Hard Science and Tough Choices: Transitions from RF to FF

A RESEARCH & RECOMMENDATIONS UPDATE

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Disclosure Statement

Objectives

By the end of the session, attendees will be able to:

- Discuss the history of best practice recommendations for car safety seat usage
- Describe controversies in the research around car safety seat best-practice
- Discuss current AAP policy recommendations
Changing Knowledge & Products

I'M NOT SAYING IT'S SCIENCE...
BUT IT'S SCIENCE

data
1962 American Academy of Pediatrics Recommendations

- Many vehicles did not have belts as standard equipment
- Wear seat belts
- Have them installed in your vehicle if needed

1972 AAP Recommendations

- No hook-on car seats
- Under 50 pounds use CR with internal harnesses; over 50 pounds use lap belt (no shoulder belt)
- Over 50 pounds use lap belt No shoulder belt for children due to poor fit
1974 AAP Recommendations

- Specific well-designed RF and FF models for small children
- Over 4 and 40 lbs use a lap belt – a cushion may help the child to see out the window
- Over 4’6” and 55 lbs use both a lap and shoulder belt

1996 AAP Recommendations

- RF to 1 and 20 lbs and never in front of an air bag
- No shield CR models for premature and small infants
- No shields
- FF conv or integrated over 1 and 20-40 lbs
- BPB or shield booster for over 40 lbs
- Proper use highlighted

2002 AAP Recommendations

- RF at least to 1 and 20 lbs and better to maximum weight/height
- FF convertible or integrated seat over 1 & 20-40 lbs
- BPB until lap and shoulder belts fit
- Comprehensive proper use info
- Kids in back
- No aftermarket belt positioners
- Special needs recommendations
There are three kinds of lies: lies, damned lies, and statistics.

— Benjamin Disraeli

2007 Study

Car safety seats for children: rear facing for best protection

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 RFCs or FFCs when riding in passenger cars, sport-utility vehicles, or light trucks were included in the study. Logistic regression models and restrained effectiveness calculations were used to compare the risk of injury between children restrained in RFCs and FFCs.

Results: Children in RFCs were significantly more likely to be seriously injured than children restrained in FFCs in all crash types (OR 1.76, 95% CI 1.40 to 2.20). When considering frontal crashes alone, children in RFCs were more likely to be seriously injured (OR 1.28, although this finding was not statistically significant [95% CI 0.95 to 1.59]). In side crashes, however, children in RFCs were much more likely to be injured (OR 2.53, 95% CI 3.74 to 7.18). When 1-year-olds were analyzed separately, these findings were also more likely to be seriously injured when restrained in RFCs (OR 5.22, 95% CI 3.43 to 8.24). Efficiency estimates for RFCs (95%) were found to be 1.5% higher than those for FFCs (95%).

Conclusions: RFCs are more effective than FFCs in protecting restrained children aged 0–23 months. The same findings apply when 1-year-olds are analyzed separately. Use of an RFC, in accordance with restraint recommendations for child size and weight, is an excellent choice for optimum protection up to a child’s second birthday.
2011 AAP Recommendations

2011 NHTSA Recommendations

Car Seat Recommendations for Children
Implications of 2011 AAP Policy

Rear-facing versus forward-facing child restraints: an updated assessment

Timothy L. McLaughlin,1 Kristy B. Arbogast,2 Christopher P Shenwood,3 Federico Voca,4 Marilyn Bull5, Jeff R. Caudill,6 Richard W. Kent6

Results Years 1998–2015 of NASS-CDS contained 1107 children aged 0 or 1 year old meeting inclusion criteria, with 47 of these children sustaining injuries with Injury Severity Score of at least 9. Both 0-year-old and 1-year-old children in RFCRS had lower rates of injury than children in FFCRS, but the available sample size was too small for reasonable statistical power or to allow meaningful regression controlling for covariates.

Conclusions Non-US field data and laboratory tests support the recommendation that children be kept in RFCRS for as long as possible, but the US NASS-CDS field data are too limited to serve as a strong statistical basis for these recommendations.
NHTSA Affirms Position

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Child Passenger Safety

Abstract

Child passenger safety has dramatically evolved over the past decade. However, much remains uncertain in the benchmarking of safety for infants, toddlers, and children. The purpose of this study is to synthesize safety research for children from birth through age 6 in the areas of infant restraint systems, child safety seats, and a description of the relative risk of injury in the event of a crash. The study concludes that: 1) children under 1 year of age are at least 7 times more likely to be killed in a crash than older children; 2) children under 3 years of age are at least 5 times more likely to be injured in a crash than older children; 3) children under 5 years of age are at least 5 times more likely to be killed in a crash than older children; and 4) children under 5 years of age are at least 5 times more likely to be injured in a crash than older children.

American Academy of Pediatrics

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2011 2018
2019 Best Practices

No more 5X safer to age 2
No data specifying age 2

- Under 1
  - Always RF
- 1-4
  - RF to RF limits;
  - Then FF
- 2-8
  - FF with harnesses to FF limits
  - Then BPB
- 8-12
  - BPB until belts alone fit
  - Then lap and shoulder belt

Questions & Discussion?

TRADITION
JUST BECAUSE YOU’VE ALWAYS DONE IT THAT WAY
DOESN’T MEAN IT’S NOT INNOCENT STUPID.

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