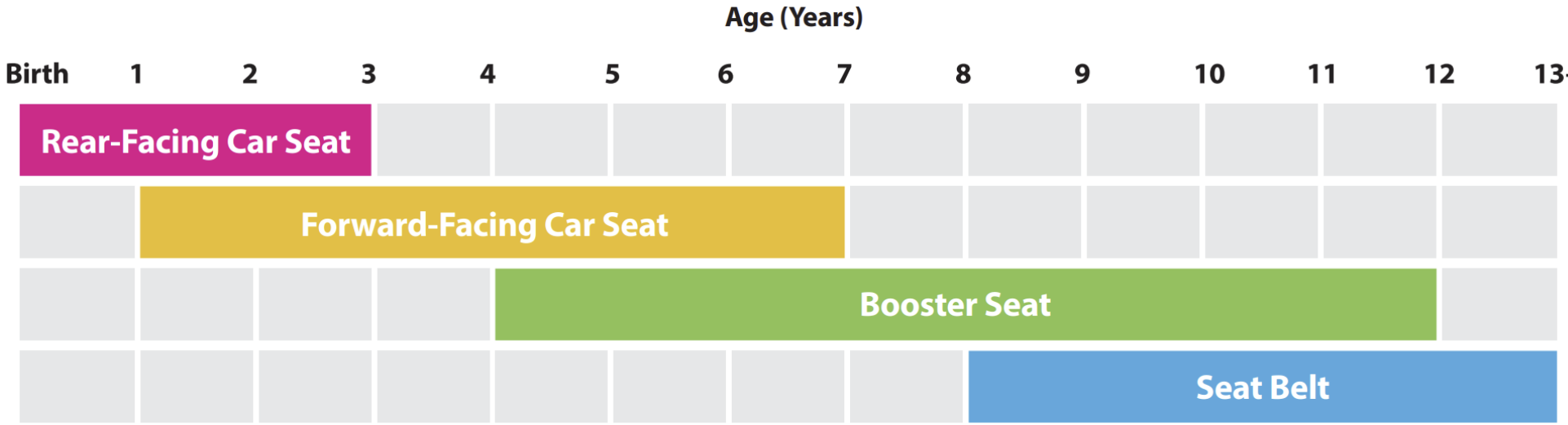
Why are Booster Seats Important?

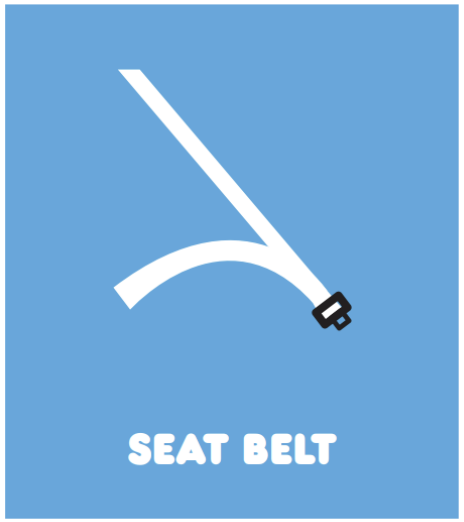
Seat Belt

Education

Car Seat Recommendations for Children

There are many car seat choices on the market. Use the information below to help you choose the type of car seat that best meets your child's needs.





NHTSA Public Site

NHTSA

Ratings | Recalls | Risky Driving | Road Safety | Equipment | Technology & Innovation | MORE INFO

EQUIPMENT
Topics

Car Seats and Booster Seats

Language: English

Overview

Car seats and boosters provide protection for infants and children in a crash, yet car crashes are a leading cause of death for children ages 1 to 13. That's why it's so important to choose and use the right car seat correctly every time your child is in the car. Follow these important steps to choose the right seat, install it correctly and keep your child safe.

American Academy of Pediatrics

- All infants and toddlers should ride in a rear-facing car safety seat (CSS) as long as possible, until they reach the highest weight or height allowed by their CSS's manufacturer. Most convertible seats have limits that will permit children to ride rear-facing for 2 years or more.
- All children who have outgrown the rear-facing weight or height limit for their CSS should use a forward-facing CSS with a harness for as long as possible, up to the highest weight or height allowed by their CSS's manufacturer.
- All children whose weight or height is above the forward-facing limit for their CSS should use a belt-positioning booster seat until the vehicle lap and shoulder seat belt fits properly, typically when they have reached 4 ft 9 inches in height and are between 8 and 12 years of age.
- When children are old enough and large enough to use the vehicle seat belt alone, they should always use lap and shoulder seat belts for optimal protection.

AAP Parent Website

healthychildren.org
Powered by pediatricians. Trusted by parents.
from the American Academy of Pediatrics

Search for safety, tips, illness, etc.

Ages & Stages | Healthy Living | Safety & Prevention | Family Life | Health Issues | News | Tips & Tools | Our Mission | shopAAP

Healthy Children > Safety & Prevention > On The Go > Car Seats: Information for Families

Safety & Prevention

- Immunizations
- All Around
- At Home
- At Play
- On The Go

SAFETY & PREVENTION

Share | Pin | Email | Print

Car Seats: Information for Families

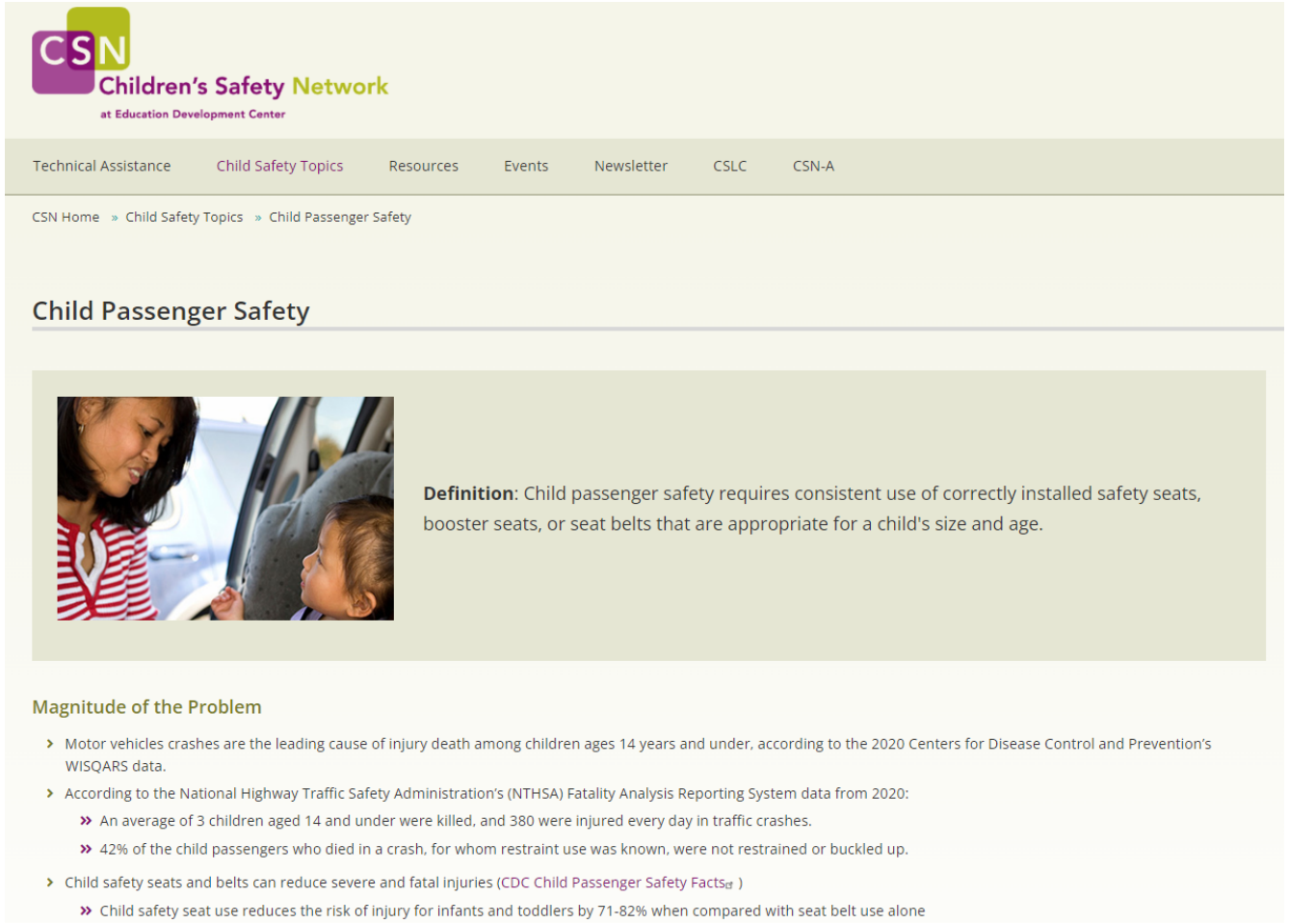
One of the most important jobs you have as a parent is keeping your child safe when they are riding in a vehicle.

Each year, thousands of young children are killed

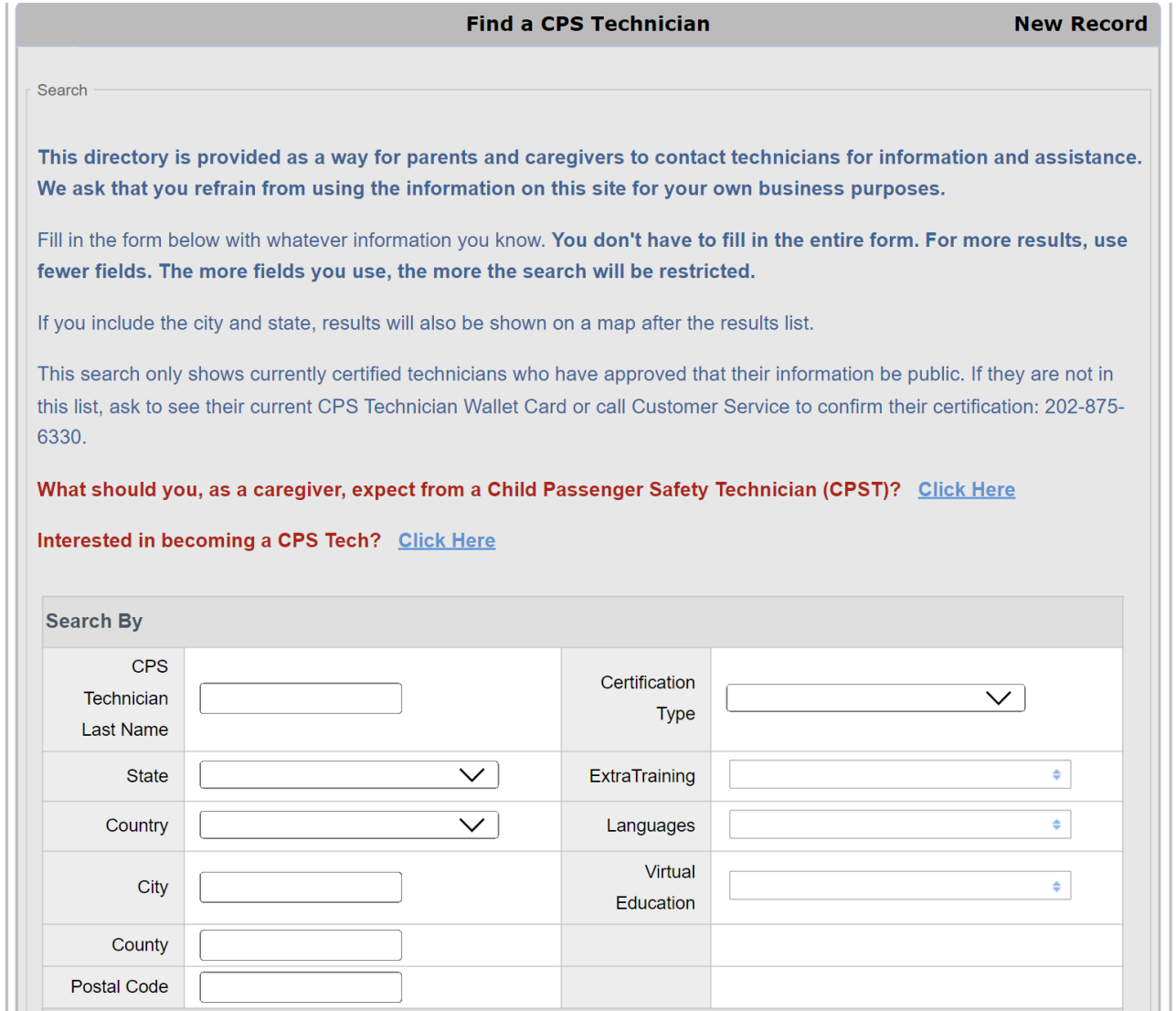
Heading Home With Your Newborn: From Birth to

Back

Children's Safety Network Website: Child Passenger Safety Topic Page



cert.safekids.org



Find a CPS Technician **New Record**

Search

This directory is provided as a way for parents and caregivers to contact technicians for information and assistance. We ask that you refrain from using the information on this site for your own business purposes.

Fill in the form below with whatever information you know. **You don't have to fill in the entire form. For more results, use fewer fields. The more fields you use, the more the search will be restricted.**

If you include the city and state, results will also be shown on a map after the results list.

This search only shows currently certified technicians who have approved that their information be public. If they are not in this list, ask to see their current CPS Technician Wallet Card or call Customer Service to confirm their certification: 202-875-6330.

What should you, as a caregiver, expect from a Child Passenger Safety Technician (CPST)? Click Here

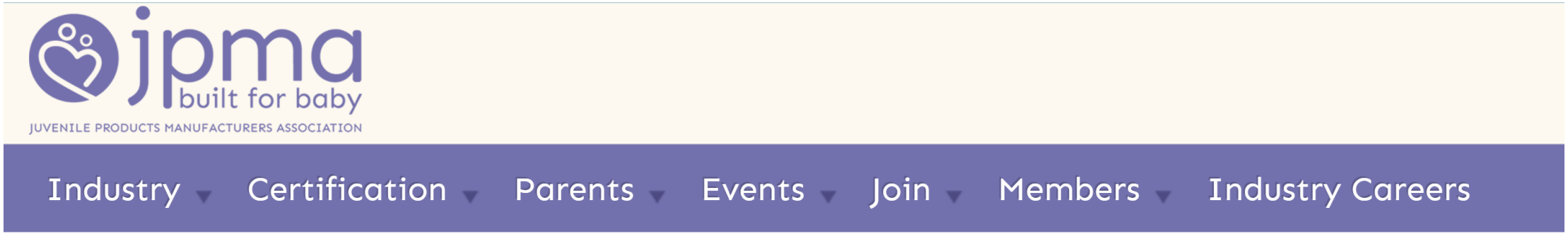
Interested in becoming a CPS Tech? Click Here

Search By

CPS Technician Last Name		Certification Type	
State		ExtraTraining	
Country		Languages	
City		Virtual Education	
County			
Postal Code			

- MODULE 1 • INTRODUCTION
- MODULE 2 • THE CPS TECHNICIAN ROLE
- MODULE 3 • CRASH DYNAMICS
- MODULE 4 • SEAT BELT SYSTEMS
- MODULE 5 • AIR BAGS
- MODULE 6 • LOWER ANCHORS AND TETHERS
- MODULE 7 • INTRODUCTION TO CAR SEATS
- MODULE 8 • REAR-FACING CAR SEATS
- MODULE 9 • FORWARD-FACING CAR SEATS
- MODULE 10 • BOOSTER SEATS AND SEAT BELTS
- MODULE 11 • OTHER VEHICLES
- MODULE 12 • INTERACTING WITH CAREGIVERS
- MODULE 13 • USING AND MAINTAINING YOUR NEW SKILLS

Manufacturer Assistance



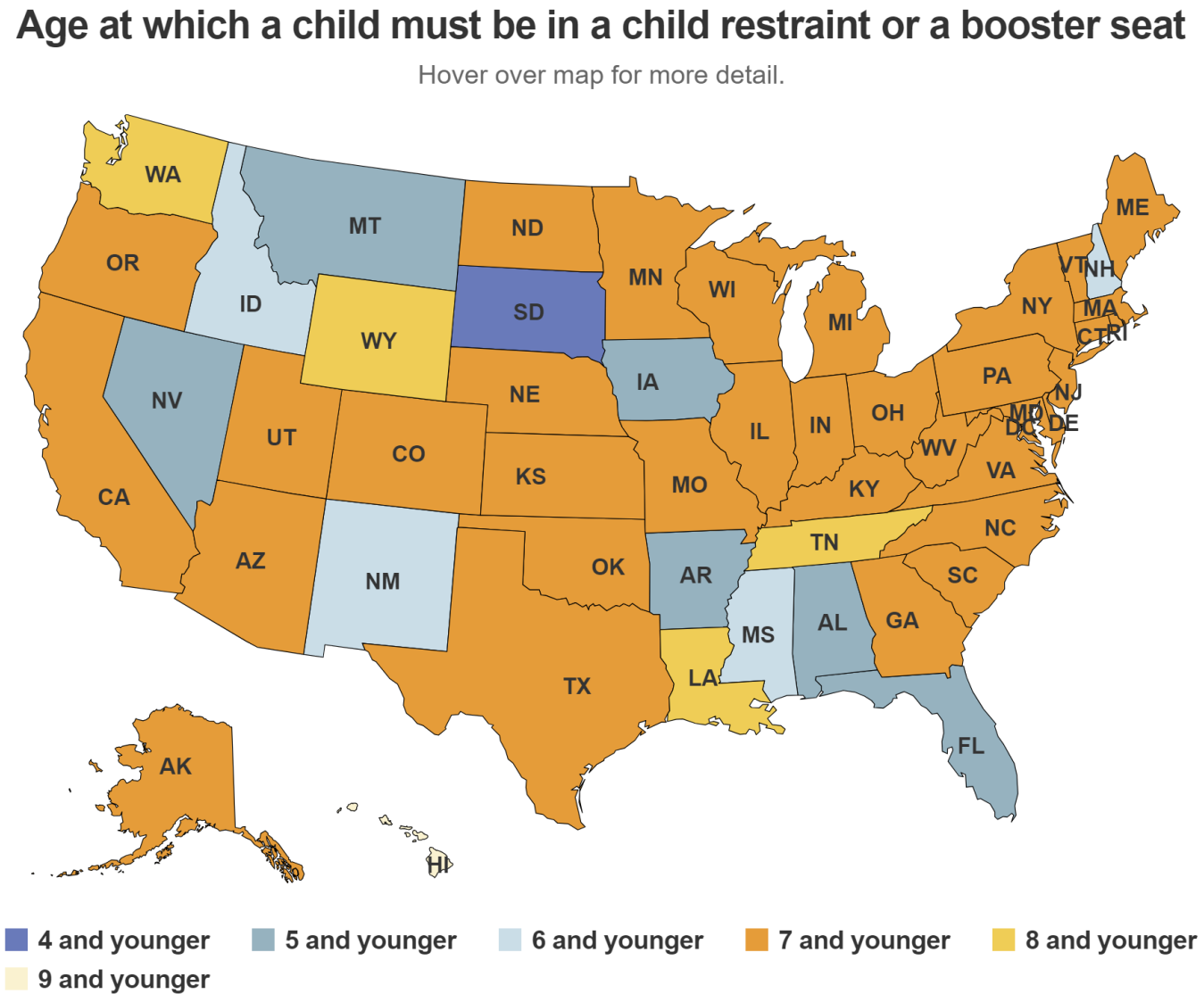
CAR SEAT HELP

Have questions about using your car seat correctly during the crisis? While many educational services are suspended or less available, the companies that make car seats are still here to help. All brands offer families assistance by telephone, e-mail and online information, and some are now offering virtual assistance where they can actually see your car seat and vehicle.

(*you can find your car seat's brand by looking at the labels or instruction booklet*)

Enactment

State Laws vs. Laws of Physics



Enforcement

High Visibility Enforcement

- Educate the public
- Promote voluntary compliance with the law
- Checkpoints
- Saturation patrols
- Forewarning increases the deterrent effect
- Tickets and fines

SAFE KIDS WORLDWIDE™

jpma built for baby

Thank you!

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Questions?

Please enter your questions using the Q/A button at the bottom of your screen

Thank you!

Please fill out our evaluation:
https://www.surveymonkey.com/r/HPC59RQ

Children's Safety Network
at Education Development Center

Visit our website:
www.ChildrensSafetyNetwork.org