

2015

# Car Seat Safety in Children Ages 4 and Above

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## Recommended Citation

Taylor, Sasha, "Car Seat Safety in Children Ages 4 and Above" (2015). *Family Medicine Clerkship Student Projects*. Book 91.  
<http://scholarworks.uvm.edu/fmclerk/91>

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# Car Seat Safety in Children ages 4 and Above

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AUGUST-OCTOBER 2015  
HINESBURG, VT  
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# Car seat safety in the United States

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- Motor vehicle injuries are one of the leading causes of preventable death in children in the United States<sup>1</sup>.
- The use of car seats, booster seats, and seatbelts has proven efficacious in reducing mortality in children of all ages. Car seat use in passenger vehicles reduces the risk of death in infants less than a year of age by 71% and in toddlers (ages 1-4) by 54%<sup>2</sup>. Compared to seat belt use alone, booster seat use reduced injury risk by 45% for children ages 4-8<sup>3</sup>. For children above the age of 8, the use of seat belts reduces death and serious injury by approximately half<sup>4</sup>.
- In order to decrease injuries and deaths to child passengers, the Community Preventive Services Task Force recommends car seat laws, car seat distribution and education programs to increase restraint use<sup>5-6</sup>.

# Car Seat Safety in the United States (children ages 4 and above)

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- Children between the ages of 4 and 12 are at particular risk of injury in motor vehicle accidents, and were more likely than younger children to experience significant injuries (e.g. abdominal bruising, intra-abdominal injury, and spinal injuries) in motor vehicle accidents<sup>8-9</sup>.
- One possible explanation for this is that older children are less likely to use proper seating than younger children. In motor vehicle fatalities of children ages 12 and younger in 2013, a total of 38% were not buckled up, with a higher percentage of older children (45% of 8-12 year olds and 42% of 4-7 year olds) not buckled up compared to younger children (27% of those under 4 years old)<sup>4</sup>.
- In states that increased the age requirement to 7-8 years old for car seat/booster seat use, there was a nearly three fold increase in the rate of children using car seats and booster seats. Additionally, there was a 17% decrease in the rate of children or suffered either fatal or incapacitating injuries<sup>7</sup>.

# The Economic Implications of Car Seat Safety

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- Safety restraint use is a very effective way to save lives in all ages, with an estimated 15,200 deaths prevented by seatbelt use in 2004, and an estimated 5,800 deaths that would have been prevented had all vehicle occupants over the age of 4 worn seat belts<sup>10</sup>.
- Between 1975-2000, seatbelt use saved the US an estimated 588 billion dollars in casualty costs. Despite this, there is an estimated loss of 26 billion dollars annually from injury-related costs<sup>10</sup>.
- Specifically related to children, one study showed that child seat misuse reduction programs and design improvements in child seats yielded savings of over 1.8 billion dollars from 1999-2005, described as “a substantial savings to society.”<sup>11</sup>
- Still another study states that a 52\$ investment in a child safety seat prevents 2,200\$ in medical costs, for a return of 42\$ for every 1\$ invested<sup>12</sup>. Another study found that in children ages 4-7, the return on investment for a booster seat was 9.4 to 1.<sup>13</sup>

# The Economic Implications of Car Seat Safety (Vermont Law)

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- Vermont law states that “(1) all children under the age of one, and all children weighing less than 20 pounds, regardless of age, shall be restrained in a rear-facing position, properly secured in a federally-approved child passenger restraining system, which shall not be installed in front of an active air bag;  
(2) a child weighing more than 20 pounds, and who is one year of age or older and under the age of eight years, shall be restrained in a child passenger restraining system; and  
(3) a child eight through 17 years of age shall be restrained in a safety belt system or a child passenger restraining system.”<sup>14</sup>
- However, these laws don’t give any other guidance as to when a child should use a child passenger restraining system or a safety belt system, leading to the potential for inadequate restraint of older children.

# Community Perspective of Car Seat Safety in Children ages 4 and above

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- Jen Del Rosario – Mother of a 3 year old
  - I think this is a huge issue. I've seen a lot of people who don't pay a lot of attention to actually using a car seat properly. It's really important but it seems to me that there isn't enough information out there.
  - People often don't understand how consequential it is, perhaps because we drive in cars so often and our parents didn't always have car seats, maybe that's why people don't take it so seriously. If it were made simple, maybe people would pay more attention.
  - To find information I usually just google to find it or ask other people, sometimes it can be hard to find the right information.
- Cathy Stanfield – Mother of a 4 year old
  - I feel like a lot of parents don't know what the guidelines of for car seat safety in their children as they get older
  - Sometimes it can get confusing trying to sort out whether the change in child seat type happens at a certain age, or a certain height, or a certain weight
  - I think it would be really important for people to know that they can get their seat inspected at the local police station or fire station, and there's one in every town so people don't have to go to far to find it

# Community Perspective of Car Seat Safety in Children ages 4 and above

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- Jill Miller, MD – mother of a 3 and 6 year old
  - Car safety is very important. On a scale from 1-10, it would be a 10. We had a professional from UVMHC inspect our car seat situation in our cars after having our second child.
  - I think it would be helpful if there was an emphasis on size considerations and transitions as kids grow up with a timeline. Physicians to be encouraged to speak with their patient's parents about the subject. Make a handout that is laminated and with a Velcro patch on it so that parents can place it somewhere visible in their car or on the side of a car seat.



# Intervention and Methodology

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- Given the increased risk for injury and death in older (4-12) child riders, the ambiguity of the Vermont law in advising when a child should graduate to different restraints, and the evidence showing that education has a appreciable effect on increased compliance and decreased car-wreck related morbidity and mortality, there appears to be an obvious need for educational material about appropriate car seat safety for children ages 4 and above.
- The goal of this project was to review various car safety resources and create a handout for families that includes statistics on car safety and a list of informational resources that families could follow up on if they had further questions. Additionally, the Vermont Department of Health provided a handout with specific recommendations for when children should move from one restraint type to another.
- The intention was to provide this handout to practitioners at Hinesburg family practice to be given to families at well child checks for ages 4 and above.

# Results

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- Patients and providers responded very positively when presented with the informational handouts.
- Parents who saw the handouts agreed that it increased awareness of the importance for car seat safety as their children got older, and also stated that the specific recommendations from the Vermont Department of Health and other resources provided were extremely helpful.
- One mother of a patient did note that it would be helpful to include information on where car seats could be inspected, saying that local police and fire stations are often helpful in that regard. That information was incorporated into an updated version of the handout.
- Providers found the specific information included in the handouts useful, and said that they felt it would be helpful for families both immediately, and if they had follow-up questions.
- Future projects could ascertain more qualitative data (such as asking more families their opinion on the handout) or quantitative data (such as keeping track of the number of handouts provided or creating a quality improvement survey).

# Effectiveness and Limitations

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## **Effectiveness**

Further information is necessary to evaluate the effectiveness of this project. Initial feedback was positive and endorsed meeting two of the goals of the project – increasing awareness of the importance of car seat safety in older children and providing concrete recommendation and further resources on the subject to families.

To further evaluate its effectiveness, it would be beneficial to follow up with families in future visits after they've received the information to assess changes in knowledge and attitudes about car seat safety.

## **Limitations**

Given the brief time line for the project, it was impossible to obtain longitudinal data that would have been helpful in determining the effectiveness of the handout and whether there was a change in self-reported education levels and confidence in car seat safety knowledge.

Providers have a very limited time in each visit to cover a wide array of subjects, and there will likely be restrictions on the amount of time they can offer to discuss car seat safety with each family. Additionally, there is no way to assure that providers give the handout to all families of children ages 4 and above.

# Future projects

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- This project focused on car seat safety information for children ages 4 and above. Additional projects could design a resource for younger children with a similar focus on car seat safety statistics and resources for families.
- Additionally, quality improvement studies could be done with parents to determine the effectiveness of the handout. A pre-test could be given to families to assess baseline knowledge and confidence in car-seat safety. The informational handout could then be provided, and at a later visit the family could fill out a post-test to see if there is a change in knowledge level and confidence. This could even be done with a control group of families who receive car seat information as usual from the physician to see if there is a noticeable difference in those who receive the extra handout.
- Finally, parents who receive the handout could be asked their opinions on how effective it is and what could be done to improve it.

# References

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- 1) CDC. [Web-based Injury Statistics Query and Reporting System](#) [online]. National Center for Injury Prevention and Control, Centers for Disease Control and Prevention (producer). [2011 Sept 30].
- 2) Durbin, D. R. (2011). [Technical report—Child passenger safety](#). *Pediatrics*, 127(4). Advance online publication. doi:10.1542/peds.2011-0215
- 3) Arbogast KB, Jermakian JS, Kallan MJ, Durbin DR. Effectiveness of belt positioning booster seats: an updated assessment. *Pediatrics* 2009;124;1281–6.
- 4) National Highway Traffic Safety Administration. Traffic safety facts, 2013 data: occupant protection. Washington, DC: US Department of Transportation, National Highway Traffic Safety Administration; 2015. Available at <http://www-nrd.nhtsa.dot.gov/Pubs/812153.pdf>.
- 5) Zaza, S, Sleet DA, Thompson RS, Sosin DM, Bolen JC, Task Force on Community Preventive Services. Reviews of evidence regarding interventions to increase the use of child safety seats. *American Journal of Preventive Medicine* 2001; 21 (4S), 31-47.
- 6) CDC. [Child Passenger Safety: Buckle Up Every Age, Every Trip](#) Vital Signs. [2014 Feb 4].
- 7) Eichelberger AH, Chouinard AO, Jermakian JS. Effects of booster seat laws on injury risk among children in crashes. *Traff Inj Prev* 2012;13:631–9.
- 8) Durbin DR< Arbogast K, Moll E. Seat belt syndrome in children: a case report and review of the literature. *Pediatr Emerg Med*. 2001; 17:474-477
- 9) Valent F, McGwin G Jr, Hardin W, Johnston C, Rue LW 3<sup>rd</sup>. Restraint use and injury patterns among children involved in motor vehicle collisions. *J Trauma*. 2002; 52:745-751
- (10) *The need for seat-belts and child restraints*. World Health Organization 2009 ([http://www.who.int/roadsafety/projects/manuals/seatbelt/seat\\_belt\\_manual\\_module\\_1.pdf](http://www.who.int/roadsafety/projects/manuals/seatbelt/seat_belt_manual_module_1.pdf) accessed September 10th 2015).
- (11) Zaloshnja E, Miller TR. The Economic Benefit of Child Safety Seat Misuse Reduction Programs and Design Improvements for Children in Rear Seats. *Annu Proc Assoc Adv Automot Med*. 2007; 51:197-206
- (12) *Public Health is ROI. Save Lives, Save Money*. National Public Health Week 2013. ([http://www.nphw.org/assets/general/uploads/APHA\\_Updated\\_NPHW\\_brochure\\_508\\_sm.pdf](http://www.nphw.org/assets/general/uploads/APHA_Updated_NPHW_brochure_508_sm.pdf) accessed September 10th 2015).
- 13) Miller TR, Zaloshnja E, Hendrie D. Cost-outcome analysis of boosters seats for auto occupants aged 4 to 7 years. *Pediatrics*. 2006 Nov;118(5):1994-1998