

# A School-Based Program to Increase Seatbelt Use

Robert Morrow, MD  
Bronx, New York

*To improve rates of seatbelt use in young school children and their parents, a curricular intervention was evaluated in a before-after trial over a 15-week period. A public school for pre-kindergarten through second grade (ages 4 to 8 years) in Yonkers, New York, was studied; all of 422 students were included and finished the study. A sequential group of parent drivers were also evaluated, although they were not subject to active intervention. All students were involved in a month-long curricular intervention to raise their awareness of seatbelt use and car safety ("May is Buckle-up Month"). Independent professional observers measured seatbelt use in a nonblinded manner before the intervention, after the intervention, and 1 month after the intervention. Belt use among students increased from 46% to 66% ( $P < .01$ ), and stayed at 63% at follow-up, although boys showed an insignificant change. Parent use improved from 47% to 61% ( $P < .01$ ), and remained at 62% at follow-up. Intensive curricular exposure to the use of seatbelts can measurably improve the use of belts by young school children. Parental behavior also shows a marked improvement. Such interventions can be organized by community health practitioners, including those in full-time practice, with minimal funding.*

The internal combustion engine has transformed the Western way of life—and death. Children are injured and killed by automobile accidents at rates that compare with the great plagues of the past. Over the last quarter century, accidents have been the leading cause of death for children between the ages of 1 and 14 years of age, and automobile accidents produce roughly one half the mortality; of this number, one half are passengers, at a rate greater than 600 yearly.<sup>1,2</sup> Adults also die and are maimed in large numbers as passengers of automobiles.

Ways do exist to reduce this epidemic. Safer vehicles, safer roads, and safer drivers all contribute to a safer environment. Seatbelt use, however, has an immediate role in reducing the death and injury rate, and seatbelts are available in most vehicles. The benefits of proper restraints for drivers and passengers are clear from experimental and epidemiological data.<sup>3-6</sup>

The data are remarkable; in 1983, nearly 30,000 occupants of automobiles died on US highways. Only 484 (2%) were reportedly wearing seatbelts.<sup>7</sup> Properly used restraints could prevent at least 60% of serious injuries to older children, teenagers, and adults;<sup>5</sup> virtually all serious injuries to infants and younger children would also be prevented.<sup>6</sup>

Use rates are quite low, especially for young children. Legislation in all 50 states mandates proper use of safety restraints for children aged 5 years and younger. A majority of states have laws for older occupants.<sup>5</sup> In New York State a law raised seatbelt use from 20% to 76%, but after 1 year, use dropped to 45%.<sup>8</sup> A 1981 survey found only 17% of children aged over 3 years were restrained by report,<sup>1</sup> with such reporting over-estimating real use.<sup>9</sup> An arresting finding from Quebec showed good increases after a law was passed, with adult rates increasing from 14.7% to 55.5%, but children aged 5 to 11 went from 3.7% to only 23.0%.<sup>10</sup>

In general, researchers have paid little attention to the early school age group, though this age is particularly vulnerable both to injury and to formative ideas. These children are out of car safety seats, in which they are placed by someone older, and into seatbelts, which they put on themselves. In that sense, they can "speak for themselves," making a choice that was not available to them

Submitted, revised, February 22, 1989.

From the Family Practice Residency Program, St. Joseph's Medical Center, Yonkers, and the Department of Family Practice, New York Medical College, Valhalla, New York. This work was presented at the Annual Meeting of the Society of Teachers of Family Medicine, Baltimore, Maryland, April 25-29, 1988. Requests for reprints should be addressed to Dr Robert Morrow, 5997 Riverdale Ave, Bronx, NY 10471.



when they were younger, and, statistically, many of these children make the wrong choice and suffer the consequences. At this age school teaches them to be social beings by defining normative social behavior outside the family setting (such as being quiet in class and obeying other rules). This study addresses both the physical vulnerability and intellectual receptiveness of this young age group.

Interesting work has been done by Bowman et al<sup>11</sup> in Australia on preschoolers aged 3 to 5 years. They point out that, whereas legislation has been spectacularly successful in increasing use by adults (80%) and infants 6 months to 4 years (80.9%), children aged 4 to 7 years had a rate of 46.4%. They attribute this low rate both to a child's testing of parental authority and the parental wish to avoid conflict. They then offered two interventions: a coercive one aimed at parents (threats of fines), and an educational one aimed at the children only. Coercion did not effect any change; the educational group seatbelt use rate rose from 60.6% to 75.0%. Drivers showed scanty changes.

Chang and colleagues<sup>12</sup> found a similar but smaller benefit in California for an educational program aimed at both children and their parents. Use of a safety seat or seatbelt rose in this group of children from 21.9% to 44.3%.

Other related studies demonstrate the positive effects physicians can have on safety behavior in infants,<sup>13</sup> but apparently physicians are effective at the reported rate of 15 percent.<sup>14</sup> Community-based interventions seem to have small effects.<sup>15-17</sup>

The study reported here evaluates ways in which these statistics can be improved. A curricular intervention was designed and implemented, and seatbelt use rates were measured before and after the intervention. The intervention was focused entirely on the children, but driver use rates were also measured.

This study involved one large school, with a target month of intervention. This participatory, educational intervention was aimed exclusively at the children, with no sessions or materials for the parents. Placing car safety at the center of the school's curriculum was the key to the intervention. Every month has its own icon, or symbol; for example, November has a turkey, October a carved pumpkin, February a heart. May was "Buckle-up" month.

## METHODS

### Sample

A magnet school in Yonkers, New York, was selected because it was centrally located, attracting students from the entire city. Children arrived by private car (the study group) and by bus (not counted). Pupils reflected a diverse racial and socioeconomic group. This school is committed

to a "gifted and talented" program, with all students passing an entrance examination, and it spans prekindergarten through second grade (ages 4 through 8 years).

The Yonkers school was chosen because it requires transport of the children. Traditionally, this age group attends neighborhood schools and arrives on foot. The principal investigator was also the chair of the Health and Safety Committee of the Parent Teacher Association and thus able to facilitate the study as a volunteer.

At the time of the study the school had a population of 422 children evenly divided among the four grades. Preintervention counts in April 1986 included 125 children and 132 drivers (a few children were missed by the observers owing to the newness of counting children). After intervention, 147 children and 150 adults were counted. At the 1 month follow-up, 107 children and 107 adults were counted.

### Observation

Trained professional staff of the Westchester County Department of Public Works-Traffic Safety Board performed the observations as a function of the Occupant Restraint Grant (funded by the New York State Governor's Traffic Safety Committee). Two initial preintervention counts were done, the two results of which were in agreement. The staff were not blinded to the study; however, during the same period they were involved in studies at other locations, where they observed a negative change in seatbelt use. School buses, which carried approximately 180 children, were not included in the observation, both because of difficulty in observation and because belt use in school buses was not a focus of the study.

Observers counted children at the short entrance road to the school, where traffic was slow enough to facilitate an accurate observation. Tall vans and minibuses were excluded because it was difficult to count passenger seatbelt use in them. Observation was done twice before the intervention (April 15 and April 28), once after the intervention (June 9), and once (June 24) at the end of the semester. The school moved to a new site the following fall, precluding a long-term follow-up.

### Intervention

The school administration and teachers agreed to center the curriculum around car safety for 1 month. The Westchester County Occupant Restraint Program provided free materials, such as coloring books and posters. A visit by Buckle-up Bear (a person in a bear suit) started the month, and age-appropriate activities, such as coloring, reading,



TABLE 1. CHILDREN SURVEYED (percentage restrained)

Survey	Boys No.(%)	Girls No.(%)	Total No.(%)
Preintervention (sum of 2 observations)	122(52)	128(41)	250(46)
Postintervention 1	75(60)	52(72)	147(66)
Postintervention 2	56(54)	51(73)	107(63)
<i>P</i> <.01			

acting, viewing movies, and painting posters, were organized. Children particularly liked a 4 × 6-in. card that read "Buckle Up—I Love You" which they would show through the car window at unbuckled adults. When the adult buckled, the child would flip the card to the "Thank You" side.

The central issue of the intervention was to have the curriculum (reading, play, math, art, etc) encompass the idea of car safety in a positive way that would enhance the children's sense of mastery of their environment.

## RESULTS

The results are summarized in Tables 1 and 2. The program was successful at improving seatbelt use for both children and parents. The children increased seatbelt use from 46% to 66% ( $\chi^2 = 14.28, P < .01$ ). The improvement persisted for the 3-week follow-up at 63% (Figure 1). The parents also showed a striking improvement, from 47% to 61% ( $\chi^2 = 8.33, P < .01$ ), which persisted at 62% at follow-up (Figure 2).

An unexplained feature of the data is that the boys started out with higher rates of seatbelt use than the girls, and although the boys improved from 52% to 60%, this change was neither significant statistically nor present at follow-up, with the rate returning to 54%. No similar differential effect was found for parents, though women were more likely to use seatbelts overall.

## DISCUSSION

Although limited, these data point to a measurable increase in seatbelt use in preschool children exposed to a curricular intervention. These children, among the most vulnerable and unprotected in vehicular accidents, can be led to modify their own behavior and reduce their risk.

These children apparently can serve as effective modifiers of adult behavior also, with benefits that exceed many reported studies of interventions aimed at adults alone. This improvement seems to be consistent in brief follow-up,

TABLE 2. ADULTS SURVEYED (percentage restrained)

Survey	Men No.(%)	Women No.(%)	Total No.(%)
Preintervention (sum of 2 surveys)	67(36)	197(50)	264(47)
Postintervention 1	36(53)	114(64)	150(61)
Postintervention 2	22(55)	85(64)	107(62)
<i>P</i> <.01			

though it is unfortunate that a longer follow-up was impossible because of the end of the school year and the moving of the school to a new site, with vastly increased school bus use.

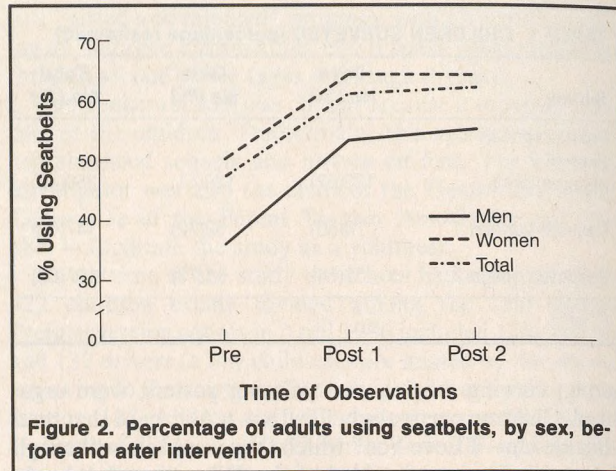
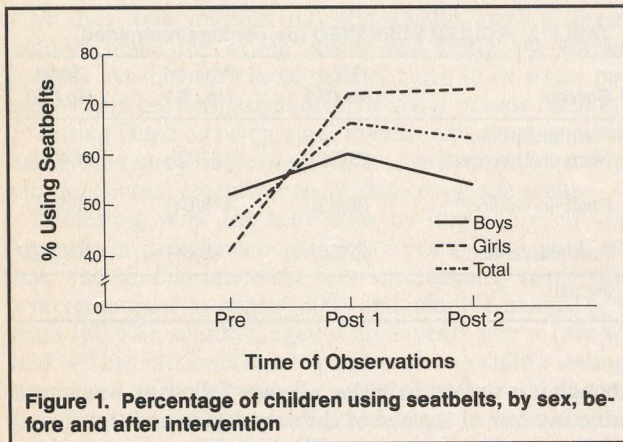
The results specifically for boys, however, are less convincing. A small but statistically insignificant improvement was seen and did not last. The study design offers no explanation for this observation, although observer error due to different dress (for example, a girl wearing pants being mistaken for a boy) is possible. If the observation reflects boys' true behavior, an intervention should be modified to address this problem.

The author feels that any unbuckled child reflects parental permissiveness or acquiescence, and that boys are allowed more socially unacceptable behavior, such as hitting and rudeness, because "they are just boys." Indeed, if being unbuckled represents defiance of authority, children will use the issue to gain autonomy. Thus, education should emphasize self-mastery through proper self-protection and preparation (like race drivers) to temper antisocial and self-destructive behavior. Being in charge of one's own health and safety is indeed the basic premise of this intervention.

One observational bias involves the unblindedness of the study; that is, the observers and subjects were aware of the intervention. As mentioned, the observers were trained professionals who have reported increases and decreases in seatbelt utilization in other projects as well as in other monthly surveys. The subjects' behavior was not affected in the course of the first two observations, so it is unlikely that the presence of observers influenced the study's outcome. It certainly would simplify matters if safety behavior could be improved merely by posting observers!

The lack of a control school reflects the small scale of this project, which was initiated and carried out by a family physician in full-time private practice. Although a control group would validate these results, the study retains the value of being a before-after trial. Funding was not available for this study, which in fact required no additional moneys not already allocated in the school or county budget.





## CONCLUSIONS

This study demonstrates that a simple curricular intervention at a preschool and lower grade level can significantly improve seatbelt use in both children and adult drivers. Several questions remain, such as how to improve seatbelt use by boys, how long beneficial effects last, and whether education aimed at parents would improve or worsen the outcomes.

The point remains that the schools are a universal resource for improving safety behavior. One task for health practitioners is to utilize this resource at whatever level is available. Many physicians have children in school, and certainly almost all live in communities with schools; the author's experience is that the school administrations are open to working with local health professionals at a curricular level. This involvement can lead to a gratifying and measurable improvement in community health if carried out in a planned and systematic manner. Using other community resources (eg, health departments, traffic safety departments, and mental health outreach groups) can amplify such an effort several-fold, without becoming bogged down in bureaucracy and the search for funding.

Such interventions can work when they are consistent efforts. Health and safety can become part of a total curriculum at a preschool and elementary level. Perhaps through such efforts family physicians can add the seatbelt to the list of cultural symbols—the pumpkin, the valentine, the turkey, the snowman—that inform children's lives.

## Acknowledgments

Assistance of the Westchester Department of Public Works/Traffic Safety Board was made possible through funding from the Occupant Restraint Grant of the New York State Governor's Traffic Safety Committee. Statistical analysis was performed by Peter Brooks.

## References

1. Haaga J: Children's seatbelt usage: Evidence from the National Health Interview Survey. *Am J Public Health* 1986; 76:1425-1427
2. Vital and Health Statistics of the United States. 1980, Vol 2. Mortality, Part A, National Centers for Health Statistics (Rockville, Md). DHHS publication No. (PHS) 81-1353. Government Printing Office, 1984, Table 5-2
3. Guerin D, Mackinnon DP: An assessment of the California child passenger restraint requirement. *Am J Public Health* 1985; 75:142-144
4. Muller A: Is the Oklahoma child restraint law effective? *Am J Public Health* 1986; 76:1251-1252
5. State Legislation Concerning Use of Safety Belts—United States, 1985. *MMWR* 1985; 34, issues 29, 32
6. Decker MD, Dewey MJ, Hutcheson RH, Schaffner W: The use and efficacy of child restraint devices. *JAMA* 1984; 252:2571-2575
7. Cerelli EC: The 1983 Traffic Fatalities Early Assessment. National Highway Traffic Safety Administration. DOT publication No. HS-806-541. Government Printing Office March 1984
8. Seatbelt Use Down as Law's Anniversary Nears. *Gannett Westchester Newspapers*, Dec 8, 1985, p1, col 6
9. Agran PF, Wehrle PF: Injury reduction by mandatory child passenger safety laws. *Am J Public Health* 1985; 75:128-129
10. Stulginkas JV, Pless IB: Effects of a seat belt law on child restraint use. *Am J Dis Child* 1983; 137:582-585
11. Bowman JA, Sanson-Fisher RW, Webb GR: Interventions in preschools to increase the use of safety restraints by preschool children. *Pediatrics* 1987; 79:103-109
12. Chang A, Dillman AS, Leonard E, English P: Teaching car passenger safety to preschool children. *Pediatrics* 1985; 76:425-428
13. Reisinger KS, Williams AF, Wells JK: Effect of pediatricians counseling on infant restraint use. *Pediatrics* 1981; 67:201-206
14. Faber MM, Hoppe SK, Diehl AK: Physician knowledge and clinical behavior regarding automobile safety for children. *Pediatrics* 1985; 75:248-253
15. Saunder S, Pine J: Seat belt education program—A model for public health settings. *Health Educ Q* 1986; 13:243-247
16. Gemming MG, Runyan CW, Hunter WW, Campbell BJ: A community health education approach to occupant protection. *Health Ed Q* 1984; 11:147-158
17. Pless IB, Stulginkas J, Zvagulis I: Observed effects of media campaigns on restraint use. *Can J Public Health* 1986; 77:28-32