

Protecting the Most Vulnerable: Linking Research and Action for Booster Kids

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SafetyBeltSafe U.S.A.

www.carseat.org 800/745-SAFE

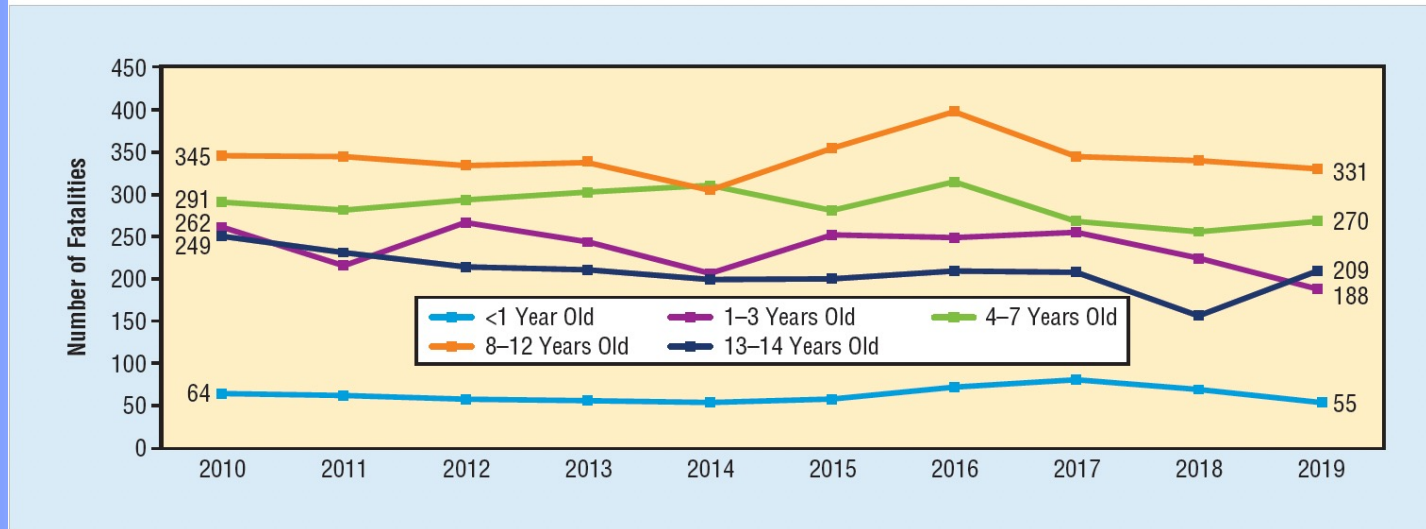


Why Big Kids Need Boosters

- Injury Data
- Research supporting the 5-Step Test
- State CPS Legislative Goal: Louisiana model
 - I. Rear seat travel: data on effect of law on behavior
 - II. Tools with Messages for Teaching

Trends in Child Deaths in Traffic

Child Traffic Fatalities, by Age Group, 2010–2019



Source: FARS 2010–2018 Final File, 2019 ARF

— 8-12 year olds — 4-7 year olds

Our goals:

- Seats with internal harness until about 6 years old, then booster.
- Booster until child passes 5-Step Test (approximately 10 – 12 years old).
- Back seat until **at least** age 13.

Best Practice Review: Booster Use

SBS USA 5-Step Test*:

1. Does the child sit all the way back against the auto seat?
2. Do the child's knees bend comfortably at the edge of the auto seat?
3. Does the belt cross the shoulder between the neck and arm?
4. Is the lap belt as low as possible, touching the thighs?
5. Can the child stay seated like this for the whole trip?



- Created in 2001.
- Curricula available for K-3 and 4-5 grades in "Boosters Are For Big Kids."

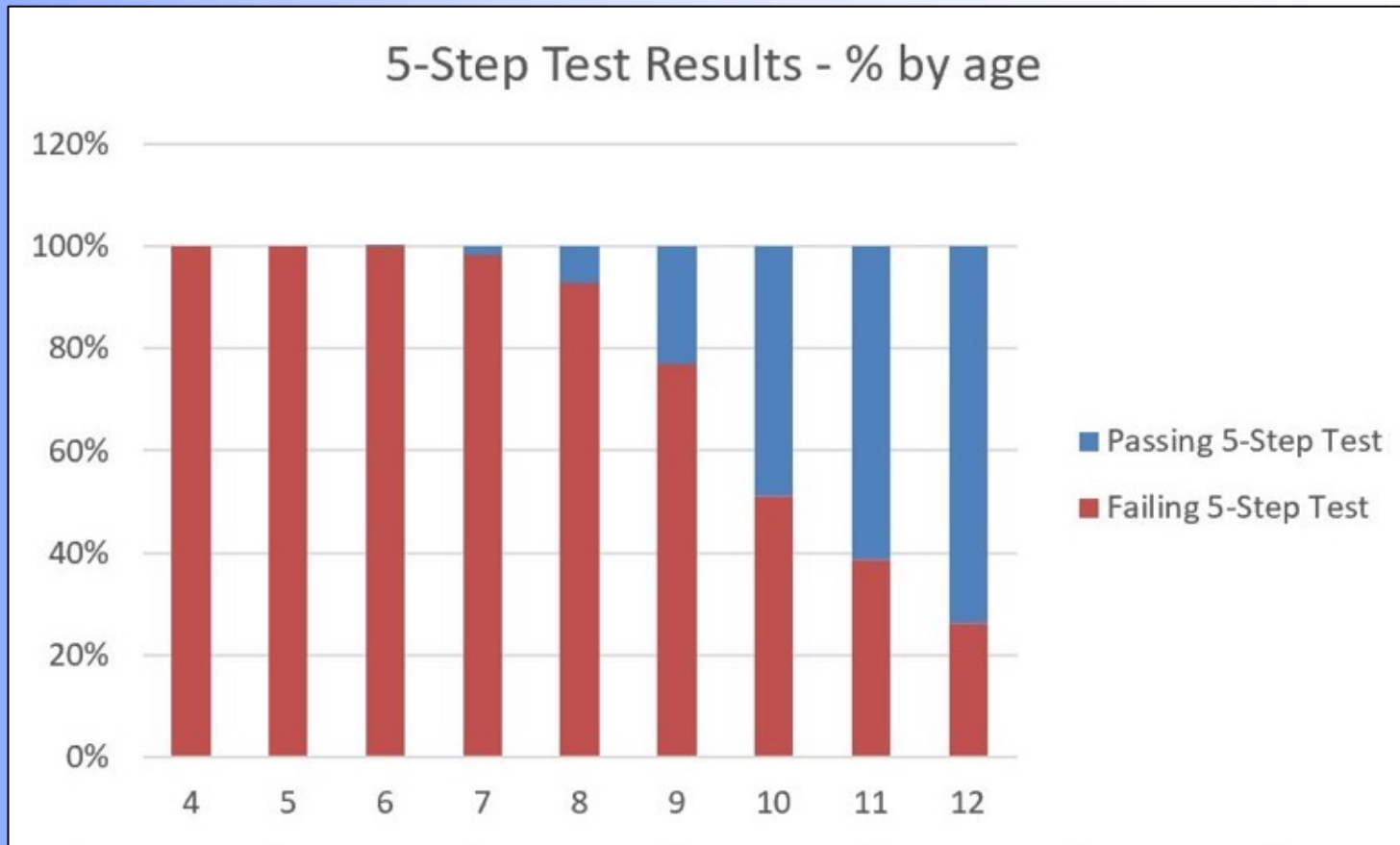
Free flyers available: #630 & 630s
For California, 630CA, 630sCA

SBS USA Data: Booster Use

Findings using SBS USA 5-Step Test

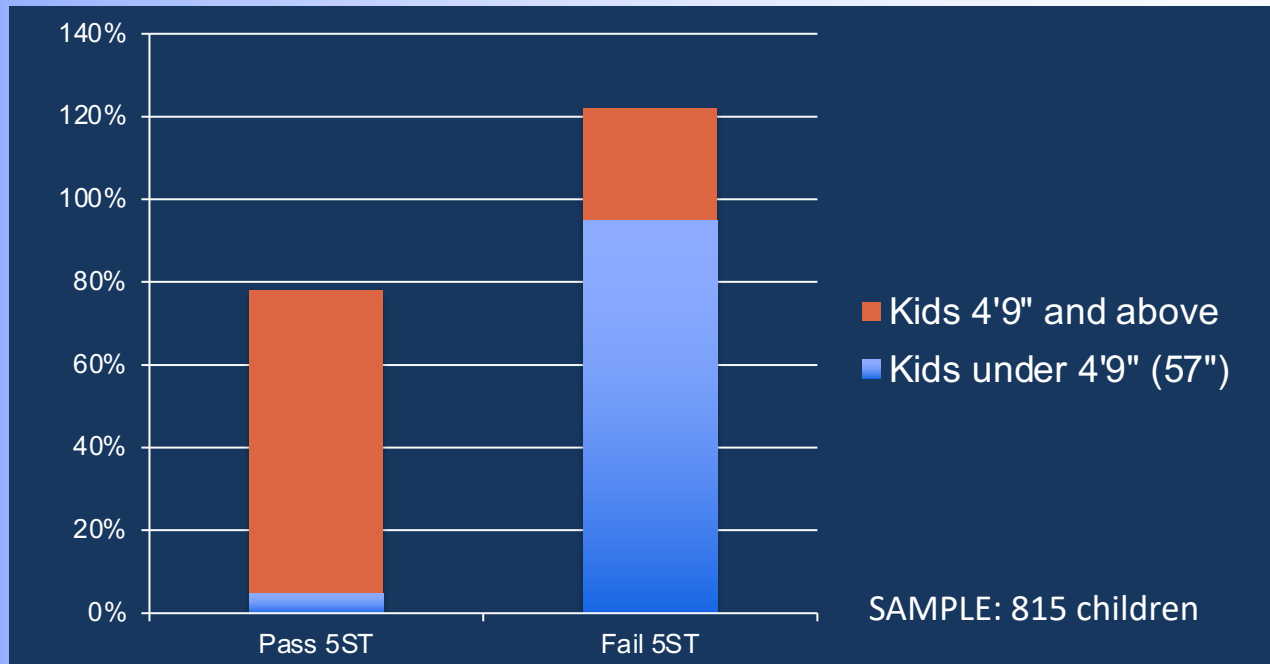
SAMPLE = 9,146 children, ages 4 – 12

Tested at 95 5-Step Test events (2/2008 through 8/2020)



SBS USA Data: Booster Use

Height Data from SafetyBeltSafe U.S.A. Testing
Results of special study at events February to August 2011



27% of kids taller than 4' 9" **FAILED** the 5-Step Test.

5% of kids shorter than 4' 9" **PASSED** the 5-Step Test.

Louisiana CPS Law

Age/Size	Restraint Use
Birth to at least 2 years old	Ride rear facing in an infant or convertible child safety seat
At least 2 years old and has outgrown the rear facing seat by height or weight	Ride in a forward-facing child safety seat with an internal harness
4 years old and has outgrown the forward-facing seat with internal harness by height or weight	Ride restrained in a belt positioning child booster seat using a lap shoulder seat belt
9 years old or has outgrown the booster seat and can pass the 5 Step Test	Ride restrained with a lap shoulder seat belt secured correctly on the vehicle seat
Younger than 13 years old	Ride in the rear seat of a vehicle, when available and properly restrained

A child who can be placed in more than one category shall use the more protective category.
Child safety seats must be used according to the manufacturer's instructions.

5 Step Test: The seat belt fits correctly when the child sits all the way back against the vehicle seat, the child's knees bend over the edge of the vehicle seat, the belt fits snugly across the child's thighs and lower hips and not the child's abdomen, and when the shoulder strap snugly crosses the center of the child's chest and not the child's neck.



Effective 8/1/2019

Legislative Goal - Summary

- **Why change laws? Families look to law for best safety advice.**
- Too many laws **imply** an upper age limit for use of child restraints/boosters.
- Improve understanding of state laws:
 - Catch up with Louisiana by incorporating the 5-Step Test – easy to learn; easy for enforce, works, AND kids can do it themselves.
 - Bring law in concert with vehicle instructions for staying in back until age 13.
- Data and research papers indicate boosters needed to ages 10-12.

GOAL:

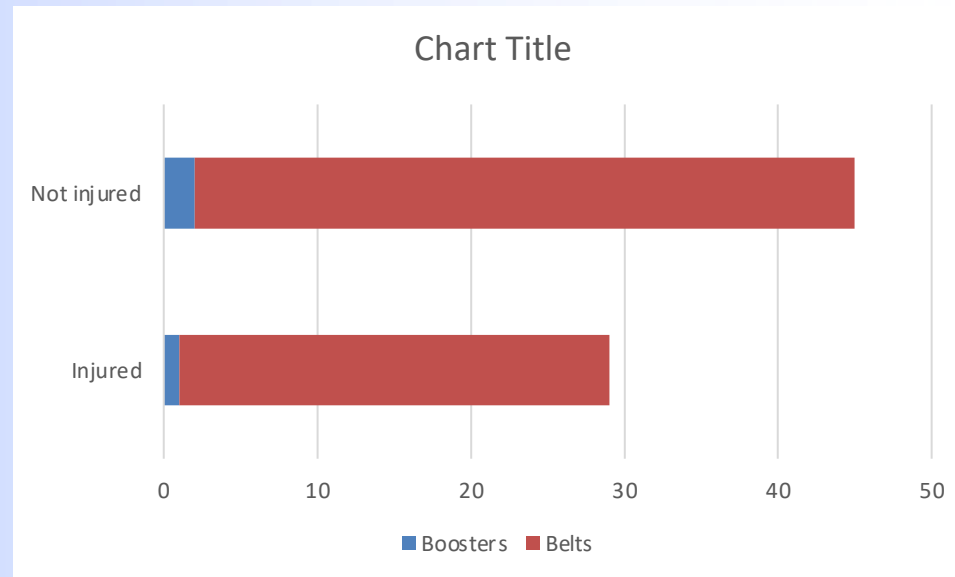
Laws based on belt fit (5-Step Test) & back seat to at least age 13.

CA Legislative Goal - Discussion

Anaheim P.D. data: 2020

- 8 to 10-year-olds
- 74 in collisions, 3 using boosters
- 1 injured of 3 in boosters.
- 28 injured of 71 not in boosters.

Only 4% of children 8-10
in crashes in boosters.



Although California requires correct belt fit to ride without a booster, the data indicate that the vast majority of parents do not recognize that.

Quick Review of Research: belt fit

Predicting vehicle belt fit for children 6-12

M. Reed & K. Klinich, PhD, *Traffic Injury Prevention (2016)* UMTRI

Summarized in 3/16 *SafetyBeltSafe* News: Based on detailed measurements of kids and cars.

“Overall, these results support the conclusion that relatively few children under 12 years of age can ‘graduate’ from a booster without experiencing a marked degradation in lap belt fit.”

Child Seat Belt Guidelines: Examining the 4'9" Rule as the Standard

AM Morse, ME Aitken, SH Mullins, BK Miller, MM Pomtree, EM Ulloa, JS Montgomery & ME Saylots,
Journal of Trauma and Acute Care Surgery (2017) ePub

Substantial proportions of children meeting AAP height guidelines for using safety belt only do not meet safety requirements for fit, especially in larger, commonly used vehicles (large SUVs and trucks).

Quick Review of Research: belt fit

Booster Seat Effectiveness Among Older Children: Evidence From Washington State

M. Anderson, PhD, L. Carlson, MD, D. Lee, PhD, *American Journal of Preventive Medicine*, 2017

79,859 children with full data included in comparing belt vs. booster outcomes. Booster seat use associated with 29% reduction in risk of injury (19% adjusted for other factors (newer cars, e.g.) which might reduce risk). From '02-'15: 92% in belts only but up from 2% in '02 to 14% of 8 – 12-year-olds by 2015.

Can Age or Height Define Appropriate Thresholds for Transition to Adult Seat Belts? An Analysis of Observed Seat Belt Fit in Children Aged 7–12 Years

Anvay Parab, Tom Whyte, Bianca Albanese, Lynne Bilston, Sjaan Koppel, Judith L. Charlton, Jake Olivier, Lisa Keay, Julie Brown, *Int. J. Environ. Res. Public Health* **2022**

... taller and older children have a better chance of achieving a good seat belt fit. However, with variations in seat geometry between vehicles, no single simple metric clearly defines an appropriate transition to the adult seat belt. Mentions that **National Health and Medical Research Council of Australia supports the “5 step test” to judge belt fit at about ages 10-12.**

Quick Review of Research: rear seat travel

Rear seat belt laws and restraint use in rear-seated teen passengers traveling in passenger vehicles involved in a fatal collision on a U.S. roadway

J. Pressley, H. Gollatari & C. Liu, *Trauma Acute Care Surgery*, October 2016

Notable research on teens highlights importance of being buckled up in rear but indicates how hard it seems to be to maintain this habit.

RESULTS – Independent Predictors of Restraint Use: law and driver

LAW: Primary safety belt law: teens 60% more likely to be belted. Secondary safety belt law – with Graduated Driver Licensing Law, 50% belted; without, 40% belted. However, effect temporary – passengers riding with 18- or 19-year-old drivers have restraint levels similar to teens with no rear-seat restraint law.

DRIVER: Largest single predictor of teen belt use: driver use of safety belt (64% vs. 19%). **Key area for injury prevention strategies – education AND enforcement.** Negative effect: male driver; driver use of drugs or alcohol.

RESULTS: Half of rear-seated teens restrained, half unrestrained. *Unrestrained* rate increased with age (65.8% of 13 - 14-year-olds restrained to 43.3% of 18 – 19-year-olds restrained). 25% died. **77%** of deaths in **unbelted** teens. 18.5% ejected – 96% of them unrestrained. 56% died.

CONCLUSION: Findings support the need for coverage of rear-seated teen passengers in law; primary enforcement.

SafetyBeltSafe U.S.A. comment: Importance of education, enforcement AND involvement of CPS professionals in legislative & regulatory processes.

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Louisiana vs. Future CPS Laws

Using California as an Example

Requirements for Riding:	Louisiana Law	California: Law and Proposal
Rear Facing	Until at least age 2 and the height or weight limit of RF CR is outgrown	Current: To age 2 unless 40 lbs. or 40 in. Proposal: As long as possible, but with guidance for owners of “to 22 lb.” RF-only CRs and CRs with 22-lb. minimum for FF.
Using a Harness	Until at least age 4	Current: Not explicit Proposal: Until age 6(?), unless child weighs more than 50 pounds
In a Booster Seat	Until age 9, unless proper fit based on 5-Step Test	Current: Until age 8 (and proper belt fit), unless 4’9” (and proper belt fit) Proposal: Until age 10, unless proper fit based on 5-Step Test
In the Rear	Until age 13 (aligns with vehicle instructions)	Current: Until age 8 Proposal: Until age 13 (aligns with vehicle instructions)

Update: Texas Statewide CPS Conference June 29 – July 1, 2021

Building a Better Booster

Kathleen Klinich, PhD

University of Michigan Transportation Research Institute

Why does it matter? What are the data for U.S. children over time? How do boosters actually work to protect children better than belts alone?

Major improvements 2006 vs. 2017 for younger children but:

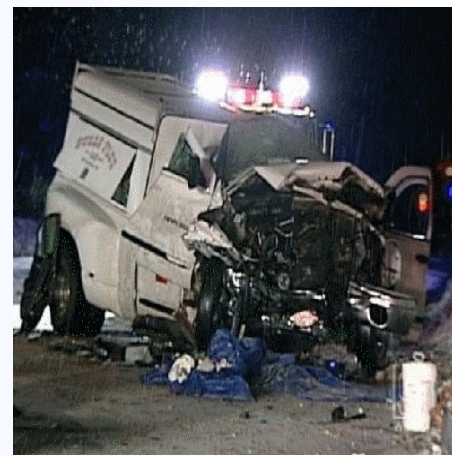
- **8 – 12-year-olds: little movement in booster use from 8% to 11%; remain more unrestrained over time than younger children.**
- On 3-15-22 at Lifesavers, Dr. Klinich is presenting a version of her excellent seminar in Texas. For those inspired to work on this issue, I recommend attending.

Slides from David Mooney, MD Boston Children's Hospital

- Included with Dr. Mooney's permission from his address at Texas Statewide Child Passenger Safety Conference, 6/30/21
- Presented on the physics of trauma in vehicles and included several patients and how they were injured and/or protected.
- The case summarized here illustrates the reason for concern about a law that **implies** no child restraint is needed at age 8.
- Next, very brief excerpt from Case from David Mooney, MD, Boston Children's Hospital, TX CPS Conference, June '21

Why Urge Booster Use Longer

Scenario: 9-year-old boy in *lap belt only* in vehicle on high-speed secondary road & driver with alcohol & cell phone use.



Immediate Consequences:

- Child taken to OR at outside hospital before transfer to Boston Children's.
- Abdomen full of blood.
- Stopped bleeding.
- Dr. Mooney found lumbar spine had cut spinal cord; stabilized patient.

Long-term Consequences:

- Parents divorced.
- Child has multiple medical admissions without return of function.

What Happened?

- High kinetic energy: sudden deceleration w/concentrated G-force=spinal cord took force
- Example of how law that mentions age 8 might lull parents into not considering alternatives.
- Example of child riding with parent who took alcohol onboard.
- Medical case continues as child who is now in college and requires wheelchair.

Tools for Parents and Professionals

Video 'shorts' posted on YouTube from SafetyBeltSafe U.S.A. (www.carseat.org)

Each video covers specific CPS issue. Link to them for your community.

Here we have 2: one for parents and kids; one for presenters, each less than 4 minutes. We also have one set that is California-specific.



Further Information

SafetyBeltSafe U.S.A.

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www.carseat.org

Founded in 1980

The national non-profit solely focused on child passenger safety.



Research Review

Perforated Small Intestine: A Case of a Delayed Presentation of an Intra-Abdominal Injury in a Pediatric Patient With a Seatbelt Sign

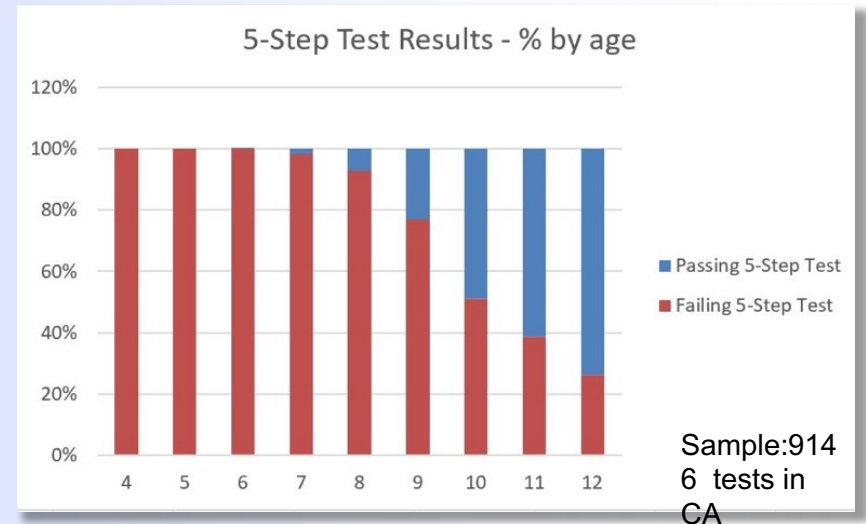
TAKE HOME MESSAGE FOR TECHS and PROFESSIONALS SERVING CHILDREN AND FAMILIES:

- Parents need to know: look for 'seat belt sign' after a crash; EMT will observe but if not called, adults need to understand this.
- Wearing belt correctly vital – both with booster or alone. Lap belt must sit low on the lap, touching the thighs.
- Teach the 5-Step Test to all parents and children.



Legislative Goal - Discussion

- **Improve understanding of California law as an example:** catch up with Louisiana by incorporating the 5-Step Test – easy to learn; easy for enforce; works AND kids can do it themselves AND bring law in concert with vehicle instructions.
- Data and research papers indicate boosters needed to ages 10-12.
- Anaheim Police Dept: Of 74 8-10-year-olds in crashes, 4% using boosters: 1 of 3 in boosters injured; 40% of 71 without boosters were injured.
- Teach 2 facts now: 5-Step Test & back seat to at least age 13.



Back seat until age 13 matches guidance in vehicle owner's manuals!