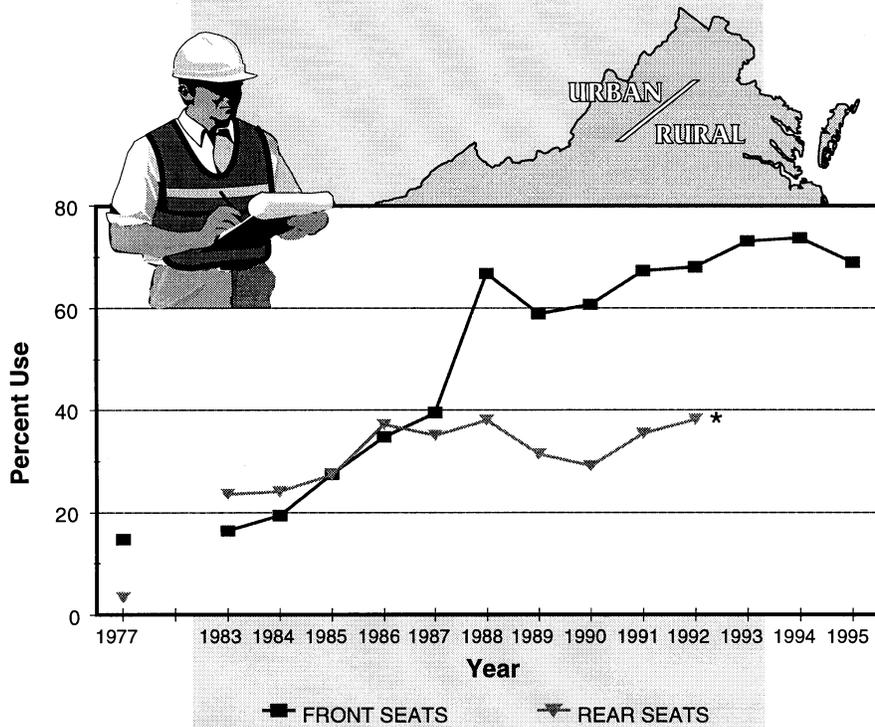


FINAL REPORT

SAFETY RESTRAINT USE IN VIRGINIA: USE RATE TRENDS FROM 1983 THROUGH 1995



* Data not collected after 1992.

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Supplementary Notes				
Abstract				
<p>The purpose of this report was to take a retrospective glance at Virginia's experience in getting her citizens to use the automobile safety restraint systems available to them. In Virginia, data on safety belt and child safety seat use were collected annually from 1983 until 1994. Data on child safety seat use were not collected in 1995, although safety belt use figures were again gathered.</p> <p>The data revealed that, for most years, the change in safety belt use rates was small. The use of child safety seats increased substantially after the effective date (January 1, 1983) of the statute requiring it. Safety belt use by front seat occupants also increased substantially following the effective date of the mandatory use law (January 1, 1988), which applied only to front seat occupants. However, use by rear seat occupants was lower in 1989 and 1990 than in 1987. Infants had higher rates of safety restraint use than did older passengers, with the infant use rate peaking in 1991. Further, belt use was higher in metropolitan areas.</p> <p>Both safety restraint use statutes were effective in increasing the use rates of the target populations: infants and front seat occupants. Virginia legislators should enhance the lifesaving potential of passenger restraint systems by mandating the use of safety belts by rear seat passengers.</p>				

**SAFETY RESTRAINT USE IN VIRGINIA:
USE RATE TRENDS FROM 1983 THROUGH 1995**

**Charles B. Stoke
Senior Research Scientist**

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(The opinions, findings, and conclusions expressed in this
report are those of the author and not necessarily those of
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EXECUTIVE SUMMARY

Introduction

One of the most effective ways to prevent deaths and reduce injuries in motor vehicle crashes is to use safety belts. In Virginia, safety belts have been required in all new cars sold in the state since 1963. But the fact that cars come equipped with safety belts does not ensure they will be used. Both the state and federal governments have developed and implemented numerous efforts, particularly public information and education campaigns, to induce belt use by drivers and passengers. They have also carried out a variety of enforcement activities, and the automobile industry has developed and equipped cars with various safety belt systems. Unfortunately, these efforts have had a limited effect on safety belt use rates. From 1974, the first year a safety belt use survey was done in Virginia, until 1983, when a series of annual surveys was begun, safety belt use in the urban areas of the state actually decreased from 21.5 to 17.3 percent. These numbers probably reflect the fact that after much public and political opposition to federally mandated systems to increase belt use, the government retreated from these systems.

After persuasion and technology had apparently failed, attention turned to increasing use by statute. In 1982, Virginia's General Assembly passed a child safety seat law with an effective date of January 1, 1983. In 1987, they passed a mandatory use law (MUL) applicable only to front seat occupants with an effective date of January 1, 1988.

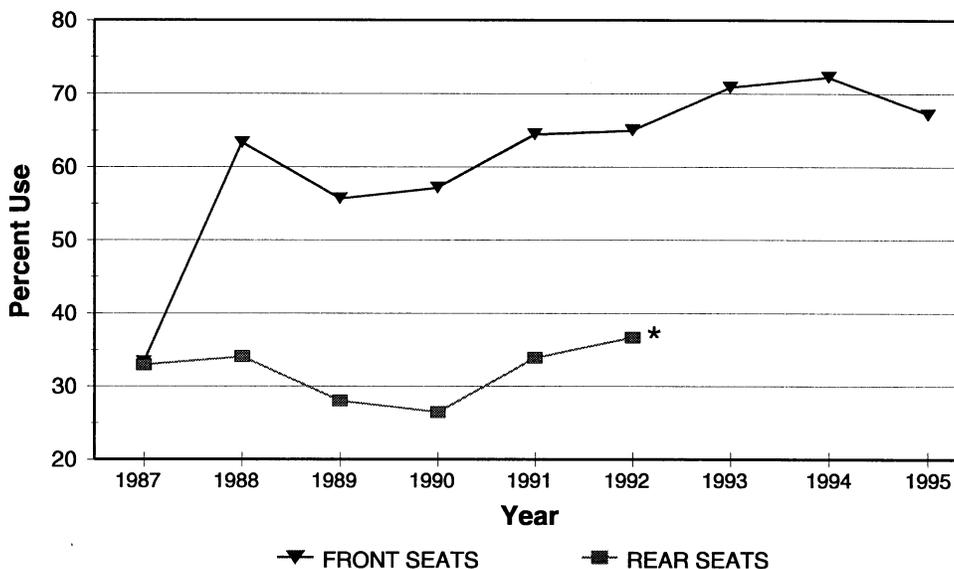
Purpose

The purpose of this study was to review the results of safety belt use surveys of the past 13 years, note important trends and changes in trends, and identify problems and opportunities revealed by the data for Virginia's highway safety program administrators.

Analysis

Although extensive data were collected in the surveys, only a few data elements remained consistent from 1983 through 1995: safety belt use, locality (statewide, metropolitan, and non-metropolitan), seat position, and occupant age.

Because the early surveys were in metropolitan areas only, statewide belt use data are available only since 1987. Figure ES-1 shows that in the year before the MUL was implemented, both front and rear seat occupants were belted about 33 percent of the time. After the MUL became effective, belt use by front seat occupants increased significantly (30 points), with no real change in use by rear seat occupants. This major difference in use rates continued through 1992.



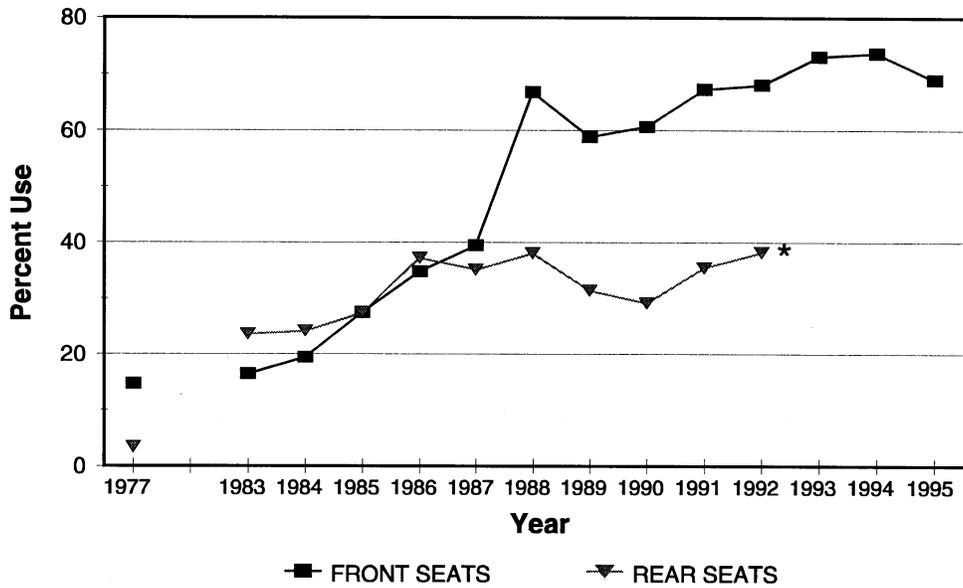
* Data not collected after 1992.

Figure ES-1. Statewide Belt Use by Occupant Seat Position: 1987-1995

Because data on rear seat occupants were not collected after 1992, it cannot be established that the gap still exists, but there appears to be no reason to believe it does not. From 1988 through 1995, the increase in front seat belt use was minor (less than 4 points). Between 1988 and 1992, rear seat use rates increased only slightly (less than 3 points). Although belt use in both seating positions increased slightly, the important fact is that after passage of the MUL applying to front seat passengers in 1988, front seat belt use was nearly 30 points greater than rear seat use each year.

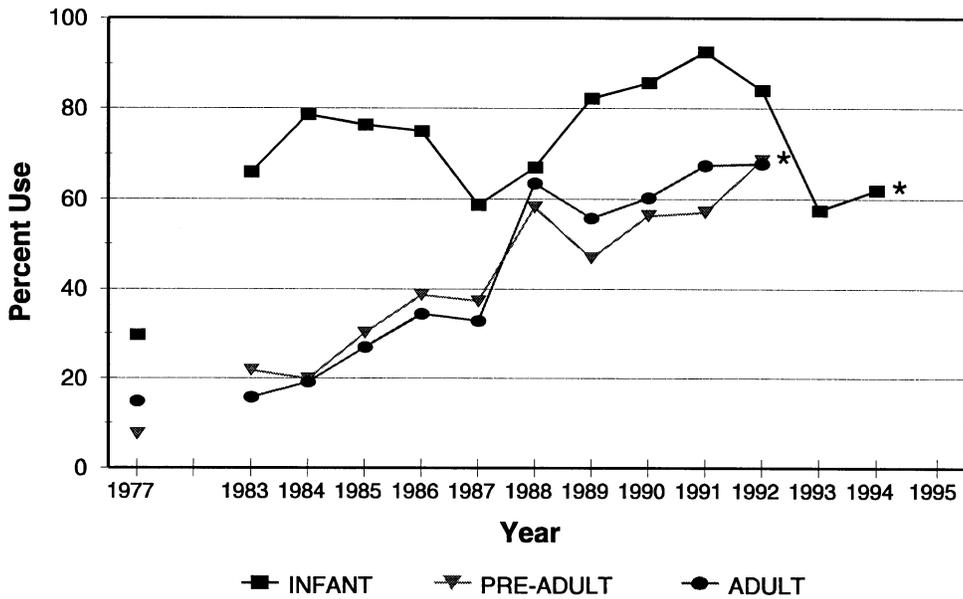
Figure ES-2 shows that between 1983 and 1987 belt use rates by front and rear seat occupants in Virginia’s metropolitan areas were similar and that they generally increased. The increase was greater for front seat occupants. The difference in use rates was greatest in 1983 (just over 7 points) and smallest in 1985 (no difference). After the effective date of the MUL, use by front seat occupants increased significantly. Although the rate dropped slightly in 1989, it rose over the next 5 years and peaked at 73.7 percent in 1994 before dropping in 1995. The MUL had no significant effect on rear seat occupant use in 1988 (a 3-point increase), but strangely, these rates were lower in 1989 and 1990 than in the years just prior to passage of the law. By 1992, rear seat belt use in the metropolitan areas had again reached the level (just over 38.0 percent) in 1988. Rear seat belt use data were not collected after 1992 because they were not required of the states to meet the provisions of Section 153 of the Intermodal Surface Transportation Efficiency Act.

Figure ES-3 shows front seat belt use in Virginia’s metropolitan areas categorized by age. The pre-adult (ages 4-16) and adult (age 16+) use rates track very closely with there being no real



* Data not collected after 1992.

Figure ES-2. Belt Use in Metropolitan Areas by Occupant Seat Position: 1983-1995



* Pre-adult and adult data not collected after 1992 and infant data not collected in 1995.

Figure ES-3. Front Seat Belt Use in Metropolitan Areas by Occupant Age: 1983-1995

difference in rates in 1984 and 1992, and a difference of only 9 points in 1989 (the year of greatest divergence). Throughout the period, both groups increased their use rates, nearly 47 points by pre-adults and 52 points by adults, with both rates peaking at approximately 68 percent

in 1992. The trend for infants (under age 4) was quite different. Use rates varied tremendously over the 13-year period and fluctuated in a 35-point band (from 57.6 percent in 1993 to 92.6 percent in 1991). Although the trend was not uniform, the net result over the period was an overall drop in use between 1983 (66.0 percent), when the law went into effect, and 1994 (62.0 percent). Although pre-adult and adult rates were low in 1983 and infant rates were high, in the last year for which age data are available, older Virginians had higher safety belt use rates.

Conclusions

Three conclusions became evident from this study:

1. After implementation of Virginia's child safety seat law, the rate of child safety seat use increased significantly and has remained relatively high each year since.
2. Immediately after the effective date of the MUL, safety belt use by front seat occupants increased significantly and has generally remained high each year since.
3. There was little change in belt use in any other year.

Recommendation

In Virginia, the rear seat safety belt use rate is extremely low. In view of the limited effects of education, enforcement, and engineering efforts and the significant positive effect of the mandatory use law on safety belt use rates, Virginia's General Assembly should enact a third belt use statute requiring safety belt use by rear seat occupants.

SAFETY RESTRAINT USE IN VIRGINIA: USE RATE TRENDS FROM 1983 THROUGH 1995

**Charles B. Stoke
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INTRODUCTION

In the late 1950s and early 1960s, there was little data on motor vehicle safety belt use rates or the effectiveness of belts as a safety countermeasure. By the 1990s, it had become generally accepted that a correctly used safety belt was an easy and effective way of preventing fatalities and reducing the severity of injuries in motor vehicle crashes. The benefits of automobile safety belt systems were first officially recognized by Virginia lawmakers in 1963 when a statute was enacted that required all new vehicles sold in the state to be so equipped. Unfortunately, requiring vehicles to have safety belts in no way ensures that drivers and passengers will use them.

In the mid-1970s, various national and state surveys of safety belt use (both in questionnaire format and by actual observations of occupants in traffic) showed extremely low rates of use, generally less than 15 percent. Over the past 20 years, numerous public information, education, and enforcement efforts to increase the use rate have been carried out. For the most part, these efforts have been funded by the National Highway Traffic Safety Administration (NHTSA) and the various state highway safety agencies, including the Transportation Safety Administration of the Department of Motor Vehicles (DMV) (formally the Highway Safety Division of Virginia). When these efforts produced limited positive results, emphasis turned to legislative remedies. In 1982, the Virginia legislature passed a primary enforcement statute requiring all occupants under 4 years old to be protected by a child safety seat. In 1987, a mandatory use law (MUL) was passed requiring front seat occupants of passenger cars to use a safety restraint. This statute required secondary enforcement. The effective date of these statutes was January 1 of the year following passage.

After the effective date of Virginia's child safety seat law in 1983, annual surveys were conducted to determine the use rates of safety seats and seat belts.

PURPOSE AND SCOPE

Over the 13-year period beginning in 1983, a series of reports were published providing the results of the yearly belt use surveys.¹⁻¹⁴ Only during the 1983-1986 period were attempts made to monitor changes in use rates over time. The purpose of the current study was to review and assess the longitudinal data, report observed changes, and, if possible, identify reasons for changes in trends.

VIRGINIA SURVEY DATA

The first safety belt use survey in Virginia was conducted in the four metropolitan areas of the state in 1974: Northern Virginia (Arlington, Alexandria, and Fairfax County), Tidewater (Norfolk, Virginia Beach, Hampton, and Newport News), Richmond (and surrounding counties), and Roanoke (and the towns of Salem and Vinton plus Roanoke County). Subsequent surveys were conducted in 1975, 1976, and 1977. Data were not collected for the 5-year period from 1978 through 1982. In 1983, after the child safety seat law became effective, surveys of safety belt and child safety seat use were again initiated, and additional surveys have been conducted, at least on an annual basis, each year since.

Over this nearly 20-year period, the types of data collected varied considerably. Appendix Table A-1 shows what types of data were collected each year from 1983 through 1995, the period covered by this trend analysis. Two surveys were conducted in 1992: the one in June was the last under the Federal Highway Safety Act's § 402 program and the one in September was the first under the 1991 Intermodal Surface Transportation Efficiency Act's (ISTEA) § 153 program (described later).

From June 1983 through June 1992, survey data were collected only at signalized intersections for all occupants of passenger cars with Virginia license plates. Trucks and vans were not included because of the difficulty of visual verification of safety restraint use. Sites were selected on the basis of potential safety of survey personnel, traffic volume, type of road, and whether the persons (and vehicles) traveling through the site were representative of the area's socioeconomic mix. This determination was made based on information from a variety of sources including local and state police officers, other state agency staff, other researchers, and local business and industry representatives.

Section 153 of ISTEA provided incentive funds for the states either to enact an MUL or, if one was in place, to conduct activities to increase safety belt use rates. To qualify for these funds, the states had to achieve a specified rate of use for safety belts and motorcycle helmets. Congress authorized NHTSA to establish necessary survey guidelines. In the 1992, 1993, and 1994 § 153 surveys, and the 1995 state survey, belt use data were collected at sites randomly chosen from throughout the state (both urban and rural areas), only from "passenger vehicles," and only with respect to the driver and outboard front seat passenger. The use of signalized intersections was not required. Both in-state and out-of-state vehicles were included in the sample.

Belt Use

Each year, data were recorded on how the belt system was being used, but there were differences in the way this was recorded. From 1983 through 1990, belt use was recorded as

either only lap belt used, lap/shoulder belt combination used, or no belt system used. In 1991 and June 1992, belt use was recorded as either correct, incorrect, or none. From September 1992 through June 1995, use was recorded as yes or no only as it applied to the visible use of the shoulder belt.

Because of these variations, certain categories of data were combined so that data from earlier and later years could be compared:

- For results from 1983 through 1990, if either the lap belt or lap/shoulder belt system was used, use was considered a “yes” response.
- For results from 1991 and June 1992, both correct and incorrect use was considered a “yes” response.
- For results from September 1992 through 1995, no combination was needed since use was recorded as either “yes” or “no.”
- For results from 1983 through 1990, both correct and incorrect child seat use was considered a “yes” response.

Occupant Age

Occupant age was divided into five categories during the 1983 through 1990 surveys. In 1991 and June 1992, there were three categories: those required to be in a child safety seat (under age 4), pre-adults (ages 4 to 16), and drivers (over age 16). Age data were not collected from September 1992 through June 1995. Since DMV officials wanted information on child safety seat use, a metropolitan child safety seat survey was conducted in the summers of 1993 and 1994 (but not in 1995). The data were collected at the same survey sites, on the same day of the week and hour of the day, and under the same observational conditions as were used in previous child safety seat surveys.

Location

Data on the location of each survey site were also recorded. Data were collected only in the four major metropolitan areas of the state during the 1983-1986 period. In 1987, survey sites were added in nine communities classified as towns, and data were collected at these locations through June 1992. For 1991 and June 1992, sites were added in localities classified as mid-size cities. In 1991 and June 1992, data were collected at 50 locations (for 2.5 hr by each of two observers at each site) selected from throughout the state and classified as metropolitan, mid-size city, and town. With the state electing to seek ISTEA § 153 incentive funds, NHTSA required that 120 sites, 84 classified as urban and 36 classified as rural, be used for the survey conducted

after September 1992. Data were collected for 1 hr at each site by a single observer. Although the § 153 program was not in effect in 1995, Virginia elected to continue data collection and used the same process and procedure that were used in the three previous surveys. Data were combined and classified as statewide for the 1987-1995 period.

Other Data Categories

Three other categories of data were collected at one time or another during the 13 years. Gender was recorded from 1983 through 1990; vehicle age was recorded in 1983, 1984, and 1985; and ethnic group was recorded in 1991 and 1992. However, these data were collected over too few years to be considered in this trend analysis.

METHOD

Appendix Table A-1 shows that although extensive amounts of data were collected and categorized, only four data categories were used for a major portion of the 13-year period: locality, safety belt use, seat position, and occupant age. Yearly rates of safety belt use for these four categories were obtained from the previously published reports.¹⁻¹⁴ Because of the necessity to combine certain data groups from various years, there is some dissimilarity (generally attributable to rounding error) between the data published in an individual yearly report and the data shown in this report. This dissimilarity is relatively minor, generally amounting to a fraction of a percentage point.

The data fall basically into two groups, based on the year of the survey. The first group comprises data collected from 1983 through June 1992, a series of surveys where the data categories were generally consistent, and is referred to as *the § 402 surveys*. The second group comprises data collected September 1992 through 1995 and is referred to as *the § 153 surveys*. The data categories for these four surveys are consistent but are not as inclusive or as detailed as those for the previous 8 years.

The data were analyzed as subsets based on three categories of locality: metropolitan, non-metropolitan, and statewide. Although the primary focus was the 1983-1995 period, 1977 metropolitan data were included because they were the most current state data that had been collected on belt use prior to the effective date of the child safety seat law. They served as a baseline use rate to show the change in use that occurred as a result of a change in the law.

RESULTS

Metropolitan Areas

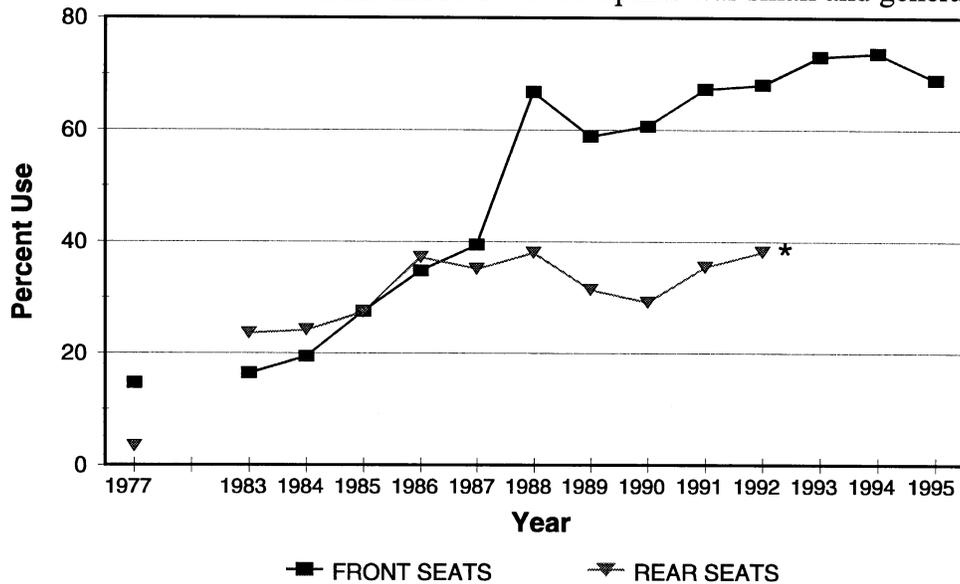
All Occupants

Appendix Table A-2 shows metropolitan safety belt use rates for all occupants. Rear seat belt use data were not collected after 1992.

Between 1977 (the base year) and 1987 (the year prior to the MUL), front seat use increased by nearly 25 points, with year-to-year increases being relatively small. In 1988, post-MUL, the use rate increased significantly, more than 27 points. In 1989, the rate declined by 8 points, probably because motorists realized that enforcement would be limited. From 1989 through 1994, the yearly increases in the use rate totaled nearly 15 points. Front seat belt use reached the highest rate in 1994 (73.7 percent), nearly 7 points higher than the rate in the first year post-MUL, but the rate dropped to 69.0 percent in 1995.

Between 1977 and 1983, the rear seat rate increased just 20 points. The child safety seat law became effective on January 1, 1983, and the survey data were collected in June. Other than in 1987, the use rate increased yearly over the 1983-1988 period, a total increase of just over 14 points. The rate declined from 1988 through 1990 but increased in 1991 and 1992, reaching a rate equal to that in 1988.

The trends for metropolitan occupants are shown in Figure 1. From 1983 through 1987, the difference in use rates between front and rear seat occupants was small and generally



* Data not collected after 1992.

Figure 1. Belt Use in Metropolitan Areas by Occupant Seat Position: 1983-1995

followed the same direction in the rate of change each year except 1987; i.e., if the use rate for one seat position increased, the other did also. A major change occurred in 1988, the year the MUL applicable to front seat occupants became effective. Since 1988, the wide divergence in the front and rear seat use rates has continued. Except in 1990, the change in the front and rear seat rates was in the same direction since 1988, but the magnitude of the change was different.

Front-Seat Occupants

Appendix Table A-3 shows metropolitan belt use rates for front seat occupants by age. Data on age were not recorded during the 1993, 1994, and 1995 § 153 surveys, and a child seat survey was not conducted in 1995. Each year, infants had the highest rate of use. From 1983 through 1987, pre-adults had a higher rate than adults, but from 1988 through 1991, adults had a higher rate than pre-adults. In 1992, there was little difference between the pre-adult and adult rates.

Infants

In 1983, nearly two-thirds of these infants were in a child safety seat. For the next 3 years (1984-1986), more than three-fourths were in a child safety seat. In 1987, the use rate dropped by just over 16 points, recovered by half this drop in 1988, and continued to increase in each of the next 3 years (1989-1991), reaching the highest point in 1991 (92.6 percent). The rate dropped again in both 1992 and 1993, the year in which the rate was lowest over the entire period, but improved modestly (just over 4 points) in 1994. The use rates were lower in 1993 and 1994 than in 1983, the year the child seat statute went into effect.

Pre-Adults

Only about one-fifth of these pre-adults used safety belts in 1983 and 1984, but the rates were nearly triple that of the 1977 base year. After increases in both 1985 and 1986, the use rate dropped by 1.5 points in 1987. In 1988, there was a 21-point increase, the largest year-to-year change. After a 11-point drop in 1989, the use rate increased in each of the next 3 years. In 1992, the use rate was just over 10 points higher than in 1988. The rate was the highest in 1992, and just over two-thirds of these occupants were belt users. The years of major change, 1983 and 1988, coincided with the effective dates of the child safety seat law and the MUL, with the greatest change in the year of the MUL. Over the 1983-1992 period, there was a major increase in the use rate.

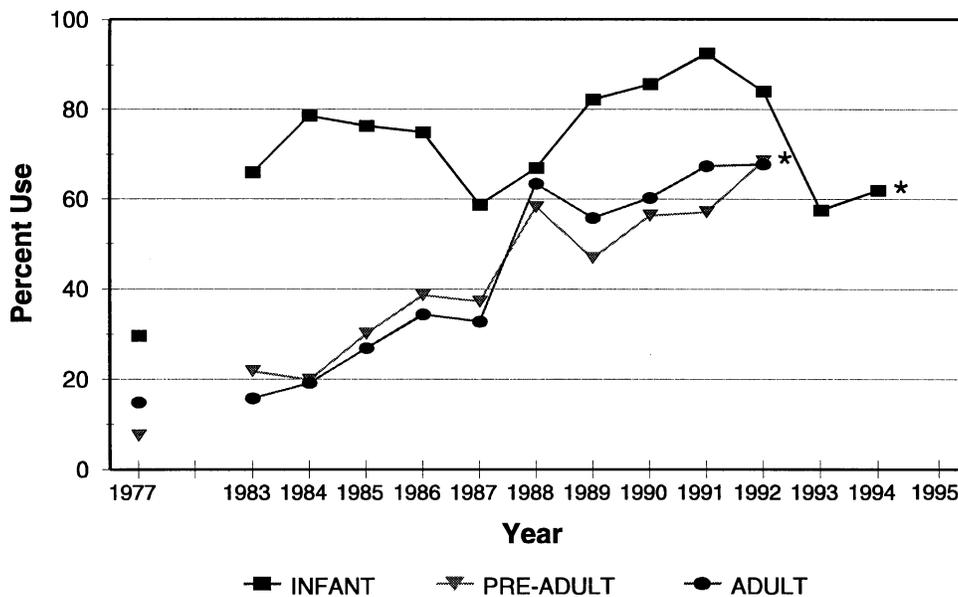
Adults

For these adults, the use rate in 1983 was similar to that in the 1977 base year, varying by less than 1 point. From 1983 through 1986, yearly increases resulted in a doubling (2.2 times) of

the rate over these 4 years. The rates in 1986 and 1987 were similar. The use rate increased by nearly 31 points in 1988, dropped by almost 8 points in 1989, and then increased in each of the next 3 years, peaking in 1992 at a rate (67.9 percent) more than 4 points higher than in 1988. The greatest change occurred in conjunction with the implementation of the MUL in 1988. Over the 1983-1992 period, use increased from less than 1 in 6 to just over 2 out of 3.

Trends

Trends in metropolitan front seat belt use by age are shown in Figure 2. The data ebb and flow over the 1983-1994 period. There is no single trend for any age group, and in several years, the use rates were very different from the previous year. For the 1983-1992 period, pre-adult and adult use rates tracked closely, with a difference of fewer than 10 points in the yearly rates, and increased overall. Generally, when there was a change in use by one of these two groups, there was a corresponding change by the other, but not necessarily to the same degree. Infant use rates varied tremendously, but the rate of child safety seat use went down. From 1983 through 1987, the infant use rate was substantially higher than that for pre-adults or adults. In 1988, the rates for all three groups were within 10 points. From 1989 through 1992, infants had the highest use rates, but the differences were not as great as in the years before 1988. The first major divergence occurred in 1983, the first year of the child safety seat law. Occupants under age 4 were subject to the statute throughout the entire period, whereas the other two age groups were subject to an MUL only since 1988.



* Pre-adult and adult data not collected after 1992 and infant data not collected in 1995.

Figure 2. Front Seat Belt Use in Metropolitan Areas by Occupant Age: 1983-1995

Rear-Seat Occupants

Appendix Table A-4 shows metropolitan safety belt use rates for rear seat occupants by age. The yearly infant use rate was much higher than that for the other two age groups. From 1983 through 1992, the yearly use rate for pre-adults was higher than the rate for adults.

Infants

Over the 1983-1989 period, with the exception of 1987, approximately two-thirds of infants were using child safety seats, and the yearly rates varied by fewer than 4 points. The rate increased 13 points in 1990 and by more than 15 points in 1991, peaking at 96.8 percent. Seat use dropped by just over 27 points between 1991 and 1993 before making a 10-point recovery in 1994. The 1994 rate was higher than in 1983 and 1988, the years the belt use statutes became effective. The increase in 1983 coincided with the child safety seat law. It is interesting to note that the MUL of 1988 had little immediate impact on the rate of child seat use, probably because the law applied only to front seat occupants and infants were already covered by the 1983 statute.

Pre-Adults

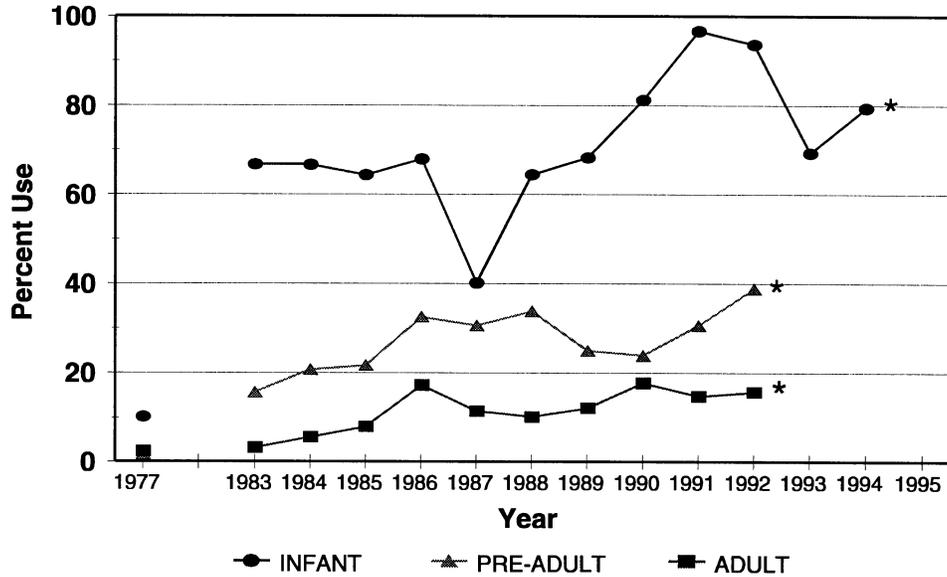
The rate for these pre-adults was much higher in 1983 than in the 1977 base year, and it increased in 4 of the next 5 years (with the exception of 1987); by 1988, the rate was double (2.2 times) that in 1983. Over the next 2 years, the use rate declined 10 points but increased again in 1991 and 1992. The 1992 rate (38.9 percent) was the highest. Although neither the child safety seat law nor the MUL applied to this group, their rate increased overall. The increase was probably attributable to a spillover effect because of a basic interest in safety on the part of adult occupants. However, in the year of greatest use, fewer than 40 percent of these occupants used safety belts.

Adults

There was little change in the use rate for these adults between 1977 and 1983, but from 1984 through 1986 the rate increased 14 points. During the 1987-1989 period, the use rate was 5 to 7 points lower than in 1986. The rates in 1986 and 1990 were similar. In 1991 and 1992, the use rate was 2 and 3 points lower than the 1990 peak. Over this study period, the rate did not exceed 18 percent in any year. Because neither the 1983 nor the 1988 statutes applied to these occupants, it may be unrealistic to think that their rate of use will change considerably.

Trends

Trends in metropolitan rear seat safety belt use by age are shown in Figure 3. Prior to 1988, if the pre-adult use rate increased, the adult rate did also. From 1988 through 1991, the movement in their use rates was in the opposite direction. There was considerably more variation in the yearly rear seat rates between pre-adults and adults than for front seat occupants.



* Pre-adult and adult data not collected after 1992 and infant data not collected in 1995.

Figure 3. Rear Seat Belt Use in Metropolitan Areas by Occupant Age: 1983-1995

Throughout the 1983-1992 period, the difference in use was from 6 (1990) to 24 (1988) points. The implementation of the MUL in 1988 had very little impact on these two groups because the law did not apply to them. The yearly infant use rate was much higher than that for either pre-adults or adults. The major change occurred with the child safety seat law in 1983. The difference in use rates among the three age groups was smallest in 1987, with a spread of nearly 29 points. The difference was greatest in 1991, with a spread of 82 points.

Non-Metropolitan Areas

All Occupants

As stated previously, belt use data for non-metropolitan areas of the state were not collected for as many years as those for metropolitan areas. Non-metropolitan data were not collected prior to 1987, and the number of sites from 1987 through 1990 were limited to those in nine towns. The number of survey hours was also much smaller in these areas. Additional sites were added for the 1991 and 1992 surveys in four mid-size cities. Data were not categorized by age in the § 153 surveys, and the child seat surveys did not include sites outside metropolitan areas. Because of fewer sites, hours, and vehicles, the non-metropolitan sample sizes were only one-fourth to one-third as large as those for metropolitan areas. For these data, 1987 (pre-MUL) is considered the baseline year.

Appendix Table A-5 shows the 1987-1995 non-metropolitan belt use rates for front seat occupants. Between 1987 and 1988, the rate increased by just over 34 points (2.7 times). From 1988 through 1995, although there were years when belt use declined (1989, 1990, and 1995) and years when belt use increased (1991 through 1994), the rate in 1995 (55.6 percent) had improved little over that in 1988 (54.0 percent). Only in 1994 did the rate of use exceed 60 percent.

Appendix Table A-5 also shows non-metropolitan rear seat belt use rates, but only for the 1987-1992 period. As discussed previously, these data were not required to be collected to qualify states for incentive funds under ISTEA § 153 guidelines. Over these 6 years, the rate increased very little, by only 3 points. The rate dropped in 1988, 1989, and 1990 by a total of 7.5 points before increasing in 1991 and 1992 by just over 10 points. One note of interest is the 5-point drop (18 percent) in 1988, the year immediately after the effective date of the MUL. It can be speculated that some occupants interpreted the law in such a way that it actually caused them to stop using a safety belt while riding in the rear seat of a car, and it took several years before this misconception could be countered. Still, even in the best of years, more than two-thirds of these occupants were not belt users.

Figure 4 shows trends for all non-metropolitan occupants over the 1987-1995 period. In 1987, the rates for front and rear seat occupants differed by only 8 points, with rear seat use being higher. When the MUL became effective in 1988, there was a major increase in belt use by front seat occupants and a slight decline in use by rear seat occupants. For the 1988-1992 period, the front seat use rate was approximately 27 points higher than the rear seat rate.

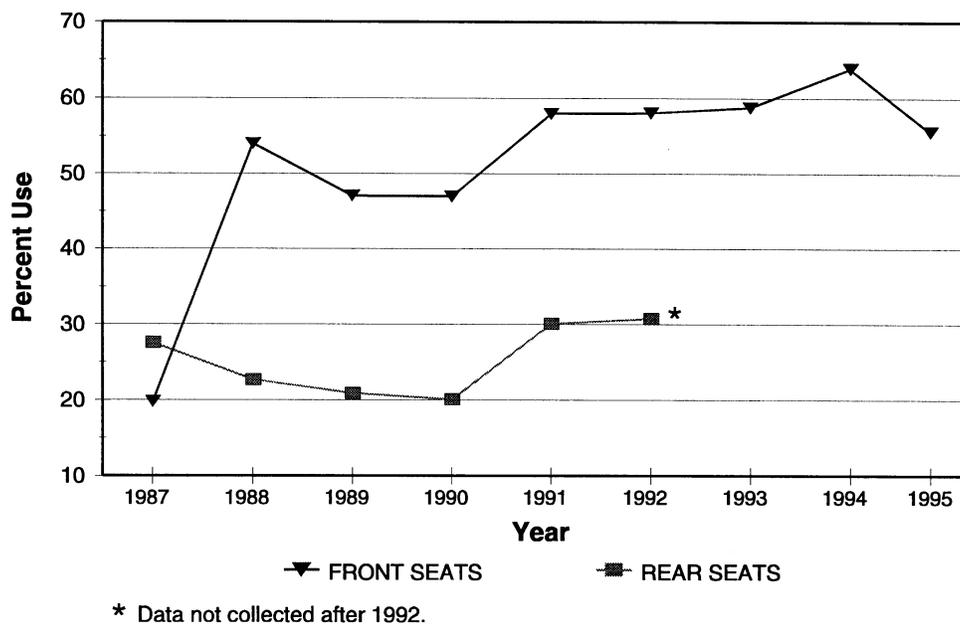


Figure 4. Belt Use in Non-Metropolitan Areas by Occupant Seat Position: 1987-1995

Generally, the direction of change in the yearly use rates was the same for both seat positions, and the degree of change each year was similar. The metropolitan rates were higher for both front and rear seat occupants each year.

Front-Seat Occupants

Appendix Table A-6 shows the non-metropolitan front seat safety belt and safety seat use by age.

Infants

The infant use data had a range of more than 50 points in the 6 years between 1987 and 1992, with the extremes in 1988 and 1990. In the first year of the MUL, child safety seat use was 17 points lower than in 1987. It increased by 33 points in 1989, and in 1990 all infants observed were in a safety seat. The use rate dropped by 16 points in 1991 and by another 19 points in 1992. In the last year with available age-specific data (1992), the rate was the same as in 1987.

During the first 4 years, the greatest number of infants surveyed was 21 in 1989 and 1990. There were 50 and 49 infants observed in 1991 and 1992. The wide divergence in use rates is attributable to the small sample and the small number of child seat users. Percentages involving small numbers tend to have large variations.

Pre-Adults

For these pre-adults, the 1988 use rate was nearly triple (2.7 times) that of 1987, an increase of 31 points. Over the next 2 years, the rate declined by 8 points, then rose by 3 points in 1991 and another 12 points in 1992. The 1992 rate was the highest (56.4 percent) over the 6 years. Although the use rate improved considerably after 1987, additional improvement is necessary. The 1992 use rate was only 7 points higher than in 1988, the first year of the MUL, and more than 40 percent of these occupants are not belt users.

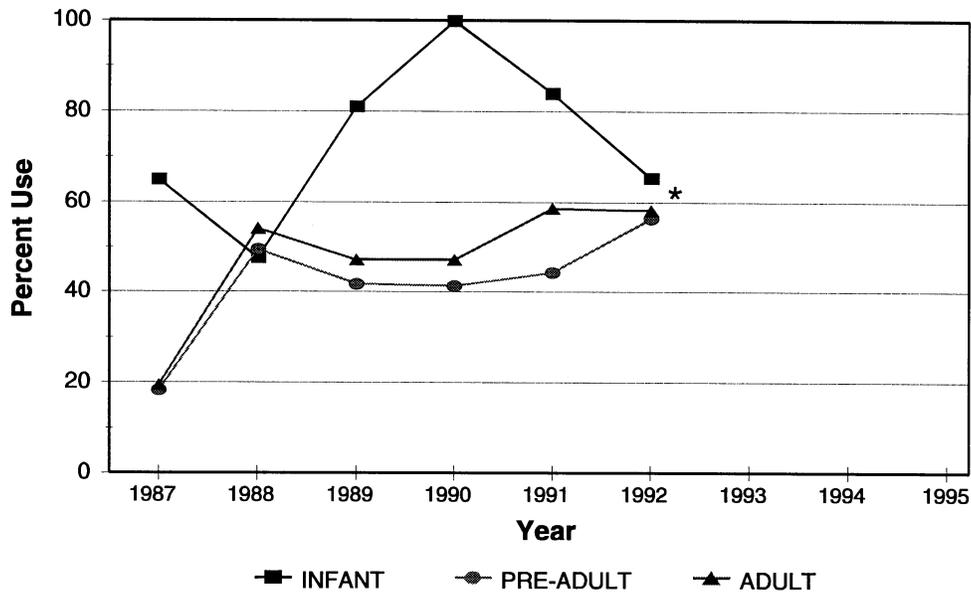
Adults

The rate for these adults nearly tripled (2.8 times) between 1987 and 1988, gaining almost 35 points. The rate dropped by 7 points in 1989 and remained at that level in 1990. The use rate increased by 12 points in 1991 and remained there in 1992. In the 5 years since the effective date of the MUL applying to front seat occupants, the use rate for these adults has increased only 4 points. In addition, more than 40 percent of these occupants are not belt users.

Trends

The trends for non-metropolitan front seat belt use by age are shown in Figure 5. For pre-adults and adults, the year of major change was the first year of the MUL, indicating that the statute was effective. Because there was already a statute applicable to infants in 1987, the lack of an increase in the infant use rate in 1988 was not surprising, but the decline of more than 17 points was unexpected.

For the 5-year period when these three groups were affected by statute, the use rate has increased only slightly since the first year of the MUL. The use rate for pre-adults and adults followed the same direction and degree of change from 1987 through 1990, with differences varying from just over 1 point (1987) to just under 6 points (1990). In 1991, although both rates increased, the change was greater for adults. In 1992, both pre-adults and adults had nearly the same rate, a result of an increase by pre-adults and no change by adults. In 1987, the infant use rate was much higher (more than 40 points) than that for pre-adults or adults. In 1988, the difference in the rates among all three age groups was less than 7 points. From 1989 through 1991, the infant use rates were 25 to 59 points higher than the pre-adult or adult use rates. In 1992, there was less than a 9-point difference in the three use rates, a situation similar to that in 1988, the first year of the MUL. The 1992 rates were only 4 (adults), 7 (pre-adults), and 18 (infants) points higher than in 1988. Except for 1988 and 1992, the infant use rate was substantially higher than that for pre-adults and adults each year.



* Data not collected after 1992.

Figure 5. Front Seat Belt Use in Non-Metropolitan Areas by Occupant Age: 1987-1992

Rear-Seat Occupants

Appendix Table A-7 shows non-metropolitan rear seat belt use data by age.

Infants

More infants were in the rear seats than in the front seats, with the number ranging from 43 in 1990 to 133 in 1991. Belt use varied by nearly 65 points over these 6 years, with the low occurring in 1988 and the high in 1991. The use of child safety seats dropped by 9 points in the first year of the MUL, a change that had not been expected. Over the next 3 years, the use rates increased 20, 16, and 28 points, respectively, peaking at 95.5 percent in 1991. The drop in child seat use in 1992 was 4 points. The rear child seat use rate was lower than that for front seat infants during the 1987-1990 period but was higher in 1991 and 1992.

Pre-Adults

The use rate for these pre-adults dropped in 1988 (3 points) and 1989 (nearly 3 points) and increased 2, 6, and 5 points in 1990, 1991, and 1992, respectively. The 1992 rate was the highest of the 6-year period, but fewer than 30 percent of these occupants were buckled up. One explanation for the very low use rate is that neither the child seat law nor the MUL applied to these occupants. Previous research has shown that public information and education programs without the passage of a law and strict enforcement have little positive impact on use rates.¹⁵⁻¹⁸

Adults

Belt use rates for these adults were substantially lower than those for all other occupants, including metropolitan rear seat occupants. Although the rates fluctuated from year to year, the changes were generally within 6 points. The rate was as low as 4 percent (1990) and was greater than 10 percent only in 1991 and 1992. Since these occupants were not subject to the MUL, their use rates were not expected to be very high. But it was never expected that nearly no adult rear seat occupants would use a safety belt.

Trends

Trends for non-metropolitan rear seat belt use by age are shown in Figure 6. Over the 1987-1992 period, use rates for pre-adults were higher than those for adults. The difference ranged from 6 points in 1989 to 18 points in 1992. These two extremes occurred in the year after the MUL (smallest difference) and the last year these data were collected (greatest difference); the difference was approximately 13 points in the other 4 years. The adult use rate increased the least (less than 4 points) over this 6-year period. Although the infant use rate was higher all 6 years, it was only after 1989 that the difference exceeded 33 points, reaching the maximum difference of 85 points in 1991. Although the child safety seat law was in effect over the entire period, the rate of rear seat use by infants did not exceed 50 percent until 1989.

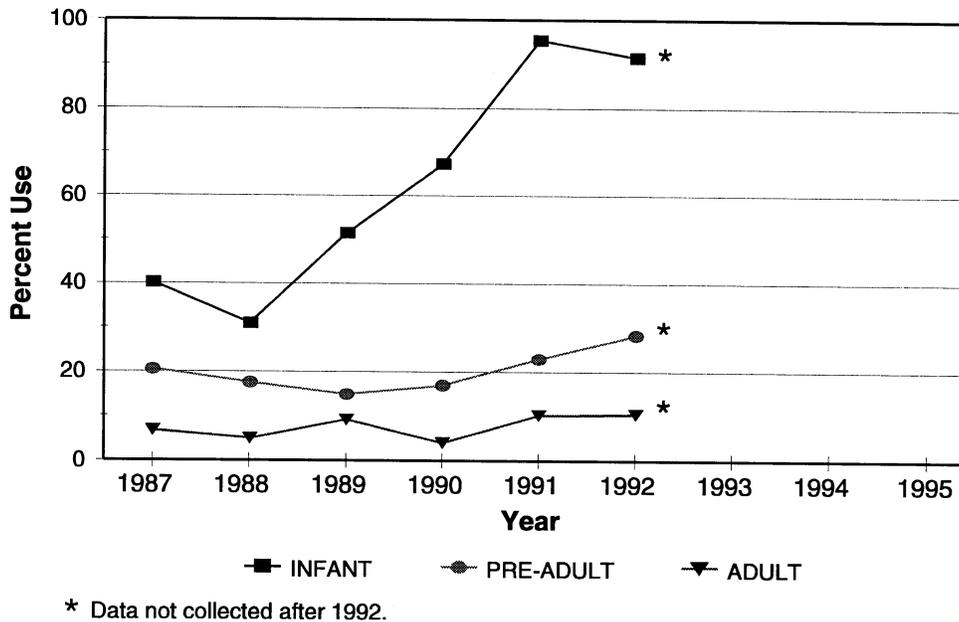


Figure 6. Rear Seat Belt Use in Non-Metropolitan Areas by Occupant Age: 1987-1992

Statewide

As previously discussed, safety belt use data were collected only in metropolitan areas prior to 1987. Although the addition of sites in towns in 1987 and in mid-size cities in 1991 added to the geographic coverage of the state, it was only with the start of the § 153 surveys in September 1992 that belt use data began to be collected from the length and breadth of the Commonwealth. The data from the metropolitan and non-metropolitan areas were representative of the rates of use in each of these broad areas individually, but the combining of the two area-wide results may not be an accurate representation of statewide use rates. Because previous data have shown that use rates are higher in metropolitan areas, the 1987-1991 data probably overestimate statewide belt use because of the over-representation of metropolitan sites and hours of data collection. In addition, the change in procedures for 1993, 1994, and 1995 (front seat only, shoulder belt only, moving vehicles) may, in and of itself, have caused the statewide use rate to be overestimated.

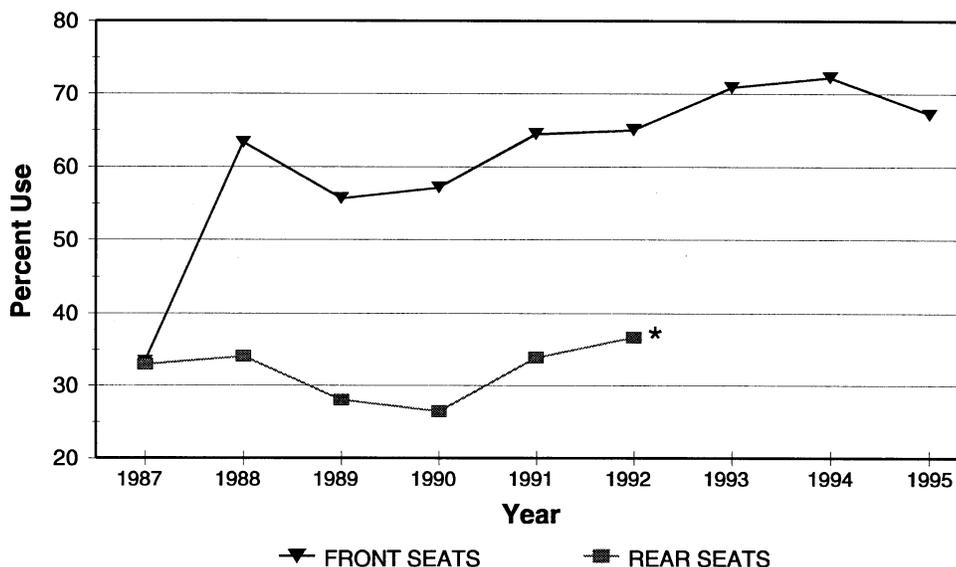
All Occupants

With the exceptions previously noted, Appendix Table A-8 shows yearly statewide safety belt use rates by seat position. Belt use by front seat occupants increased 30 points between 1987 (the base year) and 1988 (the first year the MUL was in effect). It declined by nearly 8 points in 1989. Several scenarios have been proposed as the reason for the drop: the most plausible one is

that once the public determined that full enforcement of the statute was not possible, they did not feel compelled to use a safety belt. Over the next 5 years (1990-1994), belt use by front seat occupants increased annually, ranging from less than 1 to more than 7 points, with the rate peaking at 72.3 percent. The rate dropped 5 points in 1995.

In the year prior to the MUL, safety belt use by rear seat occupants was nearly the same as that for front seat occupants. For all other years data are available, belt use by rear seat occupants was much lower. Although the MUL was in effect during this period, it did not apply to rear seat occupants. For the 1988-1992 period, the lowest use rate was in 1990 and the highest was in 1992, with a difference of just over 10 points. The year-to-year changes varied from less than 1 point to just over 7 points. The highest use rate in 1992 (36.7 percent) was less than 3 points higher than in 1988. Unlike the front seat use rate, the rear seat rate between 1987 and 1988 did not increase dramatically. This lack of a positive change was probably because the MUL did not apply to rear seat occupants.

Figure 7 shows the trends in statewide safety belt use by seat position. As discussed previously, the most complete geographic coverage of the state was after 1992; unfortunately there are no rear seat data for these years. Between 1987 and 1992, *statewide* represents only the combination of the metropolitan and non-metropolitan use rates. In 1987, there was no difference in the rates for front and rear seat occupants. When the MUL went into effect in 1988, there was a sharp and substantial increase in front seat use but little change in rear seat use. With the exception of 1990, the direction of change was the same for both seat positions and the degree of change was between 1 and 7 points for both groups each year. Between 1988 and



* Data not collected after 1992.

Figure 7. Statewide Belt Use by Occupant Seat Position: 1987-1995

1992, the difference between the front and rear seat yearly use rates was 27 to 30 points, a difference consistent over the 6-year survey period.

Front-Seat Occupants

Appendix Table A-9 shows statewide front seat belt use by age. Age-specific data were not collected as part of the § 153 surveys in 1993, 1994, and 1995. With the exception of 1988, infants had a higher rate of safety restraint use each year than did pre-adults and adults, and adults had a higher yearly rate (except in 1988) than did pre-adults, although the difference in 1992 was too small to be important.

Infants

There was little real change in the use of child safety seats between 1987 and 1988. It should be remembered that use included both correct and incorrect use. The use rate increased just over 19 points between 1988 and 1989 and just over 7 points in 1990 and 1991, with the rate peaking at 89.6 percent. The rate decreased just over 10 points in 1992. The large increase in use between 1987 and 1988 for the other two age groups did not occur for infants, primarily because they had been covered by the child safety seat law since 1983. The increase in subsequent years could have resulted from a spillover effect of the MUL and/or from the efforts of special child seat programs funded by the DMV in numerous localities around the state.

Pre-Adults

For these pre-adults, the 1988 use rate was double (2.2 times) that in 1987, an increase of more than 38 points. The 1988 rate was the highest during these 6 years. After a 24-point drop in 1989, the rate increased in 1990, 1991, and 1992 by a total of nearly 20 points, so that in 1992, it was just under 5 points lower than the 1988 peak. These occupants were covered by the MUL, and the driver is responsible for ensuring they are buckled up. These data show that although the use rate improved over that pre-MUL, there is room for additional improvement since more than one-third of these occupants are not belt users.

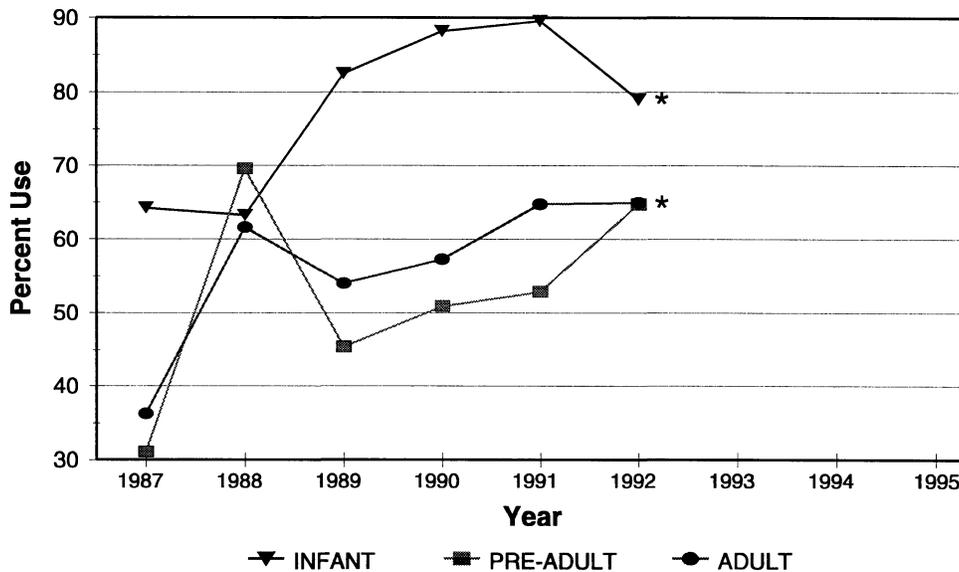
Adults

For these adults, the 1988 use rate was nearly double (1.7 times) that in 1987, an increase of just over 25 points. After a decline of nearly 8 points in 1989, the rate increased by a total of 11 points over the next 3 years, so that in 1992 nearly two-thirds of these occupants were buckled up. These occupants are covered by the MUL, and the major 1-year rate increase between 1987 and 1988 can be attributed to the statute. That the 1992 use rate was only a little more than 3 points above that in 1988 shows that there is additional room for improvement in the belt use habits of adults.

Trends

Figure 8 shows the trends of statewide front seat safety belt use by age. The difference in the yearly use rate for pre-adults and adults varied from 12 points (1991) to no real difference (1992). Adults had the higher rate each year except in 1988 and 1992. The use rates for pre-adults and adults increased sharply and substantially in 1988, after the MUL applicable to front seat occupants became effective. In 1987, the infant use rate was substantially higher than that for pre-adults and adults. In 1988, the difference in rates among the three groups was only 8 points, and pre-adults had the highest rate of use. Over the next 3 years, the infant use rate was approximately 37 points higher each year than the pre-adult rate and from 25 (1991) to 31 (1989) points higher than the adult rate. In 1992, the infant use rate was only 14 points higher than that for the other two age groups, a function of a 10-point drop in the infant use rate and a 12-point increase in the pre-adult rate.

Data from previous years had shown that the metropolitan infant use rate increased substantially and sharply when the child safety seat law went into effect. These data show that a second major increase occurred in 1989, the second year of the MUL. They also show that although the MUL was effective in increasing the use rates for all three groups, it had a greater impact on the percentage point change for infants than for pre-adults and adults through 1991, with the exception of 1988, the first year of the law.



* Data not collected after 1992.

Figure 8. Statewide Front Seat Belt Use by Occupant Age: 1987-1992

Rear-Seat Occupants

Appendix Table A-10 shows statewide rear seat safety belt use by age. As previously stated, data were not categorized by age in the § 153 surveys. A greater proportion of infants ride in the rear seats than in the front seats, whereas the reverse is true for the other two age groups.

Infants

Each year, safety restraint use by these occupants was substantially higher than that by pre-adults or adults, and the pre-adult rate was higher than that for adults. From 1987 through 1991, the use of child safety seats increased annually. The rate in 1991 (96.4 percent) was more than double (2.4 times) that in 1987, an increase of almost 56 points. Yearly increases ranged from less than 10 points (1989) to nearly 19 points (1991). Although there was a slight decline between 1991 and 1992, most rear seat infants were in a child safety seat in 1992.

To add perspective to these data, the use of child seats in 1993 and 1994 in metropolitan areas was substantially below that in 1992. In previous years, when there were both metropolitan and non-metropolitan data, the metropolitan use rate was nearly the same as the statewide use rate. Under this same condition, it is probably correct to assume that if statewide data were available for 1993 and 1994, the child seat use rate would have been in the upper 60s in 1993 and in the upper 70s in 1994, considerably different from the mid-90s found in 1991 and 1992. Even if this statewide scenario played out, these projected use rates are much improved over those from 1987 and 1988, by approximately 25 to 30 points. From 1987 through 1990, child safety seat use was lower in rear seats than in front seats, and in 1991 and 1992 it was higher. Infant rear seat occupants had been subject to the child safety seat statute since 1983, so it was interesting to note the large jump in use in 1988 after passage of the MUL and the continued yearly improvements through 1991.

Pre-Adults

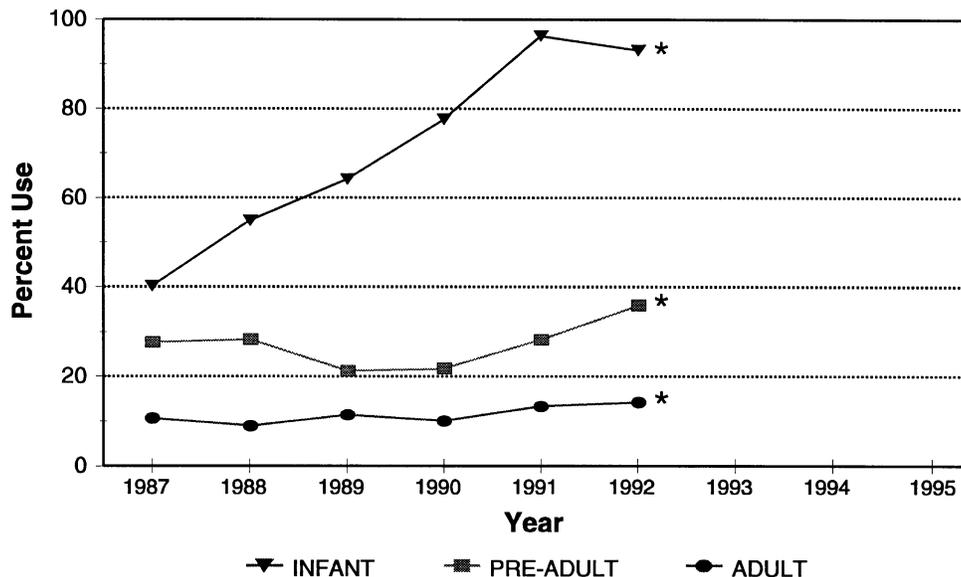
Between 1987 and 1988, there was little real change in the use rates for these pre-adults, with the increase being less than 1 point. The rate dropped 7 points in 1989 and essentially remained the same in 1990. There was an increase of just over 6 points in 1991 and nearly 8 points in 1992. Each year, the rate for these occupants was substantially lower than those for front seat occupants, primarily because the MUL applied only to the occupants of the front seats. The 1992 pre-adult use rate (36.0 percent) was the highest of this 6-year period, nearly 30 percent higher (8 points) than the 1987 rate. Even with this improvement, nearly two-thirds of these occupants do not use safety belts.

Adults

Throughout the 1987-1992 period, there was only minimal change in the year-to-year use rate for these occupants, with the yearly change ranging from less than 1 to more than 3 points. The lowest rate (9.0 percent) was in 1988, and the highest (14.3 percent) was in 1992. The rear seat use rate was substantially lower than the front seat rate each year. In the 1992 peak use year, most adult rear seat occupants were not using a safety belt. Under current Virginia law, no statute requires these occupants to be buckled up.

Trends

Figure 9 shows the trends in statewide rear seat belt use by age. Pre-adults had a higher rate each year than did adults; with the difference ranging from 10 (1989) to 22 (1992) points. The yearly adult use rates were within a relatively narrow 5-point band (9 percent to 14.3 percent) over the 6 years. The yearly pre-adult use rates, although more variable than the adult rate, were still within a 7-point band (21.3 percent to 28.4 percent) for the first 5 years; only in 1992 was the rate much higher than average and outside this band. The MUL had little or no positive spillover effect on adult and pre-adult rear seat occupants. Infant rear seat occupants were covered by the child safety seat law throughout the entire period, and their rate increased substantially through 1991; the drop in 1992 was small (3 points). For the entire 1987-1992 period, the infant use rate was much higher than for pre-adults and adults, ranging from 12 (1987) to 68 (1991) points for pre-adults and from 30 (1987) to 83 (1991) points for adults. During these 6 years, use rates by infants were relatively very high and those for pre-adults and adults were relatively low.



* Data not collected after 1992.

Figure 9. Statewide Rear Seat Belt Use by Occupant Age: 1987-1992

DISCUSSION

It is very apparent that after enactment and implementation of the child safety seat law in 1983 and the MUL in 1988, the increase in safety restraint use was substantial and significant.

Although this analysis could not factor out the individual influences of various public information and education campaigns, enforcement activities on the part of the state and localities, or the engineering changes (e.g., air bags and/or passive restraints) to vehicles, the data show that the combined influences of these factors were modest in comparison to the changes elicited by legislation.

Although other states (e.g., North Carolina and California) have had some success with massive enforcement efforts to increase safety belt use, Virginia must carefully consider whether the costs for similar enforcement efforts would result in a cost-efficient payback to the state.

Other states have also enacted primary enforcement safety belt use statutes (statutes that permit police officers to stop a driver solely for a safety belt violation). Previous research in Virginia has shown that a secondary enforcement statute applicable to rear seat occupants would result in the same overall statewide increase in belt use as would a primary enforcement statute applicable to front seat occupants.¹⁹ This is true because of the large difference in current front and rear seat use rates. The belt use data also show that rates of use in Virginia were similar to (and in some cases superior to) the rates of use in primary enforcement statute states.²⁰

SUMMARY OF FINDINGS

- Since 1983, the effective date of the Virginia child safety seat law, the percentage of infants in safety seats was greater than the percentage of pre-adults and adults using safety belts.
- Since 1988, the effective date of the MUL, there was a wide discrepancy in the use of safety belts by vehicle occupants. The rates for front seat occupants were much higher than those for rear seat occupants each year.
- After the effective date of the MUL, the use of safety belts by rear seat occupants declined.
- The use of safety belts was greater in metropolitan areas of the state.
- The use of child safety seats peaked in 1991.
- The use of safety belts by pre-adults and adults was highest in 1992, the last year these data were collected.

CONCLUSIONS

- Both the child safety seat law and the MUL were effective in increasing the use of child safety seats and safety belts throughout the Commonwealth.
- The substantial and significant difference between the safety belt use rates for front seat and rear seat occupants is attributable to the MUL.
- Public information and education programs, enforcement activities, and engineering changes to vehicles all had a minimal effect in increasing use of safety belts in Virginia.

RECOMMENDATION

Because of the effectiveness of the child safety seat law and the MUL in increasing safety belt use, Virginia should enact a secondary enforcement statute requiring rear seat occupants to use safety belts.

ACKNOWLEDGMENTS

Twenty-six persons served as data collectors for the 13 years of research reported herein, too many to acknowledge by name, but without their effort this project would not have been possible. Aaron Zdinak is acknowledged for compiling the data from the yearly reports into the format used in this report. Scott Eaton is thanked for his efforts in preparing the nine figures. The staff of the Virginia Transportation Research Council's Media Center are thanked for their editorial, graphic, printing, and distribution efforts. The author also thanks those who reviewed the draft report and made suggestions for improvement, who include colleagues at the Research Council and the Traffic Safety Administration of the DMV. Special thanks go to Ann McDaniel, who prepared the various drafts of the report, put the tables in proper format, and ensured that the author followed all of the rules concerning the organization of report preparation.

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APPENDIX

ANNUAL SAFETY BELT AND CHILD SEAT USAGE DATA

Table A-1. Safety Belt Survey Data Elements
1983-1994

	83	84	85	86	87	88	89	90	91	June 92	Sept 92	93	94	95
Belt Type														
Lap Only	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Lap/Shoulder	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Shoulder Only														
Seat Position														
Front	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Rear	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Belt Use														
Yes	x	x	x	x	x	x	x	x	x	x	x	x	x	x
No	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Child Seats Only														
Correct	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Incorrect	x	x	x	x	x	x	x	x	x	x	x	x	x	x
All Occupants														
Correct														
Incorrect														
Occupant Age														
0-3	x	x	x	x	x	x	x	x	x	x	x	x	x	x
4-16	x	x	x	x	x	x	x	x	x	x	x	x	x	x
17-30	x	x	x	x	x	x	x	x	x	x	x	x	x	x
31-60	x	x	x	x	x	x	x	x	x	x	x	x	x	x
61-Over	x	x	x	x	x	x	x	x	x	x	x	x	x	x
17-Over														
Location														
Metropolitan	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Towns														
Mid-size City														
Urban														
Rural														
Statewide														
Sex														
Male	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Female	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Ethnic Group														
Vehicle Age	x	x	x	x	x	x	x	x	x	x	x	x	x	x

**Table A-2. Belt Use in Metropolitan Areas by Seat Position (%)
1983-1995**

Year	Front Seats	Rear Seats
1977	14.7	3.4
1983 ^a	16.4	23.6
1984	19.4	24.1
1985	27.5	27.4
1986	34.8	37.2
1987	39.5	35.1
1988 ^b	66.8	38.1
1989	58.9	31.4
1990	60.7	29.1
1991	67.3	35.5
1992	68.1	38.2
1993	73.1	N/A ^c
1994	73.7	N/A
1995	69.0	N/A

^aJanuary 1, 1983 - Effective date of child seat law.

^bJanuary 1, 1988 - Effective date of MUL; applicable to front seat occupants.

^cNot available.

**Table A-3. Front Seat Belt Use in Metropolitan Areas by Age (%)
1983-1995**

Year	Infant	Pre-Adult	Adult
1977	29.7	7.6	15.0
1983 ^a	66.0	21.8	15.8
1984	78.6	19.9	19.2
1985	76.4	30.2	27.0
1986	75.0	38.7	34.4
1987	58.8	37.3	32.9
1988 ^b	67.0	58.3	63.6
1989	82.3	46.9	55.9
1990	85.7	56.4	60.4
1991	92.6	57.2	67.5
1992	84.1	68.6	67.9
1993	57.6	N/A ^c	N/A
1994	62.0	N/A	N/A
1995	N/A	N/A	N/A

^aJanuary 1, 1983 - Effective date of child seat law.

^bJanuary 1, 1988 - Effective date of MUL; applicable to front seat occupants.

^cNot available.

**Table A-4. Rear Seat Belt Use in Metropolitan Areas by Age (%)
1983-1995**

Year	Infant	Pre-Adult	Adult
1977	10.2	1.8	2.4
1983 ^a	66.8	15.7	3.2
1984	66.7	20.8	5.6
1985	64.4	21.7	8.0
1986	68.0	32.6	17.3
1987	40.3	30.7	11.5
1988 ^b	64.5	33.9	10.2
1989	68.3	25.0	12.2
1990	81.3	23.9	17.8
1991	96.8	30.7	14.8
1992	93.7	38.9	15.8
1993	69.3	N/A ^c	N/A
1994	79.5	N/A	N/A
1995	N/A	N/A	N/A

^aJanuary 1, 1983 - Effective date of child seat law.

^bJanuary 1, 1988 - Effective date of MUL; applicable to front seat occupants.

^cNot available.

**Table A-5. Belt Use in Non-Metropolitan Areas by Seat Position (%)
1987-1995**

Year	Front Seats	Rear Seats
1987	19.8	27.6
1988 ^a	54.0	22.7
1989	47.1	20.9
1990	47.0	20.1
1991	58.0	30.1
1992	58.1	30.8
1993	58.8	N/A ^b
1994	63.9	N/A
1995	55.6	N/A

^aJanuary 1, 1988 - Effective date of MUL; applicable to front seat occupants.

^bNot available.

**Table A-6. Front Seat Belt Use in Non-Metropolitan Areas by Age (%)
1987-1995**

Year	Infant	Pre-Adult	Adult
1987	65.0	18.4	19.5
1988 ^a	47.6	49.5	54.2
1989	81.0	41.8	47.2
1990	100.0	41.4	47.2
1991	84.0	44.4	58.6
1992	65.3	56.4	58.2
1993	N/A ^b	N/A	N/A
1994	N/A	N/A	N/A
1995	N/A	N/A	N/A

^aJanuary 1, 1988 - Effective date of MUL; applicable to front seat occupants.

^bNot available.

**Table A-7. Rear Seat Belt Use in Non-Metropolitan Areas by Age (%)
1987-1995**

Year	Infant	Pre-Adult	Adult
1987	40.2	20.6	6.8
1988 ^a	31.0	17.6	5.0
1989	51.5	14.9	9.2
1990	67.4	17.0	4.0
1991	95.5	22.9	10.2
1992	91.6	28.3	10.5
1993	N/A ^b	N/A	N/A
1994	N/A	N/A	N/A
1995	N/A	N/A	N/A

^aJanuary 1, 1988 - Effective date of MUL; applicable to front seat occupants.

^bNot available.

Table A-8 Statewide Belt Use by Seat Position (%)
1987-1995

Year	Front Seats	Rear Seats
1987	33.4	33.0
1988 ^a	63.4	34.1
1989	55.7	28.1
1990	57.2	26.5
1991	64.5	33.9
1992	65.1	36.7
1993	70.9	N/A ^b
1994	72.3	N/A
1995	67.2	N/A

^aJanuary 1, 1988 - Effective date of MUL; applicable to front seat occupants.

^bNot available.

**Table A-9. Statewide Front Seat Belt Use by Age (%)
1987-1994**

Year	Infant	Pre-Adult	Adult
1987	64.3	31.1	36.3
1988 ^a	63.3	69.6	61.7
1989	82.5	45.4	54.0
1990	88.2	50.9	57.3
1991	89.6	52.9	64.8
1992	79.0	64.8	65.0
1993	N/A ^b	N/A	N/A
1994	N/A	N/A	N/A
1995	N/A	N/A	N/A

^aJanuary 1, 1988 - Effective date of MUL; applicable to front seat occupants.

^bNot available.

**Table A-10. Statewide Rear Seat Belt Use by Age (%)
1987-1995**

Year	Infant	Pre-Adult	Adult
1987	40.3	27.7	10.7
1988 ^a	54.9	28.4	9.0
1989	64.2	21.3	11.5
1990	77.7	21.8	10.1
1991	96.4	28.3	13.4
1992	93.2	36.0	14.3
1993	N/A ^b	N/A	N/A
1994	N/A	N/A	N/A
1995	N/A	N/A	N/A

^aJanuary 1, 1988 - Effective date of MUL; applicable to front seat occupants.

^bNot available.