

# Pediatric Injury Prevention: Methods of Booster Seat Education

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Sixty elementary schools in Minneapolis were asked to participate in a study to evaluate the most effective education method to increase booster seat knowledge and use in kindergarten-age children. School personnel selected one of the following interventions: 1) written information, 2) parent education class and a free booster seat, or 3) student education and a free booster seat. Twenty schools participated, with 132 parents completing the telephone interview 3 to 6 months post-survey. Providing instructions to parent groups and teaching children in the classroom, along with providing an incentive booster seat, was shown to increase booster seat use. Providing information only was found to be ineffective. Pediatric and school nurses should focus their injury prevention efforts beyond written materials. Results indicate that presentations for children and their parents, along with incentives, can result in changes in behavior.

**M**otor vehicle crashes are the leading cause of death among children 4 to 14 years of age (National Highway Traffic Safety Administration [NHTSA]), 2006). Booster seats have been demonstrated to be an effective injury prevention strategy and have been shown to have a return on investment greater than 9 to 1 (Miller, Zaloshnja, & Hendrie, 2006). It is estimated that 86% of children who need to be either in a car seat or a booster seat are using seat belts instead, increasing the risk of serious injury from a motor vehicle-related crash by over three times (Durbin, Elliott, & Winston, 2003).

The use of a belt positioning booster seat (BPB) improves these factors by improving the fit of the seat belt on young children and encouraging better posture and compatibility with the vehicle seat itself. The devices are the

recommended restraint for 4 to 8-year-old children (NHTSA, 2006). Booster seats are designed to improve lap and shoulder belt fit on children, minimizing the factors that result in abdominal injury (Jermakian, Kallan, & Arbogast, 2007).

Previous studies have concluded that booster seat education needs to be targeted at both parents and children. Ramsey, Simpson, and Rivara (2000) suggested that messages for parents include improved behavior of the child in the safety seat and the increased visibility afforded to the child by a booster. An extensive review of the literature implied that a combination of education and incentives were effective in increasing booster seat use (Ehiri et al., 2006). Findings from parent focus groups suggested that parents need to be aware of the inability of lap belts to protect young children, are taught to encourage children who are resistant to booster seat use, and be given clear instructions on the correct seat needed for age and size of the child (Rivara et al., 2001).

In 2002, the Hennepin County Medical Center in Minneapolis,

Minnesota, received a grant from the Robert Wood Johnson Foundation to form an Injury Free Coalition for Kids (IFCK) site. IFCK is composed of hospital-based, community-oriented programs, whose efforts are anchored in research, education, and advocacy. Currently, the coalition includes 44 sites located in 40 cities, each housed in the trauma centers of their participating institutions. The Minnesota coalition is composed of concerned stakeholders, including health plan providers; police, fire, and emergency medical services; school nurses; Safekids of Minnesota; Foresight Childproofing; and Public Health and the Department of Public Safety.

At the time of this study, Minnesota did not have any booster seat language in its child passenger safety law. IFCK wanted to study the best method to educate parents and children about the safety benefits of using a booster. The objective of this study was to test three school-based booster seat intervention methods within the Minneapolis Public School system and compare self-report booster seat usage before and after intervention.

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Objectives and the  
CNE posttest can be  
found on pages 232-233.

**Table 1.**  
**Demographic Caregiver Characteristics of the Sample**

Characteristics	Information Only % (n)	Parent at School % (n)	Children in Classroom % (n)
Less Than High School Education*	8.7 (2)	51.1 (24)	37.9 (22)
Income Less Than \$30,000**	17.4 (4)	61.2 (30)	58.6 (44)
White Race*	69.6 (16)	32.0 (16)	35.7 (20)
U.S.-Born Mother*	78.3 (18)	40.8 (20)	67.2 (39)
Spanish Primary Language**	17.4 (4)	62.0 (31)	12.5 (7)
Total	44	121	132

\*  $p < 0.01$

\*\*  $p < 0.001$

### Parent Participation and School Cooperation Were Key

Schools were invited to participate in the booster seat intervention program and were allowed to choose one of three interventions described below. Parents participating in these interventions were asked to sign a consent form allowing a follow-up phone interview regarding child safety seat attitudes and behaviors (See Appendix A). A trained, bilingual interviewer conducted the phone interviews.

Three elementary schools were selected for a pilot test, which was conducted during the spring of 2003. Parents received the booster seat education at one of the education groups after which they were surveyed. The presentation and survey were refined based on feedback about questions.

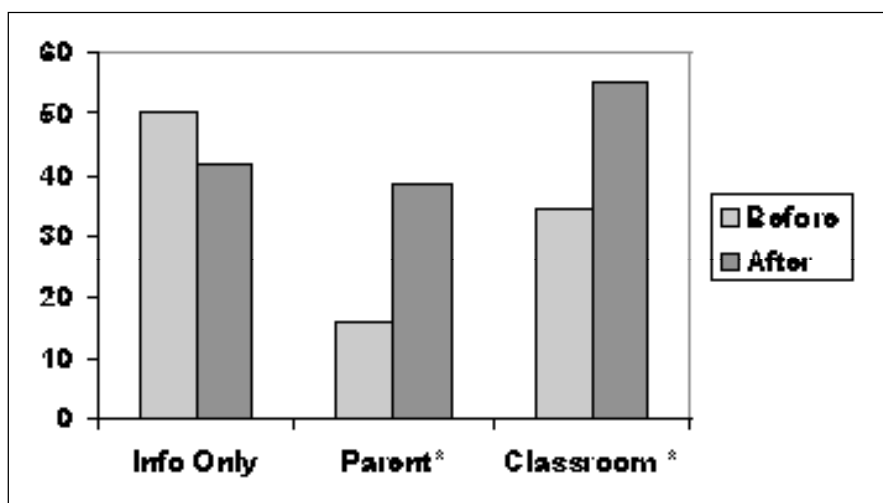
Prior to the beginning of the 2003-2004 school year, the IFCK Community Health Specialist sent a letter to all public elementary schools in Minneapolis. Follow-up phone calls were made to the principals several weeks into the school year asking for their involvement. The three different education groups were further explained, and each principal who agreed to participate selected one of the three interventions and assigned a teacher or family liaison to be the school's contact person for the study.

### Three Different Education Groups Were Compared

#### Information Only Group

All kindergarten children in the information-only schools were given materials to take home, including detailed information about the need for booster seats, why booster seats

**Figure 1.**  
**Percentage of Caregivers Currently Using a Booster Seat for Their Kindergarten Child Before and After the Intervention**



\*  $p < 0.05$  Chi Square

are important, how to choose an appropriate booster seat for their child, and contact information in case parents had questions.

#### Parents at School Group

Parents were offered an opportunity to attend a 1-hour educational session about transportation safety for children presented by IFCK staff who were certified CPS technicians. These sessions included traveling issues with children of a variety of ages, dangers of improper travel, information about the need for booster seats, why booster seats are important, and how to choose an appropriate booster seat for their child. Parents were able to ask questions related to their specific situation and were given a booster seat for agreeing to participate in the follow-

up survey. These sessions were often conducted in conjunction with an existing parent meeting.

#### Children in the Classroom

A staff person or coalition member talked to children directly about how to travel safely when they ride in a motor vehicle. A picture survey was done with all children in the classroom prior to the presentation so children could self-identify how they currently ride in the car. The picture survey was administered by the kindergarten teacher and included a drawing of a car. The children were asked, "Where do you ride in the car?" They were asked to circle the space in the front seat or the back. They were then asked, "How do you ride in the car?" and could choose from six pictures: a

**Table 2.**  
**Proportion of Caregivers Answering the Survey Questions Meeting Program Objectives by Education Venue**

	Information Only % (n)	Parent at School % (n)	Children in Classroom % (n)
<b>Beliefs</b>			
Riding in a motor vehicle is dangerous.	54.2 (13)	<b>70.0 (35)</b>	55.2 (30)
Booster seat can protect children in a crash.	15.6 (12)	37.7 (29)	46.8 (36)
<b>Self-Efficacy</b>			
They can make it safe for a child to ride in a motor vehicle.	<b>93.3 (14)</b>	60.5 (26)	63.4 (33)
Confidence in correct safety seat use.	<b>91.3 (21)</b>	<b>82.0 (41)</b>	<b>82.8 (40)</b>
<b>Behaviors</b>			
Doing things differently since receiving information.	53.8 (7)	<b>71.4 (30)</b>	59.6 (34)
Discussed information with the child.	<b>81.8 (9)</b>	<b>85.7 (36)</b>	<b>88.6 (31)</b>
Discuss how the child will ride with others.	66.7 (14)	49.0 (24)	56.0 (28)
<b>Education Program Knowledge</b>			
Read the booster seat information.	<b>81.8 (18)</b>		63.2 (36)
Learned something new.	66.7 (12)	<b>91.7 (44)</b>	40.0 (14)
Do you know where you can go for help on booster seat issues?	43.5 (10)	36.0 (18)	33.9 (19)
<b>Education Program Satisfaction</b>			
Would suggest program to other parents.		<b>86.0 (37)</b>	
Did you find the information easy to understand?	<b>100.0 (19)</b>	55.1 (27)	<b>97.4 (37)</b>
Was there enough information or would you have liked to receive more?	<b>76.9 (11)</b>	<b>88.1 (37)</b>	<b>76.8 (43)</b>

**Note:** Bolded numbers indicate that 70% of the goal was achieved for that category.

child in a car seat, a high back or no back booster, a lap belt, lap shoulder belt, or no belt. During the session, children learned about booster seats, proper seat belt use, and riding safely in motor vehicles. Parents were informed of this session with a letter explaining what their child learned in the session, why a booster seat is important, and how to choose an appropriate seat for their child. Parents who agreed to participate in the study were eligible for a free booster seat.

### Printed Information Alone Is Not Enough to Increase Booster Seat Use

Of the 60 schools invited to participate, 20 agreed. Twenty-four parents in Group 1, 58 parents in Group 2, and 50 parents of Group 3 children signed the consent form. The follow-up telephone surveys were conducted 3 to 6 months after the intervention.

The three intervention groups differed significantly in education, income, race/ethnicity, immigrant status, and language (see Table 1). Group 1 had higher income levels and education attainment than the other

**Table 3.**  
**Parents Reporting Why or Why Not They Have a Booster Seat for Their Child**

Question	%	n
<b>Do you have a booster seat for your child?</b>		
Yes	86.9	113
No	13.1	17
<b>Why do you have a booster seat?</b>		
Size: Child too big for the car seat, child too small for safety belts, or child can't see.	32.7	37
Was given a booster seat to use.	35.4	40
Believes booster seats make the child look safer.	22.1	25
<b>Why do you not have a booster seat?</b>		
Lack of knowledge about booster seats.	17.6	3
Booster seat is too expensive.	35.3	6

two groups. Group 1 was also predominantly White and spoke English as their primary language. Group 2 had the highest percent of immigrants (67%), many of whom spoke Spanish as their primary language. This group also had significantly lower levels of income and education when compared with those in Group 1. Parents of Group 3 children also had lower

income and education levels than those in Group 1. Most parents in Group 3 spoke English as their primary language, 43% were immigrants, 64% were of non-White race, 38% had less than a high school education, and 58% had annual incomes less than \$30,000.

The percentage of caregivers reporting using a booster seat before

and after the intervention increased significantly in the parent and classroom groups but not in the information only groups as shown in Figure 1. The percentage of caregivers reporting booster seat use decreased from 50% to 41.7% in Group 1, but increased from 16% to 39% in Group 2 and from 35% to 55% in Group 3.

The investigators hoped that 70% of parents would have the correct information and show the desired booster seat use following the education interventions. Over 70% of all groups believed they knew correct safety seat use. The 70% goal was met only in the beliefs section by Group 2 and only for the opinion that riding in a motor vehicle could be dangerous. None of the groups approached the 70% goal for believing that booster seats could protect children in a crash. Further, Group 2 was the only group reporting that they were doing things differently since receiving the information. Over 79% in all groups discussed the information with their child. None of the groups met the goal for discussing with their child how the child should ride when riding with others. Group 1 met the goal of having read the materials, but only Group 2 "learned something new" as part of the education program. Less than 70% of all groups reported knowing where they could go for more information on booster seat issues at the (see Tables 2 and 3).

Eighty-six percent of those who participated in Group 2 said they would recommend the class to others, although less than 70% believed that the information was easy to understand. All groups reported they believed enough information was offered in the education programs. At the end of the program, most parents in all three groups reported having a booster seat for their child (87%), as shown in Table 3.

Comments regarding why they had a booster seat clustered in three categories (see Table 3). Nearly 33% of parents reported they had a booster seat because their child was either too big for a car seat, too small for seat belts only, or they wished to see out a window. Over 35% reported they had a booster seat because they were given one to use. Only 22% of parents reported they used a booster seat because it was safer for their child. Of those parents who did not have a booster seat (13%), approximately 18% reported that they did not know about booster seats, and over 35% reported that booster seats were too expensive.

## Booster Seat Education And Incentives Have Positive Results

Study findings are consistent with other researchers reporting an increase in booster seat use when a booster seat is given as an incentive with the targeted message presented to parents and children (Ramsey et al., 2000). This study compared three different approaches to booster seat education. Because of the differences in parent education and language between the three groups, no one intervention can be identified as having a superior approach for all families. The group with the most improvement received a presentation to parents as well as a booster seat. This group also had the largest immigrant population. These parent classes benefitted a group of parents who may be harder to reach by other methods and was an effective method for providing information to both parents and children since it was offered in English with Spanish interpreters.

The "Children in the Classroom" Group (Group 3) also demonstrated a significant increase in booster seat use on the follow-up survey. However, providing only written information sent to parents without involving the students appeared ineffective. In fact, this method yielded a tendency for decreased booster seat usage over time.

This study has a number of limitations. The primary shortcomings are that the assignments of parents to the three differing educational groups were non-randomized and selected by the schools leading to significant differences in demographics of the three groups. Nevertheless, in reality, parents and school principals make a substantial number of decisions regarding their children's school selection and educational philosophy, and in this study might have self-selected the educational approach most appropriate to their situation. Complicating participation for many schools was the Minneapolis Public Schools announcement of the closure of many schools during this time, and some schools that had previously expressed interest in participating deferred to focus on the transition.

Simpson, Moll, Kassam-Adams, Miller, and Winston (2002) noted that education alone was not enough to promote booster seat use and that other issues are important to acknowledge, such as poor state booster seat laws, inconvenience of using a booster seat, difficulty in installing the booster seat, and child resistance. In this study, all groups reported high levels of self-

efficacy in booster seat use, but few believed that booster seats could keep a child safe in a crash. Although most parents in Groups 1 and 2 reported "learning something new" about booster seats, less than half of parents in all groups knew where they could go to get more information about booster seats. Only Group 2 reported doing something differently as the result of the information. These findings indicate that efforts targeted toward increasing access to booster seat resources and changing parental beliefs in the ability of booster seats to prevent injuries during a crash could have a positive effect on booster seat use rates.

## Implications for Injury Prevention Efforts

Using written information as the sole means of providing booster seat education to parents and children is ineffective even in parents with higher socioeconomic status. Involving both parents and children in booster seat education programs that combine messages dealing with knowledge, beliefs, and practices with a booster seat given as an incentive can be effective in promoting booster seat use in low-income, less-educated, immigrant populations. Providing instruction to parent groups and teaching children in the classroom about booster seats were shown to improve booster seat use, while providing information only was not found to increase use in kindergarten-aged children.

## References

- Durbin, D.R., Elliott, M.R., & Winston, F.K. (2003). Belt-positioning booster seats and reduction in risk of injury among children in vehicle crashes. *Journal of the American Medical Association, 289*(21), 2835-2840.
- Ehiri, J.E., Ejere, H.O., Hazen, A.E., Emusu, D., King, W.D., & Osberg, S.J. (2006). Interventions to increase children's booster seat use: A review. *American Journal of Preventive Medicine, 31*(2), 185-192.
- Jemakian, J.S., Kallan, M.J., & Arbogast, K.B. (2007). *Abdominal injury risk in belt positioning booster seats*. Proceedings of the 20th International Technical Conference on the Enhanced Safety of Vehicles, Lyon, Paper 07-0441.
- Miller, T.R., Zaloshnja, E., & Hendrie, D. (2006). Cost-outcome analysis of booster seats for auto occupants aged 4 to 7 years. *Pediatrics, 118*(5), 1994-1998.
- National Highway Traffic Safety Administration (NHTSA). (2006). *Best practices for promoting booster seat use*. Washington, DC: Author.

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**Appendix A  
Follow-Up Survey**

1. Are you the child's primary caretaker?  
 Yes  
 No (If no, end survey, call back to talk to primary.)
2. How dangerous do you think it is for your child to ride in a motor vehicle?  
 Very dangerous  
 Somewhat dangerous  
 Not very dangerous  
 Very safe
3. Is there anything you think you can do to make it safer for your child to ride in a motor vehicle?  
 Always  
 Usually  
 Most of the time  
 Rarely  
 Never
4. Is there anything you think you can do to make it safer to ride in a motor vehicle for yourself?  
 Always  
 Usually  
 Most of the time  
 Rarely  
 Never
5. What type of vehicle do you have?  
 Car  
 Truck  
 Van  
 Other
6. Currently, when your child rides with you, how does he or she ride?  
 In a car seat with a harness.  
 In a booster seat with both a lap/shoulder belt.  
 In a safety belt with both the lap and shoulder belt in place.  
 In a safety belt with the lap belt only in place.  
 He or she doesn't use a safety belt most of the time.
7. What seating position in the car does your child ride in?  
 Front seat  
 Back seat  
 Middle/side
8. Does your child ride with others?  
 Often  
 Sometimes  
 A little  
 Never
9. If your child rides with others, do you discuss how he or she will be riding?  
 Often  
 Sometimes  
 A little  
 Never
10. Do you have a booster seat for you child?  
 Yes  
 No  
 Why or why not? \_\_\_\_\_  
 \_\_\_\_\_
11. Do you think your child needs a booster seat?  
 Yes  
 No
12. Where did you get the booster seat?  
 Purchased at a retail store.  
 Received from a health promotion program.  
 Received from my medical provider.  
 Received from a social services program.  
 Received from a friend or relative (new).  
 Received from a friend or relative (used).  
 Other \_\_\_\_\_
13. Has cost ever prevented you from obtaining a child restraint, such as a car seat or booster seat?  
 Yes  
 No
14. How much do you believe that a booster seat can protect your child in a crash?  
 A lot  
 Some  
 A little  
 Not at all
15. Which school did your child attend last year? \_\_\_\_\_  
 \_\_\_\_\_
16. Did your child bring information about booster seat safety home from school?  
 Yes  
 No
17. Did you read the information?  
 Yes  
 No (If no, go to #27)
18. Did you learn anything new from the materials?  
 Yes  
 No
19. Did you find the information easy to read and understand?  
 Yes  
 No
20. How much did you discuss the information with your child?  
 A lot  
 Some  
 A little  
 Not at all
21. How did your child ride before you received the information?  
 In a car seat with a harness.  
 In a booster seat with both a lap/shoulder belt.  
 In a safety belt with both the lap and shoulder belt in place.  
 In a safety belt with the lap belt only in place.  
 He or she doesn't use a safety belt most of the time.
22. Are you doing anything different since receiving the information?  
 Yes (If yes, what?) \_\_\_\_\_  
 \_\_\_\_\_  
 No
23. Have you received information about child passenger safety from any other sources?  
 My child's health care provider  
 Media / TV news  
 Magazines  
 School  
 In the community  
 Other \_\_\_\_\_
24. Did you receive information about booster seat safety home from school from your child?  
 Yes  
 No
25. Did you learn anything new from the materials?  
 Yes  
 No
26. Did you discuss the booster information with your child?  
 A lot  
 Same  
 A little  
 No

**Appendix A (continued)  
Follow-Up Survey**

27. Did you discuss the session that your child attended with your child?  
 A lot  
 Some  
 A little  
 No
28. Did your child report that he or she had gained knowledge about traveling safely?  
 A lot  
 Some  
 A little  
 No
29. How receptive was your child to the information about how to improve their safety while traveling?  
 Very receptive  
 Sort of receptive  
 A little receptive  
 Not at all receptive
30. How did your child ride before you received the information?  
 In a car seat with a harness.  
 In a booster seat with both a lap/shoulder belt.  
 In a safety belt with both the lap and shoulder belt in place.  
 In a safety belt with the lap belt only in place.  
 He or she doesn't use a safety belt most of the time.
31. Where did your child ride?  
 Front seat  
 Back seat
32. Did you find the information to be easy to read and understand?  
 Very easy  
 Easy  
 Somewhat difficult  
 Very difficult
33. Did your child find the videos used to be informative and easy to understand?  
 Very easy  
 Easy  
 Somewhat difficult  
 Very difficult
34. Have you received information about child passenger safety from any other sources?  
 My child's health care provider  
 Media/TV news  
 Magazines  
 School  
 In the community  
 Other
35. Are you doing anything differently since receiving the information?  
 Yes (If yes, what?) \_\_\_\_\_  
 No
36. (For Level B parents only) Would you recommend this session to other parents?  
 Yes  
 No (why or why not?) \_\_\_\_\_
37. How confident are you that you know how to properly use a booster seat or other child safety seat?  
 Confident  
 Somewhat confident  
 Pretty unsure  
 No idea
38. Do you know where you can go for help on child passenger safety issues?  
 Yes  
 No
39. Do you think a booster seat law requiring children up to age 8 unless they are 4'9" tall is a good idea?  
 A lot  
 Somewhat  
 A little  
 Not at all
40. Would a booster seat law change how you transport your child?  
 Yes  
 No
41. Is there anything that I haven't asked that you'd like to tell me?  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
42. Do you have any suggestions for how to improve the booster program?  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
43. How are you related to the child?  
 Mother  
 Father  
 Other
44. Where was the child's mother born?  
 \_\_\_\_\_  
 \_\_\_\_\_
45. What do you consider your race and ethnicity to be?  
 Asian  
 Black or African American  
 Hispanic or Latino  
 Native American  
 White  
 African  
 Other
46. What do you consider the race and ethnicity of your child to be?  
 Asian  
 Black or African American  
 Hispanic or Latino  
 Native American  
 White  
 African  
 Other
47. What is your marital status?  
 \_\_\_\_\_  
 \_\_\_\_\_
48. At this time, what is the highest level of education you have completed?  
 \_\_\_\_\_  
 \_\_\_\_\_
49. Which of the following best describes your household income for last year?  
 Less than \$16,000  
 \$16,000 to \$30,000  
 \$30,000 to \$60,000  
 More than \$60,000  
 Don't know/Refused

Ramsey, A., Simpson, E., & Riva ra, F.P. (2000). Booster seat use and reasons for nonuse. *Pediatrics*, 106(2), e20.  
 Riva ra, F.P., Bennett, E., Crispin, B., Kruger, K., Ebel, B., & Sarewit, A. (2001). Booster seats for child passengers:

Lessons for increasing their use. *Injury Prevention*, 7(3), 210-213.  
 Simpson, E.M., Moll, E.K., Kassam-Adams, N., Miller, G.J., & Winston, F.K. (2002). Barriers to booster seat use and strategies to increase their use. *Pediatrics*, 110(4), 729-736.

**Additional Reading**

Cody, B., Mickalide, A., Paul, H., & Colella, J. (2002). *Child passengers at risk in America: A national study of restraint use*. Washington, DC: National SAFE KIDS Campaign.