

Objectives. This study evaluated the impact of Rhode Island's legislation requiring children younger than 6 years to sit in the rear of motor vehicles.

Methods. Roadside observations were conducted in Rhode Island and Massachusetts in 1997 and 1998. Multivariate regression was used to evaluate the proportion of vehicles carrying a child in the front seat.

Results. Data were collected on 3226 vehicles carrying at least 1 child. In 1998, Rhode Island vehicles were less likely to have a child in the front seat than in 1997 (odds ratio=0.6; 95% confidence interval=0.5, 0.7), whereas no significant changes in child passenger seating behavior occurred in Massachusetts during that period.

Conclusions. Rhode Island's legislation seems to have promoted safer child passenger seating behavior. (*Am J Public Health*. 2001;91:311–313)

Where Children Sit in Cars: The Impact of Rhode Island's New Legislation

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Recent data on the adverse impact of airbag technology on small children has brought increased interest in where children sit in motor vehicles.^{1–3} Nationwide educational campaigns now emphasize the need for children to be properly restrained and seated in the rear seats, and professional organizations and government agencies have endorsed these safety messages. The National Transportation Safety Board issued a recommendation in 1997 that each state amend its child passenger safety laws to make it compulsory for children to ride in the rear seats.⁴ Rhode Island became the first state to pass such a law in July 1997,⁵ and Delaware and North Carolina have adopted similar legislation.6,7

The Rhode Island statute requires that all children younger than 6 years be restrained and seated in a rear seat, unless the vehicle lacks a rear seat or all rear seats are occupied by other children. Failure to comply with this requirement is primarily enforceable (i.e., police can stop the car and issue a warning or ticket), with fines of \$30 for violation of the rear seating requirement and \$150 for violation of the restraint requirement.⁵ Legislation specifying children's seating position in motor vehicles was common in several European countries until the mid-1990s,⁸ although evaluation of such legislation has been scarce.⁹

Our goal was to evaluate the impact of the Rhode Island legislation on child seating behavior in motor vehicles.

Methods

Observational surveys were conducted in 2 states. Rhode Island vehicles were observed throughout the Providence metropolitan area over a 3-day period in the summer of 1997the weekend after the legislation was passed, but before media coverage began-and at the same locations 1 year later. At both times, operating at locations selected for convenience and high traffic volume, observers recorded information about passenger vehicles with more than 1 seating row transporting at least 1 child. Children were defined as passengers likely to be younger than 6 years as indicated by their appearance and height. Observers recorded the vehicle's state of registration, its seating capacity, the driver's use of a shoulder belt, the number of passengers, their seating location, and their approximate age category (<6, 6–13, >13 years).

Massachusetts vehicles were observed at the same randomly selected locations in 1997 and 1998 as part of the statewide Safety Belt Use Survey.¹⁰ A child was defined as an occupant who appeared to be younger than 6 years or to weigh less than 40 lb (D. Cerankowski, Center for Survey Research, University of Massachusetts at Boston; oral communication; August 1998). In our evaluation, we used only the Massachusetts data pertaining to vehicles with rear seating rows that carried at least 1 child.

A χ^2 test was used to compare the differences in driver, passenger, and vehicle characteristics across states and years. We used multivariate logistic regression analyses by state to evaluate the relation between the proportion of vehicles with a child in the front seat and year, controlling for vehicle seating capacity, passenger mix, and the driver's use of a shoulder belt. Statistical significance was defined at the $P \le .05$ level. Stata¹¹ was used for data management and analysis.

Results

Data were collected on 3226 vehicles with rear seats carrying at least 1 child younger than 6 years. As shown in Table 1, in 1997, Massachusetts vehicles were more likely to have 3 seating rows than were Rhode Island vehicles. In both 1997 and 1998, Massachusetts vehicles were also significantly more likely both to transport only 1 child and to have a belted driver than were their Rhode Island counterparts, and Massachusetts vehicles were significantly less likely than Rhode Island vehicles to have adult passengers.

Within each state, there were virtually no changes between years, with the exception that in Rhode Island, significantly fewer vehicles carried at least 1 child in the front seat in 1998 (16.4%) than in 1997 (23.4%), a 30% decrease (Table 1).

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TABLE 1—Characteristics (%) of Vehicles Transporting at Least 1 Child

	Massachusetts		Rhode Island		
	1997 (n=458)	1998 (n=266)	1997 (n=1395)	1998 (n=1107)	All (n=3226)
Vehicles with at least 1 child in the front Vehicle seating capacity	21.6	17.7	23.4	16.4 ^a	20.2
2 rows	84.2 ^b	88.0	89.8	88.4	88.4
3 rows	15.8 ^b	12.0	10.2	11.6	11.4
Driver shoulder belt used	62.9 ^b	58.7 ^b	44.9	43.5	48.1
Passenger mix					
1 child	44.5 ^b	42.9 ^b	33.8	32.4	35.6
2 children	9.6	10.2	10.8	12.6	11.2
3 children	2.0	2.3	1.9	2.4	2.1
>4 children	0.4	0.0	0.5	0.8	0.6
Adult(s) or subteen(s) $+ >1$ child	43.5 ^b	44.6 ^b	53.0	51.8	50.6

Statistically significant differences (P<.05) across years within a given state. ^bStatistically significant differences (P<.05) across states within a given year.

TABLE 2—Adjusted^a Odds Ratios (95% Confidence Intervals) of Vehicles Carrying at Least 1 Child in the Front Seat

	Massachusetts (n=724)	Rhode Island (n=2502)
Year (1998)	0.7 (0.5, 1.1)	0.6 (0.5, 0.7)
Vehicle seating capacity		
2 rows	1.0	1.0
3 rows	1.3 (0.8, 2.3)	1.0 (0.7, 1.5)
Driver shoulder belt used	0.5 (0.3, 0.7)	0.7 (0.5, 0.8)
Passenger mix		
1 child	1.0	1.0
2 children	1.2 (0.7, 2.1)	0.9 (0.7, 1.2)
3 children	1.6 (0.5, 4.6)	2.8 (1.6, 4.9)
>4 children	1.8 (0.1, 30.6)	9.3 (2.6, 33.7)
Adult(s), teens, or subteen(s) + >1 ch	ild 0.2 (0.1, 0.3)	0.1 (0.1, 0.2)

^aControlling for vehicle seating capacity, passenger mix, and driver shoulder belt use. For each state, the probability of a vehicle with rear seats having a child in the front in 1998 is compared with the probability of a vehicle with only 2 seating rows having a child as the only passenger and having an unbelted driver in 1997.

This finding was confirmed by multivariate logistic regression for each state. After control for possible confounders, Rhode Island vehicles in 1998 were significantly less likely to carry a child in the front seat than in 1997 (odds ratio=0.6; 95% confidence interval=0.5, 0.7), whereas no significant change between years was observed in Massachusetts (Table 2).

Discussion

The importance of promoting child rear seating and restraint use should not be understated: children seated in the rear are approximately 35% less likely to have fatal injuries than those seated in the front; the injury reduction is even greater if the front seat is equipped with an airbag.^{2,12–14} Unfortunately, most existing motor vehicle legislation addresses only restraint use for children in the front seats; it does not address either child restraint in the rear seats or seating position.¹⁵

Rhode Island's legislation seems to have contributed to changing child seating behavior in motor vehicles. The magnitude of the behavioral impact is modest, which suggests that vigorous enforcement (which has not occurred in Rhode Island) might be necessary to achieve full compliance. It appears that legislation mandating seating behavior is more effective in promoting change than educational interventions or informational campaigns alone (both of which were present at similar levels in both states during the time period studied).

Our result mirrors the effect of legislation on child rear seating in European cities, where a lasting impact on behavior has been seen even after repeal of the legislation.⁸ This finding also mirrors findings of the positive effects of legislation on other areas of child safety, such as child restraint laws.¹⁶ Our study is limited by the fact that observational locations were not selected randomly around the Providence metropolitan area and by the differences between the Massachusetts and Rhode Island survey procedures. Although we have ensured consistency in the data in terms of time of year and location of observations, the results from Rhode Island are not generalizable to the rest of the state.

Evaluation of other legislative attempts to change child seating behavior would be useful for confirming the Rhode Island experience. In addition, research on the factors that affect seating behavior would shed light on the mechanisms of behavior change and the potential impact of legislation on this particular behavior.

Contributors

M. Segui-Gomez planned the study and analyzed the data. E. Wittenberg and R. Glass assisted with data analysis. M. Segui-Gomez, E. Wittenberg, R. Glass, and J. D. Graham organized, supervised, and collected data in Rhode Island. S. Levenson and R. Hingson collected the Massachusetts data. All coauthors contributed to the writing of the paper.

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