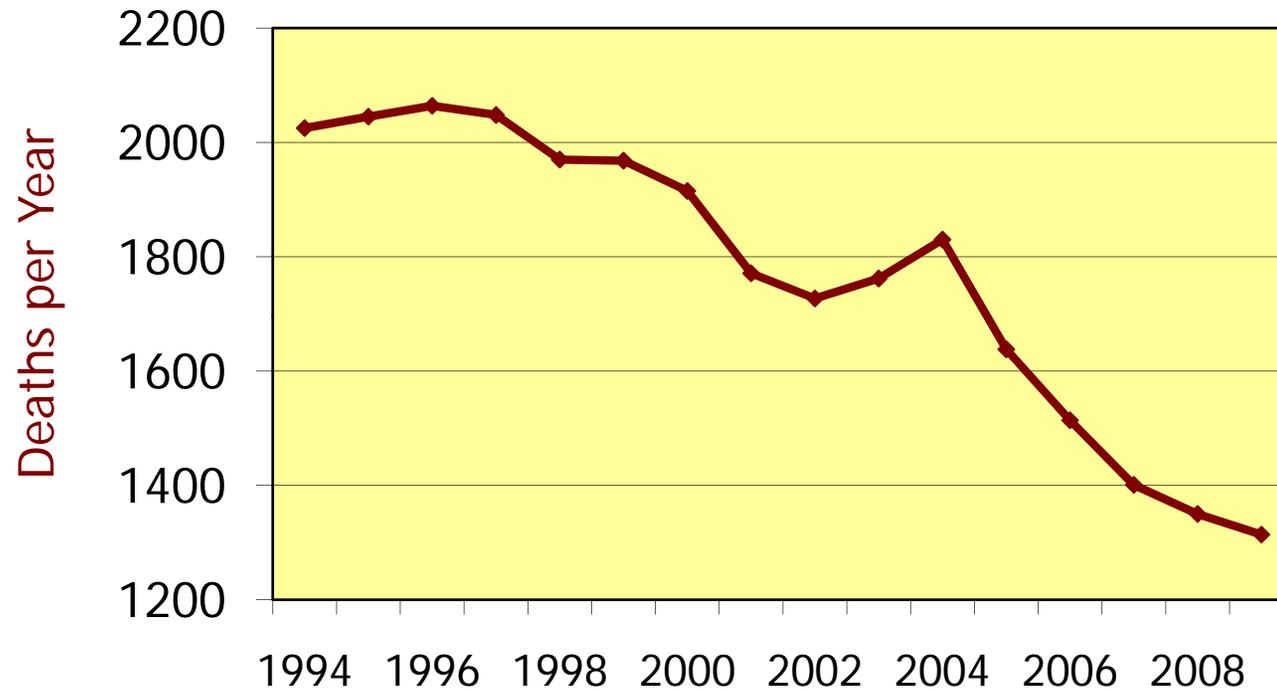


Current Trends and Future Opportunities in Child Occupant Protection

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December 2010

Fewer deaths to children under 15



3480 children saved since 1998

Causes of Injury Deaths

- Motor vehicle crashes most common cause of death for children 3+ years

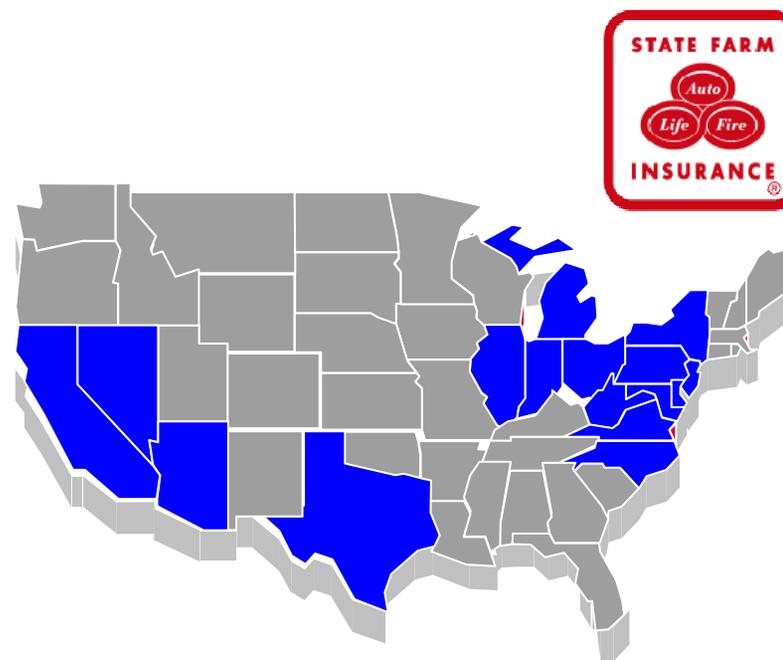
Rank	Age (years)				
	<1	1-4	5-9	10-14	15-24
1	Unintentional Suffocation 959	Unintentional Drowning 458	Unintentional MV Traffic 456	Unintentional MV Traffic 696	Unintentional MV Traffic 10,272
2	Homicide Unspecified 174	Unintentional MV Traffic 428	Unintentional Fire/Burn 136	Homicide Firearm 154	Homicide Firearm 4,669
3	Unintentional MV Traffic 122	Unintentional Fire/Burn 204	Unintentional Drowning 122	Suicide Suffocation 119	Unintentional Poisoning 3,159
4	Homicide Other Spec., classifiable 86	Homicide Unspecified 174	Homicide Firearm 47	Unintentional Drowning 102	Suicide Firearm 1,900
5	Unintentional Drowning 57	Unintentional Suffocation 149	Unintentional Suffocation 42	Unintentional Other Land Transport 80	Suicide Suffocation 1,533
6	Unintentional Fire/Burn 39	Unintentional Pedestrian, Other 124	Unintentional Other Land Transport 40	Unintentional Fire/Burn 78	Unintentional Drowning 630
7	Undetermined Suffocation 34	Homicide Other Spec., classifiable 61	Unintentional Pedestrian, Other 32	Unintentional Poisoning 69	Homicide Cut/pierce 444
8	Homicide Suffocation 30	Homicide Firearm 48	Homicide Suffocation 21	Unintentional Suffocation 60	Undetermined Poisoning 365
9	Undetermined Unspecified 28	Unintentional Struck by or Against 44	Unintentional Firearm 20	Suicide Firearm 53	Suicide Poisoning 362
10	Unintentional Fall 24	Unintentional Fall 36	Unintentional Struck by or Against 20	Unintentional Firearm 26	Unintentional Other Land Transport 310

2007 data

Child-focused crash surveillance 1998-2007

Partners for Child Passenger Safety

- Unique industry-university research partnership
- Child-focused crash surveillance system
- Integrated surveillance with in-depth investigation
- Rigorous science in support of good public policy



Partners for Child Passenger Safety

Previous child-focused crash surveillance

Impact of previous research – 1998-2007

- Enhanced evidence base for legislation, regulation
 - Upgrades to 42 state and 2 federal laws
 - FMVSS 208 evaluation of 2nd generation air bags
 - Child restraints in side impact crashes
- Evidence for priority setting- industry & advocates
 - Seat belt- associated injuries
 - Exposures to side air bag deployments
 - Informed efforts of stakeholders to increase awareness
- Foundation for important additional research
 - Pediatric crash test dummies that better mimic real children

Best Practice Recommendations

Appropriate restraint

<20 lbs **AND** <1
year
Rear-facing CRS



>40 lbs **AND** <57"
Booster seat w/ belt



≥ 13 years
Seat belts all seats



20-40 lbs **AND**
>1 year
Forward-facing
CRS

≥ 57" **AND** < 13
Seat belt in rear

Rear seating for those <13 years

Evidence for Best Practice Child Restraints



<20 lbs **AND** <1
year
Rear-facing CRS

- 71% reduction in fatalities compared to unrestrained (Hertz, 1996)
- 44% reduction in moderate/serious injuries compared to forward facing CRS (Henary, 2007)
- US American Academy of Pediatrics
“.... 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”



20-40 lbs **AND**
>1 year
Forward-facing
CRS

- 54-69% reduction in fatalities compared to unrestrained (Hertz, 1996; Rice 2009)
- 28% reduction in fatalities compared to seat belts (Elliott, 2006)
- 71-82% moderate/serious injuries compared to seat belts (Arbogast 2004; Zolshnja 2007)

Evidence for Best Practice Boosters

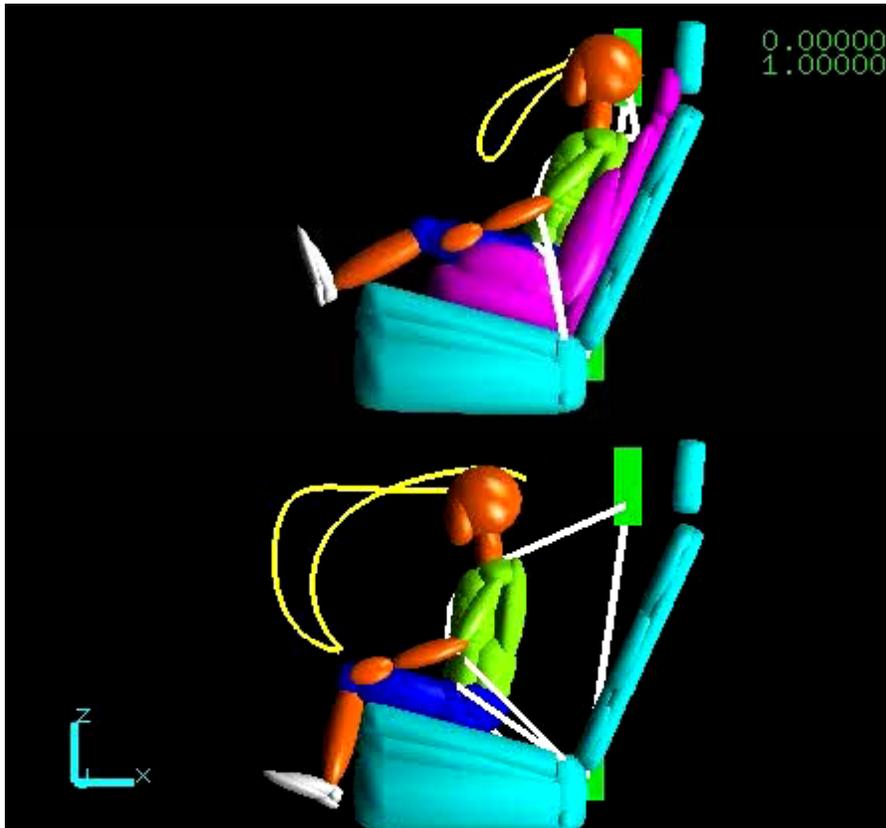


>40 lbs AND <57"
Booster seat w/ belt

- 45% reduction in moderate/serious injuries compared to seat belts (Arbogast, 2009; NHTSA 2010)
- 55-67% reduction in fatalities compared to unrestrained (Rice 2009)
- No evidence of reduction in fatality risks compared to seat belts (Rice 2009)

Value of a Booster Seat

Mechanism of injury



Child in booster

Child in belt
without booster

Evidence for Best Practice Rear Seating

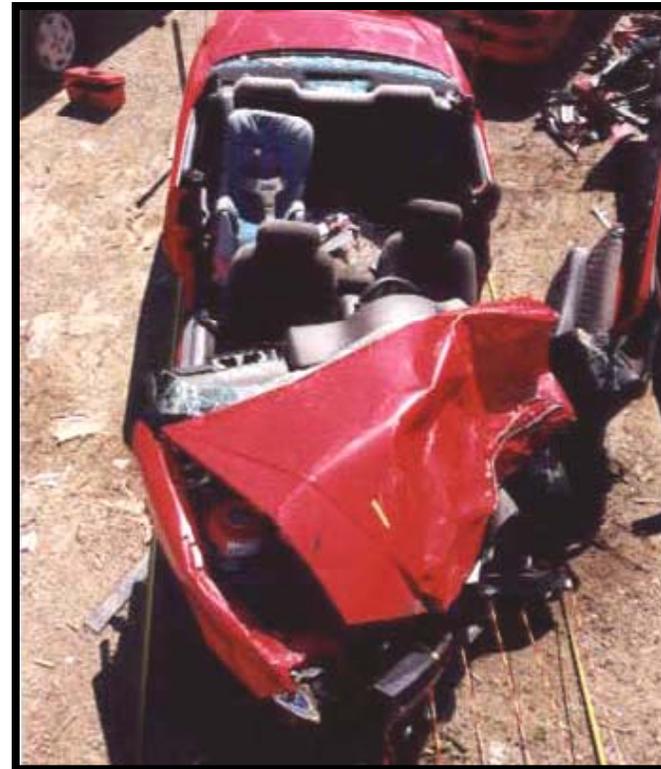


$\geq 57"$ AND < 13
Seat belt in rear

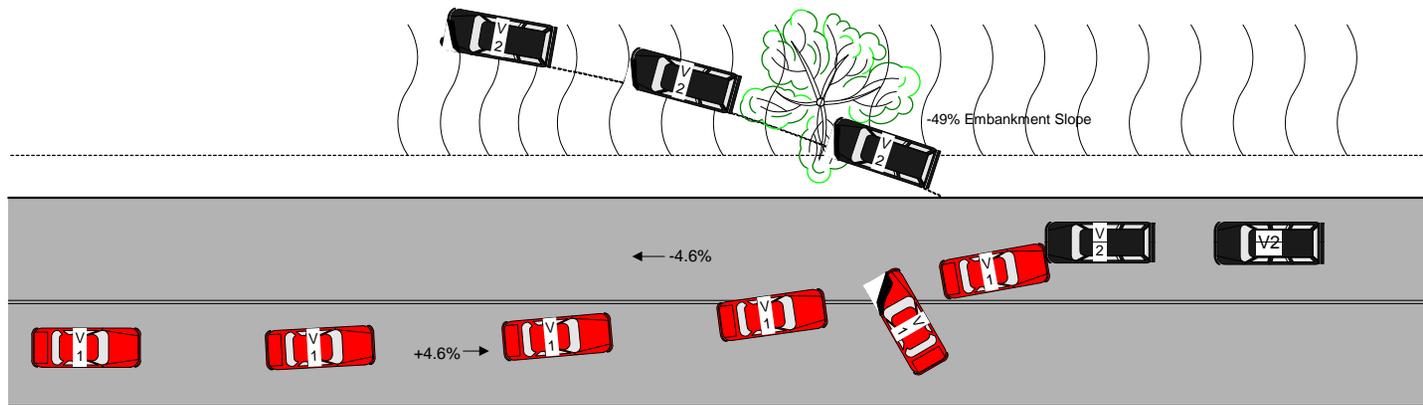
- Rear seat 35-45% reduction in fatality risk compared to front seat (children < 12) (Braver 1998, Smith 2006, Kupp 2005)
- Rear seat 31% (9-12 year olds) and 64% (0-8 year olds) reduction in moderate/serious injuries compared to front seat (Arbogast 2009)

Exemplar case: Appropriate and inappropriate restraint

- Case vehicle: 2-door coupe
- Principal other vehicle: SUV
- Vehicle roof removed by EMS
- Delta V: 44mph
- Driver: fatal injury



Crash diagram



Case vehicle



Other vehicle

- Roadway under construction
- Driver distracted by daughters in back seat
- Case vehicle drifted into opposing traffic

Case occupant Saved by her CRS

- Right Rear Passenger:
- 3 year old female
- Restraint: Forward-facing CRS
- Injuries: MINOR



Other occupant

Not using an age-appropriate restraint

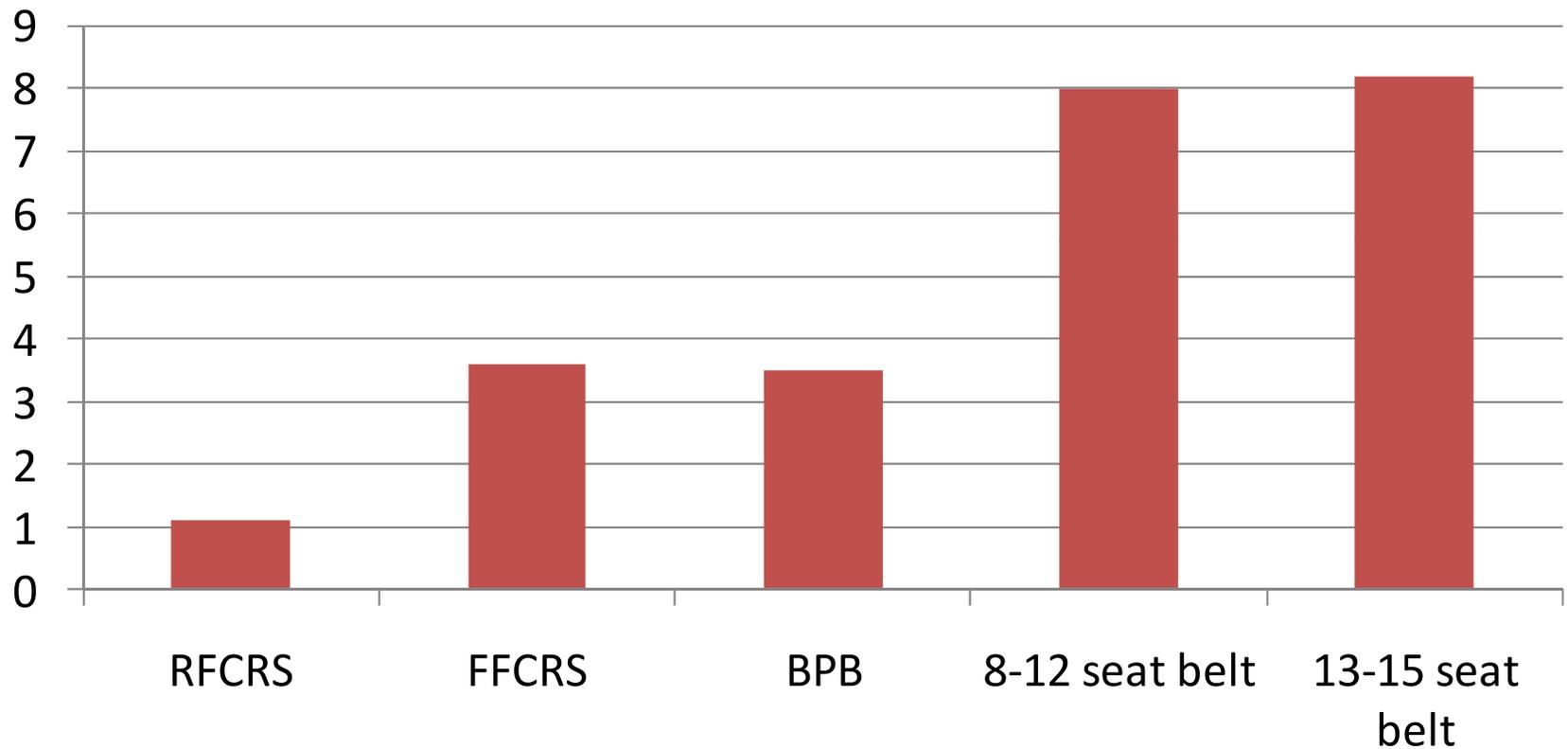
Center rear passenger

- 7 year old female
- Lap belt worn high
 - NO BOOSTER
- Serious injuries
 - Brain injury, skull fracture, L1 & L2 fractures, liver & colon lacerations

Continued Need for Family-Focused Vehicle Safety

- Success should not make us complacent
 - We have not cured the disease of pediatric motor vehicle injuries
- Future challenges remain, known and unknown
 - The vehicle safety and traffic landscape is rapidly changing
 - Innovation must continue to flourish
 - Further reductions in lives lost require enhanced efforts – problems are more complex
- A new target population emerges daily
- Need for high quality data that reflects the current situation

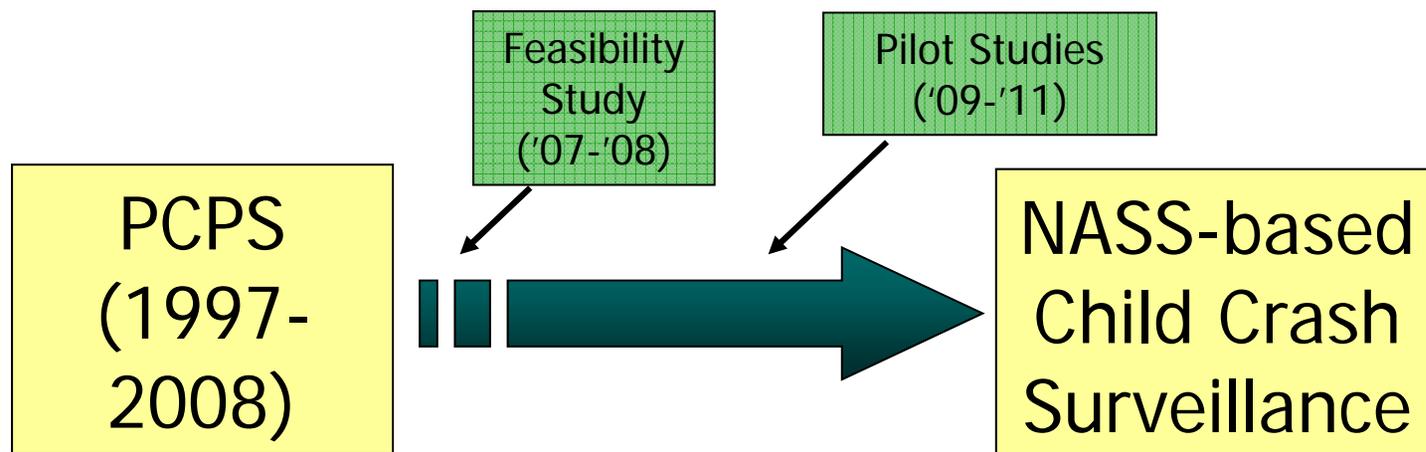
Injury Risk – Rear Seat Occupants Per 1,000 Children in Crashes



Unpublished PCPS data

NASS Child Occupant Special Study (NCOSS)

- Enhancement of current capabilities of NASS
 - Leverage existing infrastructure



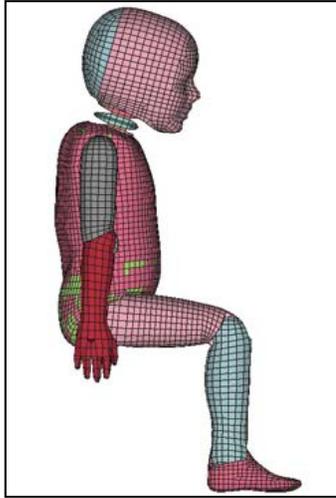
NCOSS

Enhanced Quality and Sustainability

- A nationally representative resource diverse in restraint and vehicle characteristics
- Efficient data collection that leverages existing infrastructure
- Partnership with government, industry and researchers to improve motor vehicle safety for children and youth
- Direct, independent public access to data that facilitates priority setting and messaging

Key Principles and Priorities

- Child occupant protection is more than children in child restraints
 - Includes children, youth, adolescents and young adults
- Monitor trends through rigorous, child-focused crash surveillance
 - Current databases have neither sufficient depth or breadth of child specific data
- Optimize the rear seating environment for all occupants including children



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