

# Dad, May I Have the Keys? Factors Influencing Which Vehicles Teenagers Drive

Frederick P. Rivara, MD, MPH\*‡; Matthew B. Rivara; and Keith Bartol, BA§

**ABSTRACT.** *Objective.* To determine the role of vehicle safety features, particularly vehicle size and weight, compared with other factors in parental decisions about choosing vehicles for teens to drive.

*Methods.* Written questionnaire to parents of teenagers attending drivers education training.

*Results.* The response rate to the survey was 62.6%. Two thirds reported that the teen would drive an existing family vehicle, 10.5% would buy an additional vehicle, and 20.3% would buy another vehicle as well as have the teen drive an existing family vehicle. Large size was important to only ~40% of families purchasing a car for the teen or families in which the teen would use an existing family vehicle. Gas mileage and other safety features were ranked as more important even in families in which a large car was available in the household.

*Conclusions.* Families did not rank vehicle size and weight as important as other, less effective safety features in choosing cars for their teens. Information about vehicle crash-worthiness should be incorporated into drivers education and other programs reaching new teen drivers and their families. *Pediatrics* 1998;102(5). URL: <http://www.pediatrics.org/cgi/content/full/102/5/e57>; adolescents, motor vehicle, injuries, car size.

---

ABBREVIATION. MV, motor vehicle.

---

More than 5000 teenagers die each year in the United States from motor vehicle (MV) crashes.<sup>1</sup> This high number of deaths reflects a high crash rate in this age group: the risk of crash involvement per mile driven for drivers 16 to 19 years old is four times the risk for older drivers.<sup>1</sup> Many factors enter into this high crash rate, including driver inexperience, immaturity, risk taking, and alcohol use.

Approaches to decrease the high MV injury and fatality rate of teens have had two separate focuses. One approach is graduated licensing of new drivers, in which full driving privileges are phased in over time. This allows the teen driver to gain experience under less risky conditions and has been associated with lower crash rates when evaluated.<sup>2</sup> Another approach is to decrease the risk of serious or fatal injury to occupants of vehicles that are involved in

crashes. This includes use of seat restraints, airbags, and, most importantly, vehicle size and weight. A number of studies have shown that the driver death rate associated with the smallest vehicles is more than double that associated with larger vehicles.<sup>3,4</sup>

Although information is available on the factors that affect the decision of which vehicle new vehicle buyers purchase,<sup>5</sup> little information is available on the factors that go into family decisions about which vehicles teenagers drive. This study of parents of teenagers enrolled in drivers education classes aims to determine the role of vehicle safety features, particularly vehicle weight, compared with other factors in choosing vehicles for teens to drive.

## METHODS

This study was conducted as a written questionnaire to parents of teenagers attending drivers education training offered by the Seattle public schools during the summer of 1997. This is an 8-week program offered to all Seattle residents for a modest fee. Students must be at least 15 years of age to participate; those who pass are eligible to obtain their license at age 16.

The survey with a cover letter was given to students to take home to their parents and to return the completed survey to class within 1 week. The survey was to be completed by one of the parents in the home in which the student lived. Completion of the survey did not affect the student's grade. The survey was completely anonymous; this precluded a second mailing to nonrespondents. The survey was then key-entered and analyzed using SAS. Data from the Insurance Institute for Highway Safety was used to classify vehicles as either small, midsize, large vehicle, sports utility vehicles, or vans.

The study was approved by the University of Washington Institutional Review Board.

## RESULTS

### Characteristics of Respondents

The survey was distributed to 500 teens in 10 separate classes; it was returned by 313, for a response rate of 62.6%. Age of these teens averaged 15.5 years (median, 15 years), and 54.2% were female (Table 1). There was a median of two drivers in the teen's household, not counting the student taking drivers education. Approximately 60% of the fathers and 43% of the mothers were at least college graduates; only 6.6% of mothers and 4.2% of fathers had not completed high school. Twenty-four (8.0%) of the respondents reported that they had been in a crash within the past year.

Nearly all households (97.1%) had a least one vehicle; 74.8% had at least two vehicles, 24.9% had at least three vehicles, and 5.1% had four or more vehicles (Table 2). Vehicles in the household were most commonly midsize (39.3%). Approximately half

---

From the \*Harborview Injury Prevention and Research Center; the ‡Departments of Pediatrics and Epidemiology, University of Washington; and the §Traffic Education Program, Seattle Public Schools, Seattle, Washington.

Received for publication Feb 2, 1998; accepted Jun 4, 1998.

Reprint requests to (F.P.R.) Harborview Injury Prevention and Research Center, Box 359969, 325 Ninth Ave, Seattle, WA 98104.

PEDIATRICS (ISSN 0031 4005). Copyright © 1998 by the American Academy of Pediatrics.

**TABLE 1.** Demographic Characteristics of Respondent Families (*N* = 313)

Characteristic	%	(N)
Teen Driver		
Male	45.8	(143)
Female	54.2	(169)
Mean age (range) of teen driver (years)	15.5	(15–20)
Number of current drivers in household		
≤1	18.1	(56)
2	51.3	(159)
3	24.5	(76)
≥4	6.1	(19)
Mother's education		
≤12 years	20.7	(60)
Some college	26.2	(76)
College graduate	22.8	(95)
Graduate school	20.3	(59)
Father's education		
≤12 years	17.3	(45)
Some college	13.1	(58)
College graduate	29.6	(77)
Graduate school	30.8	(80)
Respondents in crash within last year	8.0	(24)

**TABLE 2.** Characteristics of Existing Family Vehicles (*N* = 313)

Characteristic	%
Households with vehicles	97.1
Number of vehicles in household	
1	22.3
2	49.9
3	19.8
≥4	5.1
Size of vehicle	
Compact	17.4
Midsize	39.3
Large	11.3
Sports utility vehicle	16.8
Van or minivan	15.2
Households with at least one vehicle with	
Driver-only airbag	21.3
Driver and passenger airbags	27.9

(49.2%) of families had vehicles with driver-side airbags, and 27.9% had at least one vehicle with passenger-side airbags.

### Teen Driver Use of Vehicle

One quarter of respondents reported that the teen would have sole use of a vehicle when he or she gets a license (Table 3). Approximately two thirds of respondents (69.1%) reported that the teen would drive an existing family vehicle, 10.6% reported that the household would purchase an additional vehicle for the teen driver's use, and 20.3% reported that they would purchase an additional vehicle for the teen to use as well as have the teen driver share use of an existing family vehicle with other members of the household.

### Factors Influencing Purchase of a Vehicle

Factors most commonly rated important or very important in purchase of an additional vehicle for use by the student were insurance costs (93.6%), price (87.2%), repair record (84.7%), gas mileage (77.2%), presence of antilock brakes (72.9%), presence of airbags (64.5%), and other safety features

**TABLE 3.** Planned Teen Driver Use of Vehicle (*N* = 313)

Use	%
Sole use of a vehicle	26.1
Use existing family vehicle	69.1
Purchase another vehicle for use	10.6
Purchase another vehicle and have use of current family vehicle	20.3

(84.4%) Large size was important to 41.6% of the respondents, whereas small size was important to 3.7%.

Only 19 families knew what size vehicle they would buy: compact (*n* = 7), midsize (*n* = 7), large (*n* = 1), and sports utility vehicle (*n* = 4).

### Use of Existing Family Vehicles

Factors that were ranked as important or very important in deciding which of the existing vehicles the teen would use were automatic transmission (66.8%), low gas mileage (51.2%), presence of airbags (48.0%), presence of antilock brakes (57.3%), other safety features (68.4%), repair record (60.7%), and age of the vehicle (51.2%). Forty percent of respondents reported that large size of the vehicle was important or very important in their decision-making, whereas 34.1% reported that small size of the vehicle was important or very important.

Few differences existed between respondents who reported that they would buy another vehicle for the teen to use compared with those who would have the teen drive an existing family vehicle. (Table 4). The size distribution of vehicles in households were very similar, as were the proportion of vehicles with airbags.

### Respondents With Large Vehicles or Sports Utility Vehicles

We were particularly interested in respondents who had at least one large car or sports utility vehicle in the household because, on the average, these appear to be safer vehicles. Among those respondents with such vehicles who reported that the teen driver would use an existing family vehicle, only 42.9% reported large size as important or very important in the decision about which vehicle the teen would drive. Features that were more frequently rated as important or very important were airbags (47.4%),

**TABLE 4.** Comparison of Respondents Reporting That They Will Buy Another Vehicle vs Have Teen Share Use of an Existing Family Vehicle

	Percent	
	Buy Additional Vehicle	Use Existing Family Vehicle
Existing family vehicles		
Compact	19.5	17.3
Midsize	43.1	39.0
Large	9.8	10.9
Sports utility vehicle	13.8	17.1
Van or minivan	13.8	15.7
Mean model year of vehicles	1989	1988
Have at least one vehicle with		
Drive-only airbag	18.7	21.4
Driver and passenger airbags	28.0	29.0

antilock brakes (55.9%), other safety features (77.7%), and repair record (60.7%). Only 47.3% of respondents reported that their teen would drive a large vehicle or sports utility vehicle even though such a vehicle was available in the household. There were 123 respondents who reported that at least one of their existing vehicles had a driver's airbag. However, only 64.2% of these respondents reported this as an important or very important factor in deciding which vehicle the teen would drive.

We examined these same ratings in families with large vehicles or sports utility vehicles who reported that they would purchase another vehicle for the teen driver to use. Similarly, antilock brakes (93.5%), other safety features (86.2%), gas mileage (80.0%), repair record (75.9%), and airbags (74.2%) were rated as more important than large size (66.7%).

## DISCUSSION

During the past few decades, a great deal of research has established a number of vehicle features as contributing to safety, ie, decreased risk of crash or decreased risk of severe or fatal injury in a crash. Foremost among these features appears to be vehicle size and weight. Evans and Frick<sup>3</sup> analyzed Fatal Accident Reporting System data from 40 000 crashes and found that when two vehicles, the mass for which differs by a factor of 2, crash into one another, the fatality rate for the driver of the lighter vehicle is 12 times greater than that for the driver of the heavier vehicle. Even in single vehicle crashes, drivers of lighter vehicles have a two- to threefold greater risk of dying than drivers of larger, heavier cars.<sup>4</sup> The importance of vehicle weight and size holds across vehicle types.

In contrast, other types of passive safety features appear to offer much less protection. Antilock brakes have been recently found to actually increase the risk of collisions, particularly with drivers unskilled in their use.<sup>6</sup> Automatic protection offered by airbags decreases the risk of fatal injury overall by 11%.<sup>7</sup>

In recent years, vehicle safety has become an important consideration in the decisions regarding vehicle purchase.<sup>5</sup> Consumers ranked safety 6th of 38 possible factors they took into consideration in the purchase of their vehicle in 1994, compared with ranking it 25th in 1987. In another survey of 1516 recent car buyers, only 6% rated safety as the most

important feature.<sup>8</sup> Dual airbags were rated as the most important safety feature by these consumers, followed by antilock brakes, whereas only 7% believed size and weight to be the most important safety features.

Little information is available on the factors that affect the decision of which car a new teen driver will use. This study found that the most important factors, vehicle size and weight, were ranked much lower than were other factors, including other safety features. This was true both in households in which another car will be purchased for use by the new driver and in households in which the teen driver will use an existing family vehicle. Most importantly, even when families owned a large vehicle, there was no assurance that this would be the vehicle driven by the teen.

The data from this study indicate that information about vehicle crash-worthiness should be incorporated into drivers education programs and other venues for reaching new, teen drivers and their parents. Teens are less likely than other drivers to use seat belts<sup>9</sup> and have a far higher rate of crashes than other drivers. Passive protection, such as that afforded by airbags and, most importantly, vehicle weight and size, should be optimized in this group. Such information has the potential to affect substantially the high MV fatality rate for teen drivers.

## REFERENCES

1. National Highway Traffic Safety Administration. *Traffic Safety Facts*, 1995. Washington, DC: US Dept of Transportation; Sept 1996
2. Langley JD, Wagenaar AC, Begg DJ. An evaluation of the New Zealand graduated driver licensing system. *Accid Anal Prev*. 1996;28:139-146
3. Evans L, Frick MC. Mass ratio and relative driver fatality risk in two-vehicle crashes. *Accid Anal Prev*. 1993;25:213-224
4. Evans L, Frick MC. Car size or mass: which has greater influence on fatality risk? *Am J Public Health*. 1992;82:1105-1112
5. Transportation Research Board. Committee for Study of Consumer Automotive Safety Information. *Shopping for Safety. Providing Consumer Automotive Safety Information*. Washington, DC: National Academy Press; 1996
6. Evans L, Gerrish PH. Antilock brakes and risk of front and rear impact in two-vehicle crashes. *Accid Anal Prev*. 1996;28:315-323
7. Braver ER, Ferguson SA, Greene MA, Lund AK, Arlington VA. Reductions in deaths in frontal crashes among right front passengers in vehicles equipped with passenger air bags. *JAMA*. 1997;278:1437-1439
8. Ferguson SA, Williams AF. What vehicle safety means to consumers and its role in the purchase decision. *J Traffic Med*. 1996;24:83-89
9. Williams AF, Preusser DF, Umer RD, Weinstein HB. Characteristics of fatal crashes of 16-year-old drivers: implications for licensure policies. *J Public Health Policy*. 1995;16:347-360

## Dad, May I Have the Keys? Factors Influencing Which Vehicles Teenagers Drive

Frederick P. Rivara, Matthew B. Rivara and Keith Bartol

*Pediatrics* 1998;102:e57

DOI: 10.1542/peds.102.5.e57

<b>Updated Information &amp; Services</b>	including high resolution figures, can be found at: <a href="http://pediatrics.aappublications.org/content/102/5/e57">http://pediatrics.aappublications.org/content/102/5/e57</a>
<b>References</b>	This article cites 7 articles, 0 of which you can access for free at: <a href="http://pediatrics.aappublications.org/content/102/5/e57#BIBL">http://pediatrics.aappublications.org/content/102/5/e57#BIBL</a>
<b>Subspecialty Collections</b>	This article, along with others on similar topics, appears in the following collection(s): <b>For Your Benefit</b> <a href="http://www.aappublications.org/cgi/collection/for_your_benefit">http://www.aappublications.org/cgi/collection/for_your_benefit</a>
<b>Permissions &amp; Licensing</b>	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: <a href="http://www.aappublications.org/site/misc/Permissions.xhtml">http://www.aappublications.org/site/misc/Permissions.xhtml</a>
<b>Reprints</b>	Information about ordering reprints can be found online: <a href="http://www.aappublications.org/site/misc/reprints.xhtml">http://www.aappublications.org/site/misc/reprints.xhtml</a>

# American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN®



# PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

## **Dad, May I Have the Keys? Factors Influencing Which Vehicles Teenagers Drive**

Frederick P. Rivara, Matthew B. Rivara and Keith Bartol

*Pediatrics* 1998;102:e57

DOI: 10.1542/peds.102.5.e57

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://pediatrics.aappublications.org/content/102/5/e57>

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 345 Park Avenue, Itasca, Illinois, 60143. Copyright © 1998 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 1073-0397.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN®

