TECHNICAL ASSISTANCE REPORT

THE USE OF SAFETY RESTRAINT SYSTEMS IN VIRGINIA BY OCCUPANTS UNDER 16 YEARS OF AGE

SUMMER 1998

PB99-145286

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Standard Title Page – Report on State Project

Report No.	Report Date	No. Pages	Type Report:	Project No.:
VTRC 99-TAR7	March 1999	57	Technical Assistance Report Period Covered: N/A	021564 Contract No.

Title and Subtitle:
The Use of Safety Restraint Systems in Virginia by Occupants Under 16 Years of Age: Summer 1998

Key words:
Observational survey
Child seats
Safety belts
Use rates

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Supplementary Notes

Abstract:

This series of observational surveys to determine child safety seat use in Virginia began in 1993 at the request of officials of Virginia's Department of Motor Vehicles. During all 5 years (there was no survey in 1995), data for metropolitan areas were collected at the same locations, at the same time of day and day of week, and in accordance with the same criteria for determining use. In 1997, data collection was added for safety restraint use by occupants 4 to 16 years of age at the request of officials of the Virginia Department of Health (VDH), which is now responsible for the state's child safety seat program. In addition, VDH requested that sites be added in communities with a population between 50,000 and 100,000 (mid-size cities), so 7 sites were added.

The 1998 data show that the proportion of children riding in the front seats has shifted. For metropolitan area occupants under 4 years of age, the proportion of front seat occupants was 19.6% in 1997 and 7.3% in 1998 ($p < .01$). In the mid-size cities, there was no significant difference between the 2 years, 14.8% to 15.1%. For metropolitan area occupants between 4 and 16 years of age, the proportions were 47.8% in 1997 and 30.7% in 1998 ($p < .01$), and in the mid-size cities the proportions were 46.5% in 1997 and 29.4% in 1998 ($p < .01$). A shift in the riding position in the vehicles could result in highway safety benefits to child occupants.

When the 1998 child safety seat use rate data for all 41 sites (34 metropolitan and 7 mid-size city) were combined, correct use was 55.3%, incorrect use was 18.9%, and non-use was 25.8%. For 1997, correct use was 52.6%, incorrect use was 17.0%, and non-use was 30.4%.

The 1998 safety restraint use rates for all 41 sites for all occupants between 4 and 16 years of age were 47.6% (correct), 15.2% (incorrect), and 37.2% (non-use). In 1997, correct use was 42.2%, incorrect use was 4.2%, and non-use was 53.5%.

When the 1998 child safety seat use rate patterns in the metropolitan areas were compared with those in 1997 and 1993, it was found that the non-use rates in 1998 were lower, but the shift did not reach statistical significance at the 5% level. When the 1998 child safety seat use rate patterns for the mid-size cities and for all 41 sites combined were compared with those from 1997, it was found that the non-use rates were lower in 1998, but the shift did not reach statistical significance at the 5% level.

When the 1998 safety restraint use rate patterns of occupants between 4 and 16 years of age were compared with those for 1997 on the basis of metropolitan area, mid-size city, and all sites combined, it was found that in each case there was a statistically significant ($p < .01$) change in the use rate patterns primarily accounted for by a drop in the non-use rate.

The results of the 1998 survey provide three major findings: (1) between 1997 and 1998, there has been a shift toward larger proportions of occupants in the rear seats, (2) there was a small decline in the child safety seat non-use rates between the 2 years, and (3) there was a large decline in the non-use of safety restraints by 4- to 16-year-old occupants.

The results indicate that the cumulative effects of various activities of the public and private sectors to inform the public that children are safer in the rear seats has had a positive impact on riding position. In addition, the action by the General Assembly requiring mandatory restraint use by occupants 4 to 16 years of age led to increased restraint use by this age group.

It is recommended that the state and local governments continue with their efforts to increase safety restraint use, including enforcement and public information and education, especially in areas identified as having high non-use rates.

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(The opinions, findings, and conclusions expressed in this report are those of the author and not necessarily those of the sponsoring agencies.)

Virginia Transportation Research Council
(A Cooperative Organization Sponsored Jointly by the Virginia Department of Transportation and the University of Virginia)

Charlottesville, Virginia

March 1999
VTRC 99-TAR7

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EXECUTIVE SUMMARY

The Virginia Transportation Research Council has tracked the use of child safety restraint systems since 1983. Surveys have been conducted annually, with the exception of 1995, to measure the frequency of use and to make the findings available to state safety officials. The surveys have varied in detail and scope, but the principal goal has always been to estimate compliance with the relevant statutes. The surveys from 1983 through 1996 were conducted at the request of officials of Virginia's Department of Motor Vehicles. With the transfer of responsibility for the state's child safety seat program to the Virginia Department of Health (VDH) in 1997, that agency requested that the surveys be continued.

In 1998, child safety seat use data for the four metropolitan areas of the state (northern, eastern, central, and western) were collected at the same sites, on the same day of the week, and the same hour of day as in previous years. The same criteria for determining correct, incorrect, and no use were used for all surveys since 1993. In response to a request from VDH officials, the number of sites was increased in 1997 to include three localities with a population between 50,000 and 100,000, referred to as mid-size cities. In addition, VDH officials requested that data be collected on safety belt use by occupants 4 to 16 years of age. This request was made because of changes to §§ 46.2-1094 and 46.2-1095 of the *Code of Virginia,* which required these rear seat occupants to use safety restraints.

During 1998, data were collected by two persons at 34 metropolitan area sites and 7 mid-size city sites for 1.5 hours at each site. Observations were made of 472 occupants under 4 years of age for child safety seat use (41 in the front and 431 in the rear seats) and safety restraint use by 1,395 occupants 4 to 16 years of age (970 in the rear and 425 in the front seats).

Because of budgetary considerations, statewide use was not surveyed. This survey does, however, provide snapshots of child restraint system usage in four of the state's most urbanized areas and in three of its mid-size cities. Taken together, they give safety program administrators and public officials a good idea of how well citizens of the Commonwealth are observing the state's laws and whether changes occur over time.

The 1997 and 1998 observational data were compared on the basis of a number of characteristics. One with specific safety implications concerns front seat occupants. Between the 2 years, the proportion of occupants under age 4 in the front seats of vehicles observed in the metropolitan areas declined from 19.6% to 7.3% ($p < .01$). There was no practical or statistical change in the mid-size cities (14.8% in 1997 and 15.1% in 1998). There was a change in the metropolitan areas and mid-size cities for occupants 4 to 16 years of age. In the metropolitan areas, the proportion of front seat occupants declined from 47.8% to 30.7% ($p < .01$), and in the mid-size cities the decline was from 46.5% to 29.4% ($p < .01$). With fewer children riding in the front seats, deaths and injuries could be reduced.

Throughout this report, the reader should be aware that the rates of reported *correct* use are likely to be overestimated, because with an in-traffic survey, the lap/shoulder belt holding the child seat in place cannot be checked for proper tension, a factor identified by other researchers as resulting in a high rate of incorrect use.

Use Rates by Occupants Under 4 Years of Age

In 1997, when the child safety seat use rate data for all occupants under 4 years of age from all metropolitan area sites were combined, correct use was 54.1%, incorrect use was 17.4%, and non-use was 28.5% (see Figure ES-1). In 1998, correct use was 54.9%, incorrect use was 19.7%, and non-use was 25.4%, rates that were of no practical difference from the previous year's and did not reach a statistical difference at the 5% level. In 1993, correct use was 48.9%, incorrect use was 17.5%, and non-use was 33.6%. The 8-point shift from non-use to correct and incorrect use between 1993 and 1998 also did not reach statistical significance at the 5% level. Although there has been some modest improvement in the child safety seat use rate patterns in the metropolitan areas between 1993 and 1998 and 1997 and 1998, this shift in use rates could have occurred by chance. In addition, the 1998 metropolitan area use rate data show that child safety seat use in the rear seats was better than that for the front seats; correct use was higher (56% vs. 43%), incorrect use was lower (19% vs. 25%), and non-use was lower (25% vs. 32%) in the rear seats.

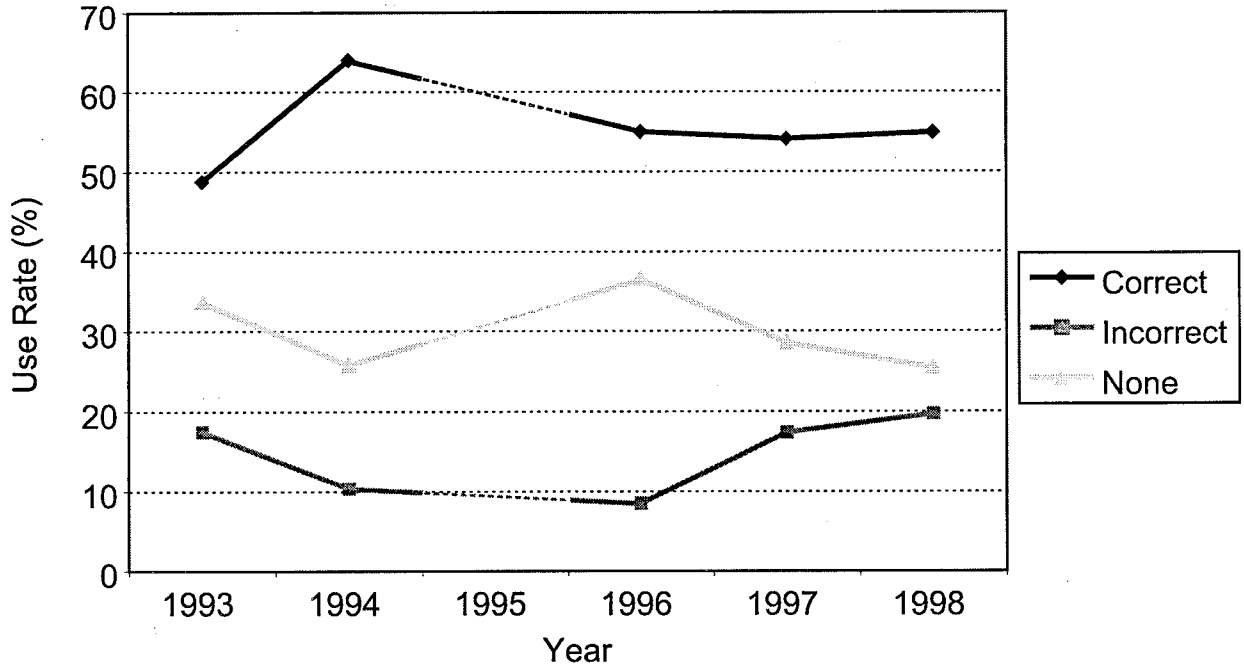

Figure ES-1. Trend in child safety seat use in the metropolitan areas for all vehicle occupants.

In 1997, when the child safety seat use rate data for all occupants under 4 years of age from all mid-size city sites were combined, correct use was 43.2%, incorrect use was 14.8%, and non-use was 42.0%. In 1998, correct use was 57.0%, incorrect use was 15.1%, and non-use was 27.9%. Although there was a 14-point shift from non-use to correct use between 1997 and 1998, this difference did not reach significance at the 5% level, primarily because of the small number of observations.

In 1997, when the child safety seat use rate data for all occupants under 4 years of age from the metropolitan areas and mid-size cities were combined, correct use was 52.6%, incorrect

use was 17.0%, and non-use was 30.4%. In 1998, correct use was 55.3%, incorrect use was 18.9%, and non-use was 25.8% (see Figure ES-2). This 5-point shift from non-use to correct and incorrect use did not reach statistical significance at the 5% level.

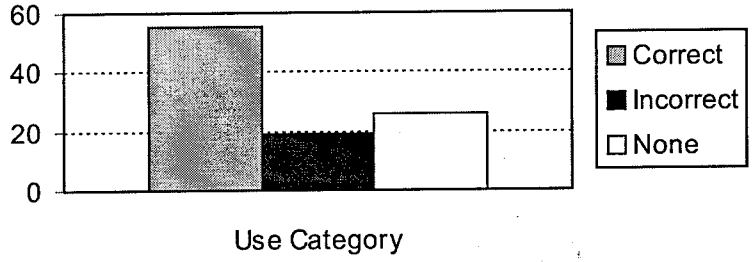

Figure ES-2. Child safety seat use in 1998 for all occupants and all sites combined.

The 1998 use rate data show that there was considerable variability among the four metropolitan areas of the state in the use of child safety seats (see Figure ES-3). The western area had the highest correct use and the lowest incorrect and non-use. The northern area had the lowest correct use and the highest incorrect use. The eastern area had the highest non-use. Correct use in 1998 ranged from 75.6% (western) to 49.2% (northern), incorrect use varied from 28.1% (northern) to 9.8% (western), and non-use varied from 33.1% (eastern) to 14.6% (western).

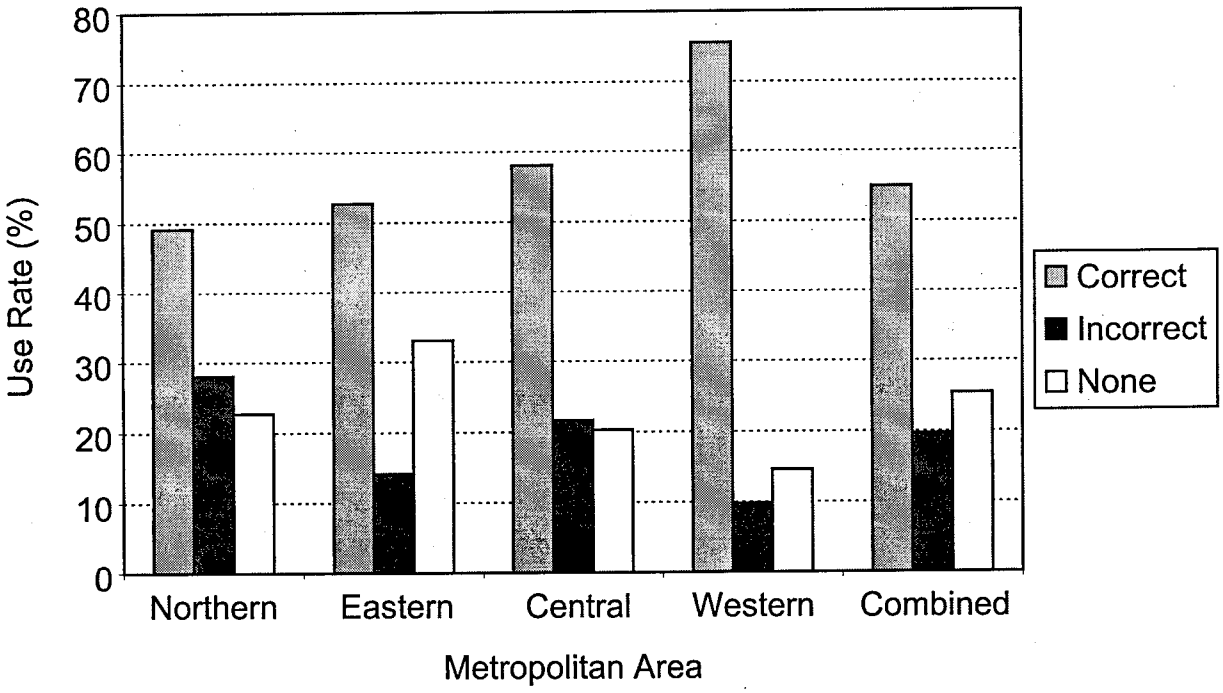

Figure ES-3. 1998 child safety seat use in the metropolitan areas for all vehicle occupants.

For the mid-size cities, in 1997 and 1998, Charlottesville had the highest correct use and the lowest incorrect and non-use, and Danville had the lowest correct use and the highest non-use. The use rate data show that between 1997 and 1998, there was an increase in correct use in Danville and Charlottesville and a decrease in non-use in all three localities. More than one half of all occupants under age 4 observed in Danville were not in a child safety seat and fewer than one third were correctly restrained. The data also show that non-use was greater in the front seats, although far fewer occupants rode in these seat positions.

Use Rates by Occupants Between 4 and 16 Years of Age

In 1997, when the safety restraint use rate data by all occupants between 4 and 16 years of age for all metropolitan area sites were combined, correct use was 44.7%, incorrect use was 4.5%, and non-use was 50.8%. In 1998, correct use was 49.0%, incorrect use was 14.3%, and non-use was 36.7%. This 14-point shift from non-use to correct and incorrect use reached significance at the 1% level.

In 1997, when the safety restraint use rate data for all occupants between 4 and 16 years of age for all mid-size city sites were combined, correct use was 31.9%, incorrect use was 3.4%, and non-use was 64.7%. In 1998, correct use was 42.2%, incorrect use was 18.7%, and non-use was 39.1%. This shift of more than 25 points from non-use to correct and incorrect use reached significance at the 1% level.

In 1997, when the safety restraint use rate data for all occupants between 4 and 16 years of age for all the metropolitan area and mid-size city sites were combined, correct use was 42.2%, incorrect use was 4.2%, and non-use was 53.5%. In 1998, combined correct use was 47.6%, incorrect use was 15.2%, and non-use was 37.2% (see Figure ES-4). This 16-point shift from non-use to incorrect and correct use reached statistical significance at the 1% level.

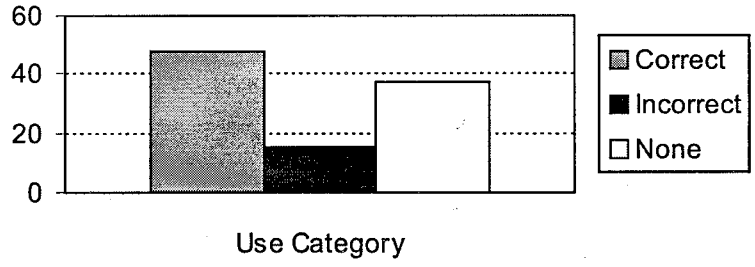

Figure ES-4. Safety restraint use by all occupants 4 to 16 years of age for all sites combined.

In 1998, compliance with §§ 46.2-1094 and 46.2-1095 was better in three of the four metropolitan areas (northern, eastern, and western) and better overall than in 1997. In the central area, nearly one half of the occupants between 4 and 16 were *not* buckled up. In the other three areas, only one third were not buckled up. When the front and rear seat rates were compared, there was a larger percentage of unbuckled occupants in the rear seats in all four areas both years, but the 1998 rates of non-use were lower than those in 1997. The data show that there has been an improvement over the 2 years in the rates of safety restraint use in the metropolitan areas

areas, only one third were not buckled up. When the front and rear seat rates were compared, there was a larger percentage of unbuckled occupants in the rear seats in all four areas both years, but the 1998 rates of non-use were lower than those in 1997. The data show that there has been an improvement over the 2 years in the rates of safety restraint use in the metropolitan areas by occupants 4 to 16 years of age. The data also show that there is considerable violation of the statues in all four areas, with between one third and one half of all occupants observed being unbelted.

Compliance with the statutes requiring occupants between 4 and 16 years of age to be buckled up was better in 1998 than in 1997 in all three mid-size cities. In 1997, the rates of unbuckled occupants varied from 52% to 85%, and in 1998, the rates varied from 32% to 57%, with Charlottesville having the lowest non-use rate both years and Danville having the highest. The data also show that non-use was higher in the rear seats than in the front seats in all three localities both years, but the gap in rates was much smaller in 1998. Overall, over the 2 years, safety restraint use by occupants 4 to 16 years of age has improved in the mid-size cities.

The results of the 1998 survey provide three major findings: (1) a greater proportion of children are riding in the rear seats in 1998 than in 1997; (2) there was a small but non-significant shift in the child safety seat use rate patterns between 1997 and 1998 and between 1993 and 1998, primarily accounted for by a drop in the non-use rates; and (3) there was a large and statistically significant shift in the safety restraint use rate patterns by occupants 4 to 16 years of age between 1997 and 1998, primarily accounted for by a decline in the non-use rates.

The results indicate that the cumulative effects of various activities of the public and private sectors to inform the public that children are safer in the rear seats has had a positive impact on riding position. In addition, the action by the General Assembly requiring mandatory restraint use by occupants 4 to 16 years of age led to increased restraint use by this age group.

It is recommended that the state continue with its efforts to increase safety restraint use, including ongoing public information and education efforts coupled with a comprehensive enforcement activity in all areas of the state, but especially in areas of lower use rates such as the central metropolitan area and Danville.

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INTRODUCTION

With the passage of the child safety seat law in 1982 (effective date, January 1, 1983) requiring safety seat use by children under age 4, officials of Virginia's Department of Motor Vehicles (DMV) requested that data be collected on the use of child safety seats. A child safety seat survey was conducted in March 1983, and additional surveys were conducted in June and October 1983. Child safety seats use data have been collected at least annually since then, with the exception of 1995.

Over the years, the number of data collection sites was increased to make the data more representative of statewide use. During the 1983-1986 period, only 27 urban sites were surveyed. In 1987, 9 sites were added in communities with a population less than 15,000. In 1990, 7 sites were added in the urban areas, and in 1991, 7 sites were added in cities with a population between 50,000 and 100,000. By 1991, there were 50 sites, and the number of sites in each area was based on the proportion of the state population that lived in the area surveyed. In 1993, when statewide safety belt data collection was initiated in response to § 153 of the Intermodal Surface Transportation Efficiency Act, child safety seat data were collected only at the 34 metropolitan sites.

In 1993, 1994, and 1996, the DMV's Transportation Safety Administration (now Transportation Safety Services) requested that child safety seat use data be collected using the same procedures, locations, time of day, and day of week each year. In 1997, the child safety seat program was transferred to the Virginia Department of Health's (VDH) Child Transportation Safety Program. This agency requested that the survey be continued and in the same manner as for previous years. In addition, they requested that data on the use of seat belts by occupants 4 to 16 years of age be collected. A new primary enforcement law requiring that rear seat occupants in this age group be buckled up became effective July 1, 1997 (see Appendix A for a copy of the bill). VDH also requested that, if time allowed, data be collected in areas of the state with a population between 50,000 and 100,000; data were collected in three such areas.

Every year, the in-traffic, direct observation method was used to collect the data. In-traffic surveys do not allow observers to enter vehicles to check for installation characteristics. Only non-use and misuse obvious from outside the vehicle can be determined. Thus, incorrect use is likely to be underestimated (and correct use overestimated) because the lap/shoulder belt holding the child seat in place cannot be checked for proper tension. Other researchers[1-4] have found that a large proportion of child safety seats are installed with the safety belt at the incorrect tension.

As part of its training program on installing a child safety seat, the Transportation Safety Training Center at Virginia Commonwealth University conducted a number of surveys between 1988 and 1992 at shopping centers and day care centers where trainees entered the automobile to check the child seat. In addition, the Community Traffic Safety Program in DMV District Five (Tidewater) sponsored a number of safety seat checks in the early 1990s in which the automobile was entered. Because the child safety seats were checked only for persons/drivers who volunteered, these surveys were not representative of the general population of the state or of the area in which they were conducted. While acknowledging the biases in the data, both groups found an extremely high rate of misuse, with the most common (modal) rate being 88% and the misuse rate ranging from 75% to 94% (unpublished data). A loose lap/shoulder belt holding the child seat in position was the major reason for the misuse determination.

Decina and Knoebel[5] also found a number of misuse problems during their 1995 four-state survey of child safety seats. For children under age 4 (the same age used in Virginia), they found that of the nearly 72% in a child safety seat, just over 80% of the seats were misused. The four main misuse/no use factors involved the locking clip, chest (retainer) clip, harness strap, and vehicle safety belt.

In a 1996 study funded by the National Highway Traffic Safety Administration, child restraint use was observed at 2,006 randomly selected sites nationwide.[6] No attempt was made to measure safety seat misuse. In this study, 61.2% of the persons under age 5 and 64.6% of the youths 5 to 15 years of age were restrained. For those under age 5, child safety seat use was considerably lower in the rural areas (35.6%) than in the cities (68.9%).

In the last 2 years, the position of the child in the vehicle (whether in the front or rear seat) has become a safety issue of extreme concern. Under certain circumstances, a child can be severely injured or killed in a low speed crash when an air bag is deployed. A study recently published by the Harvard School of Public Health reported on a child's seat position in selected U.S. and European cities. It was found that children living in the two U.S. cities (Boston and New Orleans) were more than twice (25% vs. 12%) as likely to ride in the front seats of vehicles as were the children in the three European cities (Paris, Frankfort, and Brussels).[7] Although the authors did not claim that these cities were representative of the country of which they are a part, they did conclude that statute and social norms affect seat position.

In April 1997, Virginia initiated its Smart, Safe & Sober program (SS&S), a public/private partnership dedicated to supporting aggressive enforcement of Virginia's traffic and occupant protection laws while educating the public about the dangers associated with various highway safety issues. The SS&S program was initially funded by a grant from the Air

Bag and Seat Belt Safety Campaign, a consortium of private enterprise groups including the automobile and insurance industries. Some of the major players in this program are the Virginia DMV, the Virginia State Police, the Chiefs of Police and Sheriffs Associations, and Drive Smart Virginia. Drive Smart Virginia is partially funded by the insurance, automobile, and trucking industries, and they provide education and information for state and local elected officials, state and local agency staff, and the general public, and they serve as a clearinghouse for a wide variety of public information and education efforts.

The DMV makes grants available to local police agencies to carry out special enforcement activities that target one of the four identified traffic safety issues, occupant protection being one of these. Most localities throughout the state are participating in the SS&S program. In addition, a public relations firm has been engaged to prepare various media messages for use by local agencies and to track print and electronic media coverage. Also, five law enforcement specialists have been hired to work with local police agencies and the DMV field representatives to set up special local enforcement activities and help localities qualify and apply for grants to fund their activities. The SS&S program publishes quarterly reports that detail their activities for each 3-month period, and these reports are available through the DMV.

PURPOSE AND SCOPE

The primary purpose of this project was to provide the 1998 update on the use of child safety seats and safety belts by occupants under 16 years of age in specific geographic areas of the Commonwealth to the VDH. A second significant purpose was to track use rates by age, locality, and seat position over time. To accomplish these two purposes, the following tasks were carried out:

1. Determine child safety seat use rates in the four major metropolitan areas and three selected mid-size cities in Virginia.

2. Determine restraint use rates by occupants 4 to 16 years of age in the same areas of the state surveyed for child safety seat use.

3. Compare current use rates with those from previous years.

The 1998 child safety seat survey is a continuation of a longitudinal study of correct, incorrect, and non-use use rates that began in 1993.

METHODS

For the metropolitan areas, data were collected at signalized intersections at 12 sites in the northern area (Fairfax County, Arlington, and Alexandria), 11 in the eastern area (Norfolk, Portsmouth, Virginia Beach, and Newport News), 7 in the central area (Richmond, Henrico, and

Chesterfield), and 4 in western area (Roanoke, Salem, and Vinton). For the mid-size cities, data were collected at 2 signalized sites in Charlottesville, 2 in Danville, and 3 in Lynchburg. The location of these sites is shown in Appendix Tables B-1 through B-4. The use of sites at shopping centers and day care centers was considered, but when a sample of these locations was checked at various times of day, either the traffic volume was inadequate or the traffic was not representative of the socioeconomic status of the community at large. Therefore, sites at shopping centers and day care centers were not used.

There were two persons on each survey team. Each was trained in how to collect data, how to identify the factors that constituted correct and incorrect use, and how to estimate whether a child was under age 4. Because this was an in-traffic survey, two indices were used to help determine whether the child was under age 4. The first came from previous versions of the *Code of Virginia* in which required child seat users were defined as weighing 40 lb (18.1 kg) or less. The second was developed as an aid to police officers, where a required child seat user was defined as being 40 in (1.02 m) tall or less. In this survey, if the child was judged to be under 40 in (1.02 m) tall, weigh less than 40 lb (18.1 kg), or both, he or she was assumed to be under age 4. When the observer was judging whether an occupant was 4 to 16 years of age, the lower age limit was defined by occupants who were in the child safety seat category, and the upper limit was defined by the apparent age of the driver; the full licensing age in Virginia is 16.

Data were collected for passenger cars, small sport utility vehicles (SUVs), and small vans in the curb travel lane, and no distinction was made between Virginia-licensed and out-of-state vehicles (the law makes no such distinction). The only vehicles excluded were some very large pickup trucks, very large SUVs, and vans with darkly tinted side glass because with these classes of vehicles, the observers could not see whether there was a child occupant or whether a child restraint device was being used. When a vehicle stopped for the red signal, the observers left the curb and approached the vehicle from the passenger side front fender. Each member of the survey team observed up to 15 vehicles per traffic light cycle, with the safety of the observer (staying clear of entrances to businesses) and traffic volume determining the number of vehicles surveyed. At some intersections, only five vehicles were observed because of the signal timing at the site. As required by state policy, each team member wore a hard hat and an orange safety vest.

Data were collected during four periods each day: 7:30 to 9:00 a.m., 10:30 a.m. to noon, 1:30 to 3:00 p.m., and 4:00 to 5:30 p.m.

In an effort to put occupants at ease, survey personnel carried a clipboard lettered on the back with the message "Child Safety Seat Survey." Upon seeing the message, many drivers lowered their window, responded, and allowed the observer to lean in the window to check usage. At no time did survey team members report that they felt threatened by motorists' comments or feel ill at ease to be in a survey location.

To distinguish persons in the two age groups, a "U" was used for those under age 4 and an "O" was used to identify those 4 to 16 years of age (see Figure 1). An "S" was used to show that the use data were for a child safety seat, and an "L" was used for data on regular lap/shoulder belts. Child seat use was recorded as correct (C), incorrect (I), or non-use (N).

Only those features easily identifiable from outside the vehicle were used to determine whether use was correct or incorrect. These features included that the arm bars/shields were used, that the seat harness was properly clipped between the legs of the child, that the seat was facing in the proper direction for the age of the child, that the lap/shoulder belt was routed through the child seat, and that the chest clip was in place. For a response to be recorded as correct, all features had to be used in the correct manner. Misuse or non-use of any one feature required that the use be recorded as incorrect. Non-use was recorded if there was a child under age 4 in the vehicle and no safety seat was present, a seat was present but was not being used, or a lap belt was being used in place of a safety seat. As previously stated, because of the nature of the survey procedures, correct use was likely to be overestimated, and the number/rate given in the various tables in this report should be considered the maximum level of correct use.

Safety restraint use for occupants between 4 and 16 years of age was also recorded as correct, incorrect, and non-use. Non-use was easy to determine. Incorrect use was defined as a shoulder belt obviously loose, behind the back, or under the arm. Correct use was recorded for all remaining occupants who did not fit in the two other classifications.

CHILD SAFETY SEAT SURVEY

Summer 1998

Area _____ Site _____ @ _____ Sheet # _____

Vehicle	Front Seats						Back Seats					
	Driver	Middle		Right			Left		Middle		Right	
		Belt	Use	Belt	Use		Belt	Use	Belt	Use	Belt	Use
1		U S O L	C I N	U S O L	C I N		U S O L	C I N	U S O L	C I N	U S O L	C I N
2		U S O L	C I N	U S O L	C I N		U S O L	C I N	U S O L	C I N	U S O L	C I N
3		U S O L	C I N	U S O L	C I N		U S O L	C I N	U S O L	C I N	U S O L	C I N
4		U S O L	C I N	U S O L	C I N		U S O L	C I N	U S O L	C I N	U S O L	C I N
5		U S O L	C I N	U S O L	C I N		U S O L	C I N	U S O L	C I N	U S O L	C I N
6		U S O L	C I N	U S O L	C I N		U S O L	C I N	U S O L	C I N	U S O L	C I N
7		U S O L	C I N	U S O L	C I N		U S O L	C I N	U S O L	C I N	U S O L	C I N
8		U S O L	C I N	U S O L	C I N		U S O L	C I N	U S O L	C I N	U S O L	C I N
9		U S O L	C I N	U S O L	C I N		U S O L	C I N	U S O L	C I N	U S O L	C I N
10		U S O L	C I N	U S O L	C I N		U S O L	C I N	U S O L	C I N	U S O L	C I N

I = Incorrect C = Correct N = Nonuse U = Under four S = Safety seat O= Over four L = Lap/Shoulder

Figure 1. Survey form.

RESULTS AND DISCUSSION

Appendix Tables B-1 through B-4 provide information on the number of occupants observed in 1998 at each of the 34 metropolitan and 7 mid-size city sites. For occupants under age 4, a total of 386 subjects were observed at the metropolitan sites and 86 at the mid-size city sites. For occupants 4 to 16 years of age, 1,106 were observed at the metropolitan sites and 289 at the mid-size city sites. Child safety seat use was recorded for 472 occupants, and safety restraint use was recorded for 1,395 occupants 4 to 16 years of age.

In the sections of this report that cover the child safety seat use rate data for the four metropolitan areas, the discussion *generally* follows a format of narrative on the results found in 1998, narrative comparing the 1998 and 1997 belt use rates, and narrative comparing the 1998 and 1993 (the first year of the statewide survey) belt use rates. In addition, the narrative discusses the belt use rates on the basis of all four metropolitan areas combined and for each metropolitan area individually when there are sufficient data for the narrative to be meaningful.

Readers who are familiar with the 1997 report on the results of the survey of child safety seat use will notice a slight difference in the format of the 1998 report. In 1997, the data were considered on the basis of front seat, rear seat, and total vehicle occupants. Because of the shift in the proportions of front and rear seat occupants between 1997 and 1998, with very few front seat occupants under age 4 in either the four metropolitan areas or three mid-size cities (see Appendix Tables B-1 and B-2), the number of occupants for the rear seats and for the total vehicle are essentially the same. Because the numbers are so similar, the 1998 child safety seat narrative does not discuss the data on the basis of total vehicle occupants.

A preliminary review of the belt use rates for all years data were collected did not show any consistent trends across time for geographic area or seat position; therefore, narrative comparing results between 1998 and each other year, or between any two sets of years, is not provided. For any readers who might be interested in the use rates for previous years and who would like to make their own comparisons, the data for years prior to 1998 are provided in Appendix Tables C-5, C-6, C-7, and C-8.

A test of statistical significance was used to show if the difference between any two sets of data was likely to have occurred by chance at some predetermined level of acceptance. The two levels commonly chosen are a chance of 1 in 20 (5%) and a chance of 1 in 100 (1%). It is always possible that larger sample sizes could detect a difference smaller than 1 in 100. For this report, any level above 1 in 20 is referred to as not significant. At the 1% level, it is very likely (99 out of 100) that the differences are real and did not occur by chance. The chi-square statistic was chosen to test whether the differences between the use rates in 1997 and 1998 and 1993 and 1998 were not due to chance. To perform the computations, there must be at least five observations in each category of events. When there are fewer than five, categories of events can be grouped. Most of the tests for this report were 2 x 3 chi squares; 2 years and three categories of events (correct, incorrect, and none) with more than five observations in each category (see Appendixes D, E, and F).

Child Safety Seat Use in Metropolitan Areas

Front Seat Use

Between 1997 and 1998, there was a major change in the percentages of occupants under age 4 riding in the front seats of vehicles traveling in the metropolitan areas. In 1997, 19.6% of those observed were in the front seats, whereas in 1998, only 7.3% of those observed were in the front seats ($p < .01$). The 1998 rate was considerably lower than those for Boston (25.0%) and New Orleans (27.0%) and lower than those for Frankfort (10.0%), Brussels (12.4%), and Paris (16.0%).[7]

For the combined metropolitan areas in 1998, correct use was 42.9%, incorrect use was 25.0%, and non-use was 32.1% (see Table C-1). Usage rates varied considerably among the four metropolitan areas, but the number of occupants in three of the four was too low for differences between percentages to be meaningful: 3 in the northern area, 4 in the western area and 5 in the central area.

Between 1997 and 1998, for the combined metropolitan areas, there was a 5-point increase in both correct and incorrect use and a 10-point decrease in non-use (see Table D-1 and Figure 2). Although both correct and incorrect use was up and non-use was down, this change was not statistically significant at the 5% level. Between 1993 and 1998, there was also a 10-point decrease in non-use with an 8-point increase in incorrect use and a 2-point increase in correct use (see Table D-3 and Figure 2). This shift in use patterns also did not reach statistical significance at the 5% level.

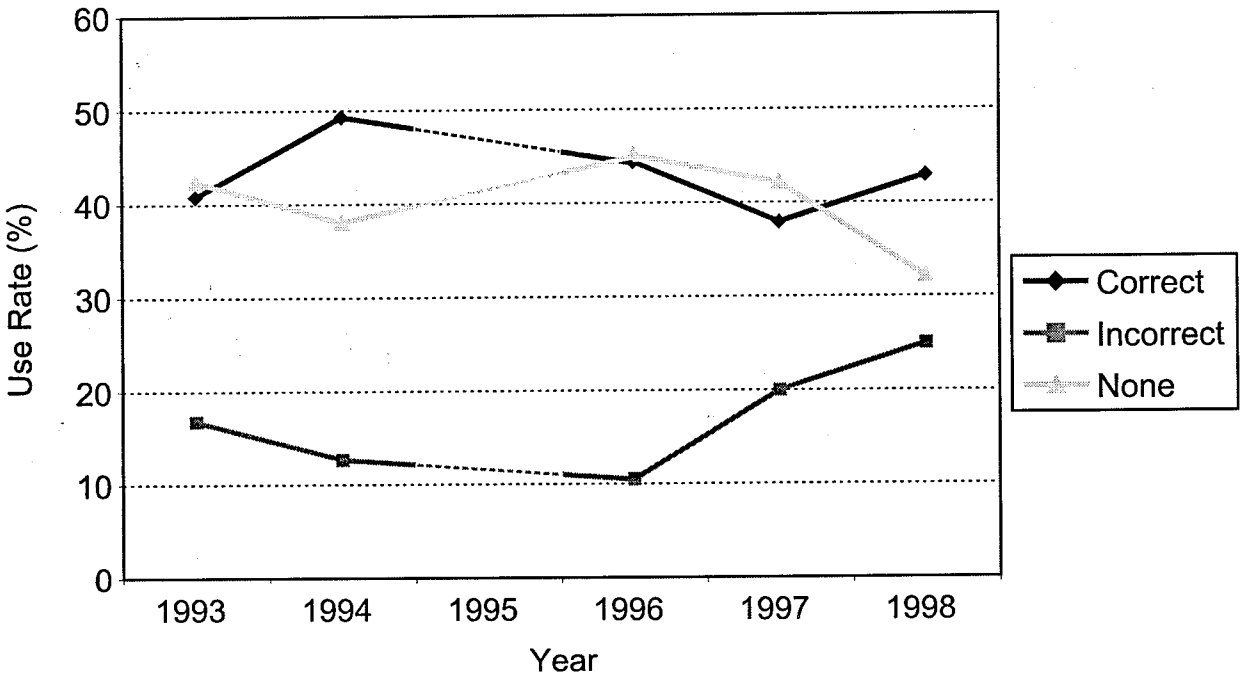

Figure 2. Trend in metropolitan area child safety seat use for front seat occupants.

In the last 3 years, there has been a large decline in the number of occupants under age 4 in the front seat. In the northern area, there were 50 occupants in 1996, but only 3 in 1998. In the eastern area, the numbers were 56 (1996) and 16 (1998); in the central area, they were 37 and 5; and in the western area, they were 19 and 4. Readers are referred to Appendices C for percentages of use by area and year but are cautioned that with the small numbers of observed occupants in the age group (under 4), the "percentages" are subject to wide variations with small deviations in actual "counts."

Rear Seat Use

When the 1998 child safety seat use data for all four metropolitan areas were combined, correct use was 55.9%, incorrect use was 19.3%, and non-use was 24.9% (see Table C-1). In considering the use rates for each metropolitan area, the rear seat use rates were similar to the total vehicle use rates (no rate varied by more than 4 points, and 8 of 12 differences were within 1 point) because nearly 93% of all occupants under age 4 who were observed were rear seat occupants. Correct use rates were 49.6% (northern), 53.0% (eastern), 60.9% (central), and 78.4% (western). Incorrect use was 10.8% (western), 13.6% (eastern), 18.8% (central), and 28.0% (northern). Non-use was highest in the eastern area (33.3%) and lowest in the western area (10.8%). Non-use rates in the northern (22.4%) and central areas (20.3%) were similar. Overall, in 1998, the western area had the best use rates and the eastern area the worst.

When the use rates from all four metropolitan areas were combined and the 1997 and 1998 rates were compared, there was nearly a 3-point rise in incorrect use coupled with just over a 2-point drop in correct use in 1998 (see Table D-2 and Figure 3). This change in rates was not significant at the 5% level. When the combined rates for 1993 were compared with those from 1998, non-use dropped by nearly 6 points, correct use rose over 4 points, and incorrect use was up nearly 2 points (see Table D-4). The 1993 to 1998 change also was not significant at the 5% level. Over time, the use rate data were mixed. The 1998 rates were slightly worse than those for 1997 but better than those for 1993, although the differences were not statistically significant.

The 1998 rear seat use rate data were also compared with those from 1997 and 1993 on the basis of the individual metropolitan area surveyed (see Table C-1, C-5, and C-8). In the northern area, between 1997 and 1998, correct use dropped by just over 11 points and incorrect use rose by over 10 points (see Table D-5), a change that was not significant at the 5% level. Between 1993 and 1998, the northern area non-use dropped by 12 points, incorrect use rose by just over 7 points, and correct use rose by nearly 5 points (see Table D-9). The 1993 to 1998 change did not reach significance at the 5% level. Although not statistically different, the 1998 northern area rates were better than those in 1993 but worse than those in 1997.

In the eastern area, between 1997 and 1998, non-use rose by over 6 points, correct use dropped by nearly 3 points, and incorrect use dropped by nearly 4 points (see Table D-6). This change in rates was not significant at the 5% level. Between 1993 and 1998, correct use dropped by 9 points, incorrect use rose by nearly 6 points, and non-use rose by 3 points (see Table D-10). The 1993 to 1998 change in rates was not significant at the 5% level. Although not statistically different, the 1998 eastern area rates were worse than those in both 1993 and 1997.

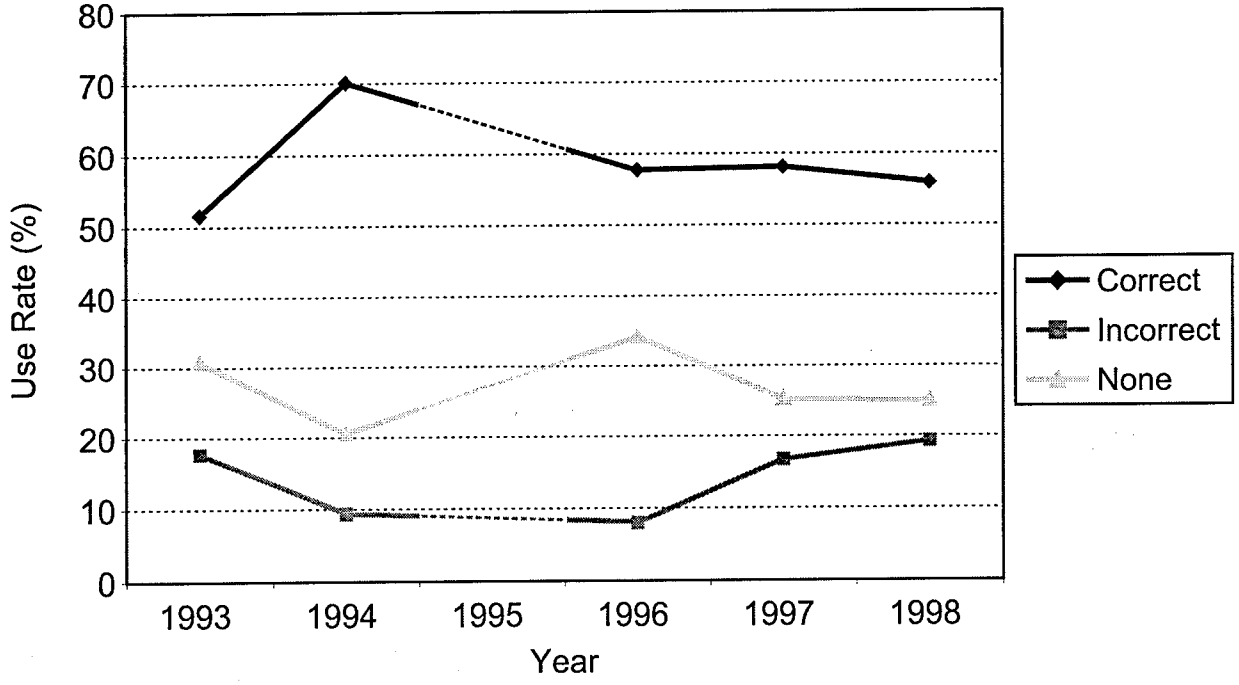

Figure 3. Trend in metropolitan area child safety seat use for rear seat occupants.

In the central area, between 1997 and 1998, non-use dropped by nearly 3 points, correct use dropped by 2 points, and incorrect use rose by over 4 points (see Table D-7). This change in rates was not significant at the 5% level. Between 1993 and 1998, non-use dropped by nearly 19 points and correct use rose by more than 16 points (see Table D-11). This change in rates did not reach significance at the 5% level. Although the comparison of the 1998 rates with those for 1993 and 1997 did not reach a statistically significant difference, the 1998 central area rates were slightly worse than those in 1997 but much better than those in 1993.

In the western area, between 1997 and 1998, correct use rose by over 33 points, non-use dropped by over 29 points, and incorrect use dropped by over 4 points (see Table D-8). This change was significant at the 5% level. Between 1993 and 1998, correct use rose by more than 26 points, non-use rose by 2 points, and incorrect use dropped by over 28 points (see Table D-12). This shift in use rates was significant at the 5% level. The 1998 western area use rates were statistically better than those in both 1993 and 1997.

Four findings are apparent from the data. First, in the last 2 years, the metropolitan area child safety seat non-use rate was relatively high: 24.9% in 1998 and 25.2% in 1997. Second, there was a small increase in the percentages of incorrect use between 1998 (19.3%) and 1997 (16.7%) and 1993 (17.7%). Third, correct use did not exceed 60% in the last 3 years and did so only once (1994) during all 5 years. Fourth, between 1997 and 1998, the rates of use show that the most improvement occurred in the western area and the greatest reversal was in the northern area.

Child Safety Seat Use in Mid-Size Cities

In 1998 in the mid-size cities, there were very few occupants in the front seats. In fact, the front seat data were sufficient only to compute the statistical test for one set of data: that involving the 1997 to 1998 shift in front and rear seat use rates, and this was a non-significant change.

Front Seat Use

In 1998, 13 children (15.1%) under age 4 were observed riding in the front seats, and in 1997, 12 children (14.8%) were in the front seats (see Table B-2). In 1998, 8 (61.5%) children were not using a child safety seat, 3 (23.1%) were correctly buckled up, and 2 (15.4%) were incorrectly buckled up (see Table C-2). Although statistical comparisons between localities and between years could not be calculated, non-use was the prevailing pattern. This finding of a high *rate* of non-use is critical in light of deaths and injuries to children caused by the passenger side air bag deploying in low-speed crashes.[8,9]

Rear Seat Use

In 1998, there were 73 occupants under age 4 in the rear seats; there were 69 in 1997. When the 1998 data from all three mid-size cities were combined, correct use was 63.0%, incorrect use was 15.1%, and non-use was 21.9% (see Table C-2). For 1998, Charlottesville had the highest correct use rate at 85.0%, followed by Lynchburg (41.2%) and Danville (31.3%). Incorrect use was 41.2% in Lynchburg, 12.5% in Danville, and 5.0% in Charlottesville. Non-use was 56.3% in Danville, 17.6% in Lynchburg, and 10.0% in Charlottesville. The relative order of correct, incorrect, and non-use in 1998 was the same as that in 1997, with Charlottesville having the best rates and Danville the worst.

The number of observations of rear seat occupants were too few to compute whether a statistical difference occurred between 1997 and 1998 when the data were considered on an individual community basis. There was, however, a large enough sample when all of the rear seat occupants from all three areas were combined. Between 1997 and 1998, combined correct use increased by 18 points, non-use dropped by nearly 16 points, and incorrect use dropped by just over 2 points (see Table D-13). This change was not statistically significant at the 5% level. Between 1997 and 1998, in Charlottesville, correct use was up 31 points, non-use was down 21 points, and incorrect use was down 10 points. In Danville, correct use was up 2 points, non-use was up 3 points, and incorrect use was down 5 points. In Lynchburg, correct use was down 5 points, non-use was down 17 points, and incorrect use was up 22 points. As previously stated, a statistical difference in the rates for the 2 years could not be computed because of the small numbers, but the data show that there was an improvement in Charlottesville over the 2 years. It might be argued that Lynchburg also had an improvement in use rates, with a decline in non-use and an increase in incorrect use. Danville might be considered to have held its own over the 2 years, with a modest increase in correct use, a modest increase in non-use, and a drop in incorrect use.

Child Safety Seat Use for all Sites Combined

Although combining the 1998 data from the 34 metropolitan area sites (386 occupants) and the 7 mid-size city sites (86 occupants) does not produce a statewide rate, it does indicate overall child safety seat use in selected areas of Virginia. For the total vehicle, correct use was 55.3%, incorrect use was 18.9%, and non-use was 25.8% in 1998. The rates for 1997 were 52.6%, 17.0%, and 30.4%. Between the 2 years, correct use was up, incorrect use was up, and non-use was down, but this shift in rates was not significant at the 5% level. The 1998 combined rates were nearly the same as those for the metropolitan areas (54.9%, 19.7%, and 25.4%) and not much different from those for the mid-size cities (57.0%, 15.1%, and 27.9%). The differences between the rates of use in the metropolitan areas and mid-size cities were not as great in 1998 as they were in 1997.

During 1998, combined metropolitan and mid-size city front seat correct use was 36.6%, incorrect use was 22.0%, and non-use was 41.5%. The rates in 1997 were 37.4% (correct), 17.8% (incorrect), and 44.9% (non-use). Between the 2 years, correct use was nearly the same, incorrect use increased, and non-use declined, but this change was not significant at the 5% level.

In the rear seats, the 1998 correct use for all 41 sites combined was 57.1%, incorrect use was 18.6%, and non-use was 24.4%. During 1997, correct use was 56.1%, incorrect use was 16.8%, and non-use was 27.1%. There was little change in rear seat use rates between 1997 and 1998: a small decline of less than 3% in non-use combined with a small increase in both incorrect use (less than 2%) and correct use (1%), a non-significant change in rates between the 2 years.

In 1998, rear seat correct use was 20.5 points (36%) higher, non-use was 17.1 points (70%) lower, and incorrect use was 3.4 points (18%) lower than the front seat use rates. The 1998 data show that for all 41 sites combined, those under age 4 who were rear seat occupants had better child safety seat use patterns than did those who were front seat occupants. The 1997 data also showed that rear seat occupants had better child safety seat use rates.

Safety Restraint Use by Occupants 4 to 16 Years of Age in the Metropolitan Areas

As previously stated, the data for safety restraint use by occupants between 4 and 16 years of age were first collected during 1997. During 1998, safety restraint use data were collected on 1,106 occupants 4 to 16 years of age in the four metropolitan areas (see Table B-3). Of these, 342 were in the northern area, 98 in the western area, 224 in the central area, and 442 in the eastern area. There were 340 front seat occupants and 766 rear seat occupants. In 1997, there were 1,593 total occupants, with 459 in the northern area, 143 in the western area, 297 in the central area, and 694 in the eastern area. In 1997, there were 761 front seat occupants and 832 rear seat occupants. Between 1997 and 1998, there was a statistically significant ($p < .01$) shift in the proportion of occupants between 4 and 16 who were in the front seats; in 1997, 47.8% of all those observed were in the front seats, but in 1998, only 30.7% were in the front seats, a 36% decline in front seat occupancy.

Total Vehicle Use

When the 1998 data for all four metropolitan areas and all seat positions were combined, correct use was 49%, incorrect use was 14.3%, and non-use was 36.7% (see Table C-3). During 1997, correct use was 44.7%, incorrect use was 4.5%, and non-use was 50.8% (see Table C-10). Between the 2 years, correct use was up over 4 points, incorrect use was up nearly 10 points, and non-use was down 14 points (see Table E-1). This shift in the usage rates was significant at the 1% level.

The 1998 use rate data were also considered on the basis of each metropolitan area. Correct use was highest in the eastern area (54.5%) and lowest in the central area (37.1%). The correct use rate was 50.6% in the northern area and 45.9% in the western area. Incorrect use was highest in the western area (21.4%) and lowest in the eastern area (11.3%). The incorrect use rate in the other two areas was nearly the same: 15.2% (northern) and 15.6% (central). The central area had the highest non-use rate, 47.3%. The non-use rates in the other three areas were 34.2% in the northern and eastern areas and 32.7% in the western area, a range of only 1.5 points.

The 1997 and 1998 use rates were also compared on the basis of each metropolitan area (see Tables C-3 and C-10). In the northern area, correct use was up over 3 points, incorrect use was up more than 9 points, and non-use was down nearly 13 points (see Table E-2). In the western area, correct use was up 13 points, incorrect use was up nearly 16 points, and non-use was down nearly 29 points (see Table E-3). In the central area, correct use was down nearly 11 points, incorrect use was up nearly 12 points, and non-use was down over 1 point (see Table E-4). In the eastern area, correct use was up over 10 points, incorrect use was up nearly 8 points, and non-use was down 18 points (see Table E-5). In each of the four metropolitan areas, the shift in rates of use between 1997 and 1998 was statistically significant at the 1% level. In practical terms, there was a positive change in the use rates in the northern, western, and eastern areas with decreases in the rate of non-use and increases in rates of correct and incorrect uses. In the central area, there was a negative change in the use rates with a decrease in correct use and an increase in incorrect use.

These data show that between 1997 and 1998, there was an improvement in the safety belt use rates of persons between 4 and 16 years of age in three of the four metropolitan areas of Virginia. There was a large drop in non-use in all but the central area, which had no real change in the non-use rate, and an increase in the correct use rate in all but the central area, which had a 10-point decline in the correct use rate.

Front Seat Use

In 1998, there were 340 front seat occupants observed for safety restraint use: 83 in the northern area, 36 in the western area, 77 in the central area, and 144 in the eastern area. In 1997, there were 761 front seat occupants observed: 212 in the northern area, 68 in the western area, 145 in the central area, and 336 in the eastern area. When the 1998 use rate data for all four metropolitan areas were combined, correct use was 59.1%, incorrect use was 17.6%, and non-use was 23.2% (see Table C-3). During 1997, correct use was 55.5%, incorrect use was 6.8%, and

non-use was 37.7% (see Table C-10). Between the 2 years, correct use was up over 3 points, incorrect use was up nearly 11 points, and non-use was down more than 14 points (see Table E-6). The 1998 use rates were an improvement over those in 1997, and the shift in use rates was significant at the 1% level.

The 1998 data were also considered on the basis of individual metropolitan area. Correct use was highest in the eastern (64.6%) and northern (61.4%) areas and lowest in the western (52.8%) and central (49.4%) areas. Incorrect use was lowest (11.8%) in the eastern area and highest (30.6%) in the western area. Incorrect use was 18.1% in the northern area and 22.1% in the central area. Non-use was greatest in the central (28.6%) area, with rates of 23.6% (eastern), 20.5% (northern), and 16.7% (western) in the other three areas. These data show that safety belt use by occupants between 4 and 16 years of age was much worse in the central area (a low correct and a high non-use). Both the eastern and northern areas can make a case that they had the best use rates; the northern area had a small advantage in a lower non-use rate, and the eastern area had a small advantage in a higher correct use rate.

The 1997 and 1998 front seat use rates were also compared on the basis of each metropolitan area (see Table C-3 and C-10). In the northern area, correct use was up nearly 2 points, incorrect use was up over 9 points, and non-use was down nearly 11 points (see Table E-7). This improvement in use rates was significant at the 5% level. In the western area, correct use was up nearly 9 points, incorrect use was up almost 28 points, and non-use was down over 36 points (see Table E-8). This improvement in use rates was significant at the 1% level. In the central area, correct use was down nearly 4 points, incorrect use was up over 15 points, and non-use was down over 11 points (see Table E-9). This change in use patterns was primarily one where non-use became incorrect use and could be viewed as having improved, and the change was significant at the 1% level. In the eastern area, correct use was up nearly 9 points, incorrect use was up over 5 points, and non-use was down over 14 points (see Table E-10). This improvement in use rates was significant at the 1% level. In practical terms, there was a positive change in all four metropolitan areas, with declines in non-use rates between 1997 and 1998. In the northern, western, and central areas, most of the non-use became incorrect use and in the eastern area, 60% of the non-use had shifted to correct use.

These use rate data show that between 1997 and 1998, front seat occupants in the metropolitan areas of Virginia who were between 4 and 16 years of age had a greatly increased incorrect use rate in all four areas. The rates also show that non-use was lower (better) in all four areas by between 28% and 68%. Correct use was higher in three of the four areas, with only the central area having a decline in correct use between 1997 and 1998.

Rear Seat Use

In 1998, there were 766 rear seat occupants observed for safety restraint use: 259 in the northern area, 62 in the western area, 147 in the central area, and 298 in the eastern area. In 1997, there were 832 rear seat occupants observed: 247 in the northern area, 75 in the western area, 152 in the central area, and 358 in the eastern area. When the 1998 use rate data for all four metropolitan areas were combined, correct use was 44.5%, incorrect use was 12.8%, and non-use was 42.7% (see Table C-3). During 1997, correct use was 34.9%, incorrect use was 2.3%, and

non-use was 62.9% (see Table C-10). Between the 2 years, correct use was up nearly 10 points, incorrect use was up over 10 points, and non-use was down over 20 points (see Table E-11). The 1998 rates of use were an improvement over those observed in 1997, and the shift in use was significant at the 1% level.

The 1998 use rates were also considered on the basis of each metropolitan area (see Figure 4). Correct use rates in the eastern, northern, and western areas were within 8 percentage points and much higher in all three areas than in the central area. Correct use was 49.7% (eastern), 47.1% (northern), 41.9% (western), and 30.6% (central). The incorrect use rates were within a relatively narrow 5 percentage point range. Incorrect use was highest in the western area (16.1%) and lowest in the eastern area (11.1%). Incorrect use in the other two areas were 14.3% (northern) and 12.2% (central). There was a range of just over 3 points in the non-use rates in the western (41.9%), eastern (39.3%), and northern (38.6%) areas. Non-use was 57.1% in the central area. The central area had the lowest correct use rate and the highest non-use rate during the summer of 1998.

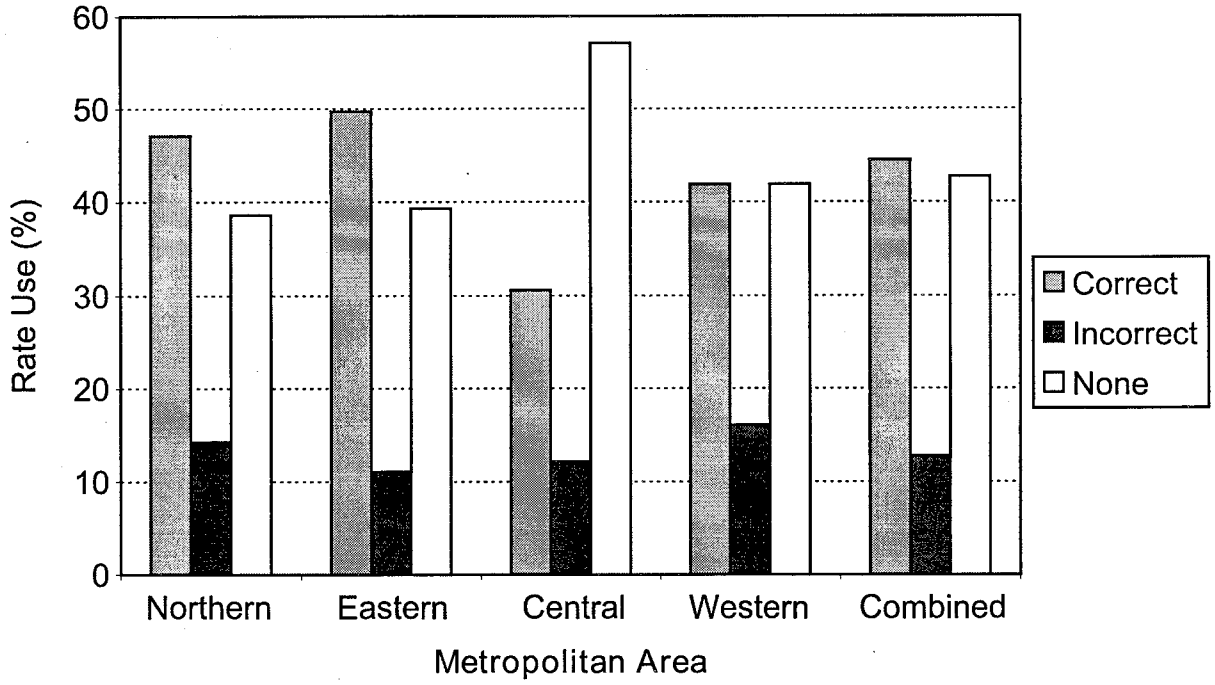

Figure 4. 1998 safety restraint use in metropolitan areas by occupants 4 to 16 years of age in the rear seats.

The 1997 and 1998 rear seat use rates were also compared on the basis of each metropolitan area (see Table C-3 and C-10). In the northern area, correct use was up over 11 points, incorrect use was up over 11 points, and non-use was down just over 22 points (see Table E-12). This improvement in use rates was significant at the 1% level. In the western area, correct use was over 19 points, incorrect use was up over 8 points, and non-use was down over 27 points (see Table E-13). This improvement in use rates was significant at the 1% level. In

the central area, correct use was down just over 12 points, incorrect use was up more than 11 points, and there was no real change in non-use (see Table E-14). This change in use rates was *not* significant at the 5% level. In the eastern area, correct use was up over 16 points, incorrect use was up 10 points, and non-use was down over 26 points (see Table E-15). This improvement in use rates was significant at the 1% level. In practical terms, there was a large decrease in non-use between 1997 and 1998 in the northern, western, and eastern areas, with this decline being accounted for by increases in both the correct and incorrect uses. In the central area, there was a decrease in correct and an increase in incorrect use.

The rear seat use rates show that between 1997 and 1998 there was a decrease in non-use in three of the four metropolitan areas and an increase in correct use in the same three areas. In the central area, there was a decrease in correct use and non-use remained essentially the same. The use rate data also show a large increase in incorrect use in all four areas, caused in part by a decline in the non-use rate. There was an improvement in the safety belt use habits of rear seat occupants between 4 and 16 years of age in the metropolitan areas of Virginia between 1997 and 1998.

Safety Restraint Use by Occupants 4 to 16 Years of Age in Mid-Size Cities

During 1998, safety restraint use data were collected on 289 occupants who were between 4 to 16 years of age in the three mid-size cities (see Table B-4). Of these, 114 were in Charlottesville, 98 in Lynchburg, and 77 in Danville. In 1997, there were 385 total occupants, with 152 in Charlottesville, 135 in Lynchburg, and 98 in Danville.

In 1998, there were 85 front seat occupants and 204 rear seat occupants. In 1997, there were 179 front seat occupants and 206 rear seat occupants. Between 1997 and 1998, there was a statistically significant ($p < .01$) shift in the proportion of occupants between 4 and 16 years of age who were front seat passengers in these three cities. In 1997, 46.5% were in the front seats, and in 1998, only 29.4% were in the front seats.

Total Vehicle Use

When the 1998 use rate data from Charlottesville, Lynchburg, and Danville were combined, correct use was 42.2%, incorrect use was 18.7%, and non-use was 39.1% (see Table C-4). When the 1997 use rate data for all vehicle occupants from the three mid-size cities were combined, correct use was 31.9%, incorrect use was 3.4%, and non-use was 64.7% (see Table C-11). Between the 2 years, correct use was up just over 10 points, incorrect use was up just over 15 points, and non-use was down nearly 26 points (see Table F-1). This improvement in the safety restraint use rates was significant at the 1% level.

When the 1998 safety restraint use rate data for all seat positions combined were considered on a locality basis, correct use was 51.8% in Charlottesville, 40.8% in Lynchburg, and 29.9% in Danville. Incorrect use was 26.5% in Lynchburg, 15.8% in Charlottesville, and 13% in Danville. Non-use was 57.1% in Danville, 32.7% in Lynchburg, and 32.5% in Charlottesville (see Table C-4). These data show that even for the best use rates among these

three communities, nearly one third of the observed occupants were not using any safety restraint system.

The 1998 use rates were also compared with those from 1997 on an individual community basis. The 1998 correct use rates were higher and non-use was lower in all three areas. In Charlottesville, correct use was up 9 points, incorrect use was up over 10 points, and non-use was down over 19 points (see Table F-2). In Danville, correct use was up nearly 16 points, incorrect use was up nearly 12 points, and non-use was down nearly 28 points (see Table F-3). In Lynchburg, correct use was up over 8 points, incorrect use was up more than 23 points, and non-use was down nearly 32 points (see Table F-4). The improvement in safety restraint use in each of these communities was statistically significant at the 1% level.

These data from 1997 and 1998 show that there was an improvement in the safety belt use habits of occupants 4 to 16 years of age in all three mid-size cities. Although there was a higher correct use and a lower non-use in Danville in 1998, the rates of use in this area were still below those of the other two mid-size cities and all four of the metropolitan areas that were surveyed.

Front Seat Use

When the 1998 use rate data from the three localities were combined, correct use was 40.0%, incorrect use was 29.4%, and non-use was 30.6% (see Table C-4). When the 1997 front seat use rate data for all three mid-size cities were combined, correct use was 38.5%, incorrect use was 5.6%, and non-use was 55.9% (see Table C-11). Between the 2 years, correct use was up just over 1 point, incorrect use was up nearly 24 points, and non-use was down over 25 points (see Table F-5). This improvement in safety restraint use over the 2 years was significant at the 1% level.

When the 1998 safety restraint use rate data were considered on the basis of each locality, correct use was 43.3% in Charlottesville, 43.2% in Lynchburg, and 27.8% in Danville. Incorrect use was 33.3% in Charlottesville, 32.4% in Lynchburg, and 16.7% in Danville. Non-use was 55.6% in Danville, 24.3% in Lynchburg, and 23.3% in Charlottesville (see Table C-4). These data show that the rates of front seat use of safety restraints were similar in Charlottesville and Lynchburg and both had better use rate patterns than did Danville.

The 1998 use rates were also compared with those from 1997 on an individual locality basis. In Charlottesville, correct use was down 8 points, incorrect use was up over 26% points, and non-use was down over 18 points (see Table F-6). This change in use rates was significant at the 1% level. In Danville, correct use was up more than 13 points, incorrect use was up over 14 points, and non-use was down nearly 28 points (see Table F-7). This improvement in use rates was significant at the 5% level. In Lynchburg, correct use was up 3 points, incorrect use was up over 26 points, and non-use was down over 29 points (see Table F-8). This improvement in use rates was significant at the 1% level.

These data show that for front seat occupants 4 to 16 years of age in the three mid-size cities, there has been a statistically significant improvement in safety belt use when the data for

all three localities were combined and for each of the localities. Nearly 70% of the change in use rates in Charlottesville was a shift from non-use to incorrect use, with the other 30% being a shift from correct use to incorrect use. In Danville, there was a shift from non-use to nearly equal increases in both correct and incorrect use. In Lynchburg, nearly all of the change was accounted for by a shift from non-use to incorrect use. As can be seen from the data, each locality had a different change in rates over the 2 years. Although the greatest improvement was in Danville, the use rate patterns remained worse than those for the other two mid-size cities and for each of the four metropolitan areas surveyed.

Rear Seat Use

This is the second year data were collected when §§ 46.2-1094 and 46.2-1095 of the *Code of Virginia* requiring rear seat occupants between 4 and 16 years of age to wear safety belts were in effect. When the 1998 data from the three mid-size cities were combined, correct use was 43.1%, incorrect use was 14.2%, and non-use was 42.6% (see Table C-4). When the 1997 data from the three mid-size cities were combined, correct use was 26.2%, incorrect use was 1.5%, and non-use was 72.3% (see Table C-11). Between the 2 years, correct use was up 17 points, incorrect use was up nearly 13 points, and non-use was down nearly 30 points (see Table F-9). This improvement in safety restraint use was significant at the 1% level.

When the 1998 rear seat safety restraint use rate data were considered on the basis of each locality, correct use was 54.8% in Charlottesville, 30.5% in Danville, and 39.3% in Lynchburg (see Figure 5 and Table C-4). Incorrect use was 9.5% in Charlottesville, 11.9% in Danville, and 23.0% in Lynchburg. Non-use was 35.7% in Charlottesville, 57.6% in Danville, and 37.7% in Lynchburg. These data show that the pattern of rear seat safety restraint use was better in Charlottesville (higher correct and lower non-use) and worse in Danville (higher non-use and lower correct use).

These data show that although a large proportion of the affected occupants in 1998 were unlawfully unbelted, there has been considerable improvement in getting these occupants to put on a safety belt, although one fourth of those using a safety belt were doing so incorrectly.

The 1997 and 1998 use rates were compared on a locality basis. In Charlottesville, correct use was up nearly 20 points, incorrect use was up almost 6 points, and non-use was down nearly 26 points (see Table F-10). In Danville, correct use was up just over 16 points, incorrect use was up over 12 points, and non-use was down 28 points (see Table F-11). In Lynchburg, correct use was up nearly 14 points, incorrect use was up 23 points, and non-use was down nearly 37 points (see Table F-12). The improvement in use rate patterns in all three mid-size cities was significant at the 1% level. In Charlottesville, 77% of the change was a drop in non-use and an increase in correct use, with the remainder accounted for by an increase in incorrect use. In Danville, 58% of the change was a shift from non-use to correct use and 42% was a shift from non-use to incorrect use. In Lynchburg, 63% of the change was a shift from non-use to incorrect use and 37% was a shift from non-use to correct use.

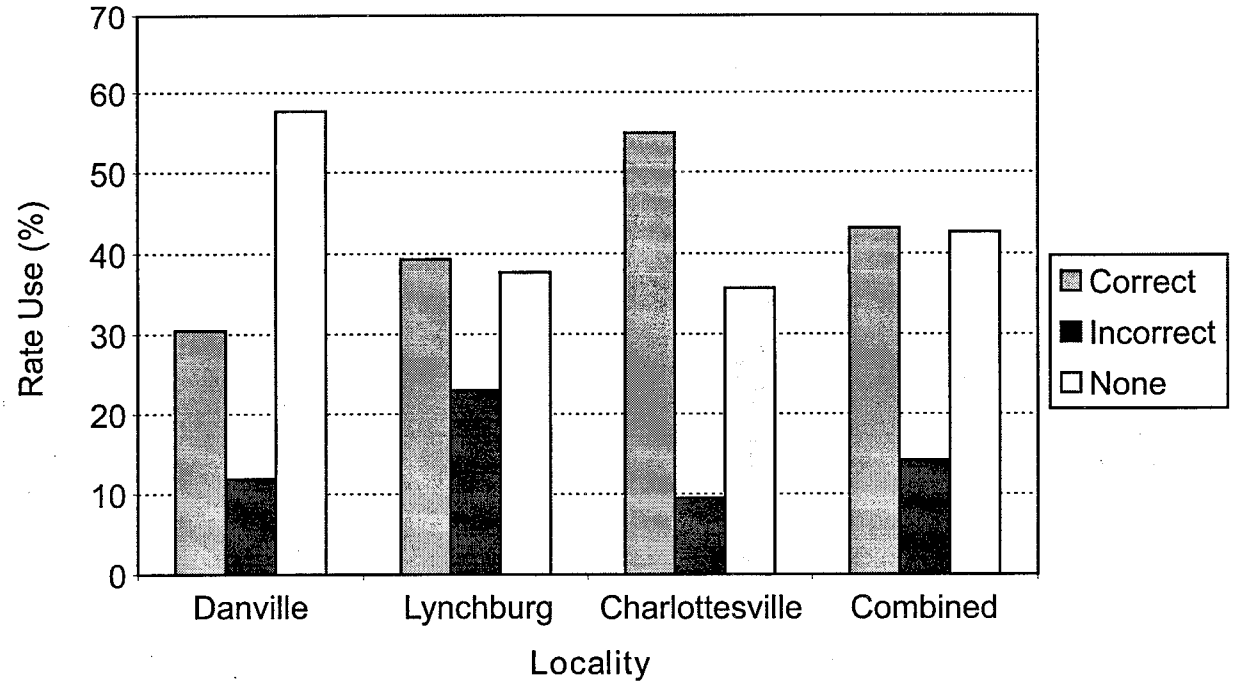

Figure 5. 1998 safety restraint use in mid-size cities by occupants 4 to 16 years of age in the rear seats.

These use rate data show that for 4- to 16-year-old rear seat occupants in the three mid-size cities, there was an improvement in safety belt use in all three localities, with an increase in correct use and a decrease in non-use. Although there was an improvement in the past 2 years in the safety belt use habits of these occupants, rates of correct use remain relatively low in Danville and Lynchburg.

Safety Restraint Use by Occupants 4 to 16 Years of Age for All Sites Combined

In 1998, there were 1,106 occupants surveyed at the 34 metropolitan sites and 289 at the 7 mid-size city sites. Correct use was 47.6%, incorrect use was 15.2%, and non-use was 37.2%. In 1997, 1,593 metropolitan occupants and 385 mid-size city occupants were surveyed. Correct use was 42.2%, incorrect use was 4.2%, and non-use was 53.5%. Between the 2 years, correct use was up over 5 points, incorrect use was up 11 points, and non-use was down 16 points. This shift in use rates was significant at the 1% level. The data show that 67% of the change was a shift from non-use to incorrect use and 33% was from non-use to correct use.

The 1998 combined use rates were more similar to those for the combined metropolitan areas (49.0%, 14.3%, and 36.7%) than for those from the combined mid-size cities (42.2%, 18.7%, and 39.1%). This is understandable in light of the fact that just over 79% of the observations were from the metropolitan areas. The differences in use rates between the metropolitan areas and mid-size cities were not as diverse in 1998 as in 1997.

When the 1998 front seat use rates for the four metropolitan areas and three mid-size cities were combined, correct use was 55.3%, incorrect use was 20.0%, and non-use was 24.7%. When the 1997 front seat use rates from the four metropolitan areas and three mid-size cities were combined, correct use was 52.2%, incorrect use was 6.6%, and non-use was 41.2%. Between the 2 years, correct use was up 3 points, incorrect use was up over 13 points, and non-use down more than 16 points. This improvement in the front seat use rate pattern was significant at the 1% level. The data show that 81% of the change was a shift from non-use to incorrect use.

In the rear seats, the 1998 correct use for the 34 metropolitan and 7 mid-size city sites combined was 44.2%, incorrect use was 13.1%, and non-use was 42.7%. In 1997, correct use was 33.1%, incorrect use was 2.1%, and non-use was 64.7%. Between the 2 years, correct use was up 11 points, incorrect use was up 11 points, and non-use was down 22 points. This improvement in the rear seat use rate pattern was significant at the 1% level. The data show that the change was for the drop in non-use to be equally divided by increases in both the correct and incorrect use.

Three facts are apparent from these use rate data. First, 4- to 16-year-old front seat occupants had higher correct use and lower non-use rates than did occupants of the same age who were in the rear seats during both 1997 and 1998. Second, there was a drop in non-use in both the front and rear seats between 1997 and 1998; front seat non-use declined 40%, and rear seat non-use declined 34%. Third, there was a modest 6% increase in front seat correct use between the 2 years, and in the rear seats correct use increased 33.5%.

These data show that when the results for all occupants from all sites were combined, there was an improvement between 1997 and 1998 in the safety belt use habits of 4- to 16-year-old occupants. These data also show that although there was more improvement for rear seat occupants in 1998, the rates still remain behind those for front seat occupants, with a lower correct use and a higher non-use.

MAJOR FINDINGS FOR 1998

Child Safety Seats

- Between 1997 and 1998, the proportion of occupants under age 4 who were observed in the front seats in the four metropolitan areas declined from 19.6% to 7.3% ($p < .01$). There was no change in the proportions in the three mid-size cities (14.8% and 15.1%).

- Although there was some decline in non-use when the data from the front and rear seats for all 34 metropolitan areas were combined, this difference in the 1993 vs. 1998 and 1997 vs. 1998 correct, incorrect, and non-use rate patterns did not reach statistical significance at the 5% level.

- When the 1993 vs. 1998 and 1997 vs. 1998 metropolitan rear seat data were considered, only in the western area did the shift in use rate patterns reach statistical significance at the 5% level and there was an improvement in the use rate patterns in 1998 over those in 1993 and 1997.

- There was a decline in non-use and a rise in correct use between 1997 and 1998 when the rear seat data for the three mid-size cities were combined, but this shift did not reach statistical significance at the 5% level.

- Between 1997 and 1998, when the data for all occupants from both the metropolitan areas and mid-size cities were combined, there was some decline in non-use, but the shift in the correct, incorrect, and non-use patterns did not reach statistical significance at the 5% level.

- When the 1998 data from the 34 metropolitan sites and the 7 mid-size city sites were combined, child safety seat use rates were better for rear seat occupants than for front seat occupants.

Restraint Use by Occupants 4 to 16 Years of Age

- Between 1997 and 1998, the proportion of metropolitan area occupants observed in the front seats declined from 47.8% to 30.7% ($p < .01$) and there was a comparable decline in the mid-size cities, from 46.5% to 29.4% ($p < .01$).

- Between 1997 and 1998, for all comparisons involving metropolitan area data, except for the front seat rates in the northern area ($p < .05$) and the rear seat rates in the central area (not significant at the 5% level), the shift in use rate patterns reached statistical significance at the 1% level. The shift in use rates was from non-use to correct or incorrect uses in all areas except in the central area where the shift was from correct to incorrect use.

- Between 1997 and 1998, for all comparisons involving mid-size city data, except for front seat use rates in Danville ($p < .05$), the shift in use rate patterns reached statistical significance at the 1% level. In all cases, the shift was from non-use to correct and incorrect use.

- Between 1997 and 1998, when the use rate data from the metropolitan areas and mid-size cities were combined, the shift in use rate patterns for the front seats, rear seats, and all occupants combined reached statistical significance at the 1% level. The shift was from non-use to correct and incorrect use.

- For the 34 metropolitan and 7 mid-size city sites combined, front seat occupants 4 to 16 years of age had a higher correct use and a lower non-use than did rear seat occupants in 1998.

CONCLUSIONS

- There is a potential safety benefit resulting from the shift in the proportion of metropolitan area children under age 4 from the front to the rear seats, because the rear seats are the safest riding position.

- There also is a potential safety benefit resulting from the shift in the proportion of metropolitan area and mid-size city occupants between 4 and 16 years of age from the front to rear seats.

- Because the child safety seat correct, incorrect, and non-use rate patterns between the two sets of comparison years (1993 vs. 1998 and 1997 vs. 1998) were similar ($p > .05$), it is concluded that the combined efforts of the public and private sectors to promote increased child safety seat use have had no statistically significant impact.

- It is reasonable to assume that § § 46.2-1094 and 46.2-1095 of the *Code of Virginia* had a positive impact on safety restraint use by occupants 4 to 16 years of age. In 1997, the statutes had been in effect for fewer than 6 weeks when the data were collected. In 1998, the public had had over a year's time to become aware of the statutes, their implications and safety benefits. In prior years, there were changes in safety belt use rates subsequent to changes in the statutes requiring their use.

RECOMMENDATIONS

- A comprehensive and statewide public information and education (PI&E) campaign should be initiated to publicize the rate of non-use of child safety seats and the rate of non-use of safety restraints by occupants between 4 and 16 years of age.

- Education and enforcement efforts *must* be ongoing and continuous, especially in light of the fact that changes to the population of children occur continuously.

- Special education and enforcement efforts should be directed at 4 to 16 year old rear seat occupants, especially outside of the metropolitan areas.

ACKNOWLEDGMENTS

The author thanks Nicole Younts and Matthew Hickey, who spent many hours traveling around the state, working from early morning to late afternoon, including weekends, to collect the data used in this report. Matt also prepared the various tables used in this report. Thanks are also expressed to Linda Evans for editing the report and to Ann McDaniel who prepared the various drafts and final version of the report.

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APPENDIX A

Bill Amending Sections 46.2-1094 and 46-2-1095 of the *Code of Virginia* to Require Occupants from 4 to 16 Years of Age to Use Safety Belts

summary | pdf

CHAPTER 793

An Act to amend and reenact §§ 46.2-1094 and 46.2-1095 of the Code of Virginia, relating to seat belts for children between the ages of four and sixteen; penalty.

[S 971]

Approved April 2, 1997

Be it enacted by the General Assembly of Virginia:

1. That §§46.2-1094 and 46.2-1095 of the Code of Virginia are amended and reenacted as follows:

§46.2-1094. Occupants of front seats of motor vehicles required to use safety lap belts and shoulder harnesses; penalty.

A. Each person at least sixteen years of age and occupying the front seat of a motor vehicle equipped or required by the provisions of this title to be equipped with a safety belt system, consisting of lap belts, shoulder harnesses, combinations thereof or similar devices, shall wear the appropriate safety belt system at all times while the motor vehicle is in motion on any public highway. A child under the age of ~~four~~ *sixteen* years, however, shall be protected as required by the provisions of this chapter.

~~B. Each driver of a motor vehicle equipped or required by the provisions of this title to be equipped with a safety belt system who is transporting a child at least four years of age, but less than sixteen years of age, in the front seat of such motor vehicle shall cause such child to wear the appropriate safety belt system.~~

~~C.~~ *B.* This section shall not apply to:

1. Any person for whom a licensed physician determines that the use of such safety belt system would be impractical by reason of such person's physical condition or other medical reason, provided the person so exempted carries on his person or in the vehicle a signed written statement of the physician identifying the exempted person and stating the grounds for the exemption; or

2. Any law-enforcement officer transporting persons in custody or traveling in circumstances which render the wearing of such safety belt system impractical; or

3. Any person while driving a motor vehicle and performing the duties of a rural mail carrier for the United States Postal Service; or

4. Any person driving a motor vehicle and performing the duties of a rural newspaper route carrier, newspaper bundle hauler or newspaper rack carrier; or

5. Drivers of taxicabs; or

6. Personnel of commercial or municipal vehicles while actually engaged in the collection or delivery of goods or services, including but not limited to solid waste, where such collection or delivery requires the personnel to exit and enter the cab of the vehicle with such frequency and regularity so as to render the use of safety belt systems impractical and the safety benefits derived therefrom insignificant. Such personnel shall resume the use of safety belt systems when actual collection or delivery has ceased or when the vehicle is in transit to or from a point of final disposition or disposal, including but not limited to solid waste facilities, terminals, or other location where the vehicle may be principally garaged; or

7. Any person driving a motor vehicle and performing the duties of a utility meter reader; or

8. Law-enforcement agency personnel driving motor vehicles to enforce laws governing motor vehicle parking.

~~D.~~ *C.* Any person who violates this section shall be subject to a civil penalty of twenty-five dollars to be paid into the state treasury and credited to the Literary Fund. No assignment of demerit points shall be made under Article 19 of Chapter 3 (§46.2-489 et seq.) of this title and no court costs shall be assessed for violations of this section.

~~E.~~ *D.* A violation of this section shall not constitute negligence, be considered in mitigation of damages of whatever nature, be admissible in evidence or be the subject of comment by counsel in any action for the recovery of damages arising out of the operation, ownership, or maintenance of a motor vehicle, nor shall anything in this section change any existing law, rule, or procedure pertaining to any such civil action.

~~F.~~ *E.* A violation of this section may be charged on the uniform traffic summons form.

~~G.~~ *F.* No citation for a violation of this section shall be issued unless the officer issuing such citation has cause to stop or arrest the driver of such motor vehicle for the violation of some other provision of this Code or local ordinance relating to the operation, ownership, or maintenance of a motor vehicle or any criminal statute.

~~H.~~ *G.* The governing body of any city having a population of at least 66,000 but no more than 67,000 may adopt an ordinance not inconsistent with the provisions of this section, requiring the use of safety belt systems. The penalty for violating any such ordinance shall not exceed a fine or civil penalty of twenty-five dollars.

§46.2-1095. Child restraint devices required; safety belts for children four to sixteen required; penalty.

A. Any person who drives on the highways of Virginia any motor vehicle manufactured after January 1, 1968, shall ensure that any child under the age of four ~~(i) of which he is the parent or legal guardian or (ii) which~~ *whom* he ~~regularly~~ transports therein is provided with and properly secured in a child restraint device of a type which meets the standards adopted by the United States Department of Transportation.

B. Any person transporting any child at least four years of age, but less than sixteen years of age, shall ensure that such child is provided with and properly secured by an appropriate safety belt system when driving on the highways of Virginia in any motor vehicle manufactured after January 1, 1968, equipped or required by the provisions of this title to be equipped with a safety belt system, consisting of lap belts, shoulder harnesses, combinations thereof or similar devices.

C. A violation of this section shall not constitute negligence, be considered in mitigation of damages of whatever nature, be admissible in evidence or be the subject of comment by counsel in any action for the recovery of damages in a civil action.

D. Any person who violates subsection B of this section shall be subject to a civil penalty of twenty-five dollars to be paid into the state treasury and credited to the Child Restraint Device Special Fund pursuant to §46.2-1097. No assignment of demerit points shall be made under Article 19 (§46.2-489 et seq.) of Chapter 3 of this title and no court costs shall be assessed for violations of this section.

E. A violation of this section may be charged on the uniform traffic summons form.

F. Nothing in this section shall apply to taxicabs, school buses, executive sedans, limousines, or the rear cargo area of pickup trucks or other vehicles.

Go to (General Assembly Home)

APPENDIX B

Safety Restraint Use by Site Location and Seat Position

Table B-1

1998 Child Safety Seat Survey Results for Metropolitan Areas

Site Location	Front Seat			Rear Seat			Total Vehicle		
	C*	I	N	C	I	N	C	I	N
Northern Area									
1 Rolling Road	0	0	0	3	3	0	3	3	0
2 Route 7	0	0	0	10	5	5	10	5	5
3 S. George Mason	0	0	0	5	6	8	5	6	8
4 N. Glebe	1	0	0	8	2	5	9	2	5
5 Rose Hill	0	0	0	2	0	0	2	0	0
6 Jordan	0	0	1	2	2	2	2	2	3
7 Route 1	0	0	0	0	1	1	0	1	1
8 Woodbridge	0	0	0	5	1	0	5	1	0
9 Herndon	0	1	0	3	2	2	3	3	2
10 Vienna	0	0	0	14	8	2	14	8	2
11 Fairfax City	0	0	0	4	2	1	4	2	1
12 Annandale	0	0	0	6	3	2	6	3	2
Northern Area Total	1	1	1	62	35	28	63	36	29
Western Area									
1 Hershberger	0	0	0	5	3	0	5	3	0
2 Orange	0	0	0	12	0	0	12	0	0
3 Vinton	1	0	2	5	1	1	6	1	3
4 Salem	1	0	0	7	0	3	8	0	3
Western Area Total	2	0	2	29	4	4	31	4	6
Central Area									
1 Broad Street	0	1	0	1	2	2	1	3	2
2 Hull Street	1	0	0	0	2	5	1	2	5
3 Chester	0	0	0	0	2	0	0	2	0
4 Petersburg	0	1	1	9	1	3	9	2	4
5 Midlothian	0	0	0	6	2	0	6	2	0
6 Parham Rd.	0	0	0	13	1	0	13	1	0
7 9-Mile Rd.	0	1	0	10	2	3	10	3	3
Central Area Total	1	3	1	39	12	13	40	15	14
Eastern Area									
1 Independence	0	0	0	0	0	1	0	0	1
2 Kempsville	0	0	0	4	1	3	4	1	3
3 Chesapeake	2	0	1	9	3	3	11	3	4
4 Portsmouth	3	0	1	2	2	2	5	2	3
5 Rte. 170	0	0	0	1	0	1	1	0	1
6 Laskin	1	1	0	27	3	3	28	4	3
7 Brambleton	0	0	1	2	0	3	2	0	4
8 Military Circle	1	1	0	3	3	8	4	4	8
9 Denbigh	1	1	2	8	2	14	9	3	16
10 Hampton	0	0	0	3	1	1	3	1	1
11 Route 143	0	0	0	11	3	5	11	3	5
Eastern Area Total	8	3	5	70	18	44	78	21	49
Urban Total	12	7	9	200	69	89	212	76	98
Grand Total									386

*C = correct use; I = incorrect use, N = none

Table B-2

1998 Child Safety Seat Survey Results for Mid-Size Cities

Site Location	Front Seat			Rear Seat			Total Vehicle		
	C*	I	N	C	I	N	C	I	N
Charlottesville									
1 High	1	1	1	14	1	1	15	2	2
2 Emmet	1	0	3	20	1	3	21	1	6
Charlottesville Total	2	1	4	34	2	4	36	3	8
Danville									
1 Main	0	0	2	1	1	5	1	1	7
2 Piney Forest	1	1	0	4	1	4	5	2	4
Danville Total	1	1	2	5	2	9	6	3	11
Lynchburg									
1 Candlers Mtn.	0	0	2	2	2	0	2	2	2
2 Oakley	0	0	0	5	4	3	5	4	3
3 Old Forest	0	0	0	0	1	0	0	1	0
Lynchburg Total	0	0	2	7	7	3	7	7	5
Mid-Size City Total	3	2	8	46	11	16	49	13	24
Grand Total									86

*C = correct use; I = incorrect use, N = none

Table B-3

1998 Survey Results of Safety Restraint Use by Occupants 4 to 16 Years of Age in the Metropolitan Areas

Site Location	Front Seat			Rear Seat			Total Vehicle		
	C*	I	N	C	I	N	C	I	N
Northern Area									
1 Rolling Road	1	1	3	1	6	4	2	7	7
2 Route 7	6	1	1	14	1	11	20	2	12
3 S. George Mason	7	2	3	9	3	27	16	5	30
4 N. Glebe	2	1	1	12	4	5	14	5	6
5 Rose Hill	4	0	0	4	0	4	8	0	4
6 Jordan	3	2	0	9	1	8	12	3	8
7 Route 1	1	0	2	5	0	3	6	0	5
8 Woodbridge	2	0	1	8	0	6	10	0	7
9 Herndon	2	4	1	7	4	5	9	8	6
10 Vienna	7	3	1	28	7	5	35	10	6
11 Fairfax City	6	1	1	7	8	11	13	9	12
12 Annandale	10	0	3	18	3	11	28	3	14
Northern Area Total	51	15	17	122	37	100	173	52	117
Western Area									
1 Hershberger	1	3	0	5	1	2	6	4	2
2 Orange	4	2	1	7	4	5	11	6	6
3 Vinton	7	2	1	8	3	12	15	5	13
4 Salem	7	4	4	6	2	7	13	6	11
Western Area Total	19	11	6	26	10	26	45	21	32
Central Area									
1 Broad Street	6	8	2	10	3	9	16	11	11
2 Hull Street	4	2	4	4	1	11	8	3	15
3 Chester	2	1	2	4	1	6	6	2	8
4 Petersburg	9	2	3	8	4	25	17	6	28
5 Midlothian	4	2	0	5	1	3	9	3	3
6 Parham Rd.	5	2	2	7	4	3	12	6	5
7 9-Mile Rd.	8	0	9	7	4	27	15	4	36
Central Area Total	38	17	22	45	18	84	83	35	106
Eastern Area									
1 Independence	4	0	1	6	1	4	10	1	5
2 Kempsville	15	2	1	18	4	14	33	6	15
3 Chesapeake	14	2	4	16	6	6	30	8	10
4 Portsmouth	6	1	2	4	1	9	10	2	11
5 Rte. 170	2	0	3	3	1	2	5	1	5
6 Laskin	15	3	5	33	4	9	48	7	14
7 Brambleton	1	0	2	7	5	7	8	5	9
8 Military Circle	4	2	8	12	2	18	16	4	26
9 Denbigh	13	2	6	20	4	20	33	6	26
10 Hampton	6	3	0	13	1	4	19	4	4
11 Route 143	13	2	2	16	4	24	29	6	26
Eastern Area Total	93	17	34	148	33	117	241	50	151
Urban Total	201	60	79	341	98	327	542	158	406
Grand Total									1106

*C = correct use; I = incorrect use, N = none

Table B-4

1998 Survey Results of Safety Restraint Use by Occupants 4 to 16 Years of Age in the Mid-Size Cities

Site Location	Front Seat			Rear Seat			Total Vehicle		
	C*	I	N	C	I	N	C	I	N
Charlottesville									
1 High	7	3	2	22	2	10	29	5	12
2 Emmet	6	7	5	24	6	20	30	13	25
Charlottesville Total	13	10	7	46	8	30	59	18	37
Danville									
1 Main	1	0	4	3	1	9	4	1	13
2 Piney Forest	4	3	6	15	6	25	19	9	31
Danville Total	5	3	10	18	7	34	23	10	44
Lynchburg									
1 Candlers Mtn.	5	3	1	11	2	5	16	5	6
2 Oakley	10	6	3	7	9	18	17	15	21
3 Old Forest	1	3	5	6	3	0	7	6	5
Lynchburg Total	16	12	9	24	14	23	40	26	32
Mid-Size City Total	34	25	26	88	29	87	122	54	113
Grand Total									289

*C = correct use; I = incorrect use, N = none

APPENDIX C

Rates of Safety Restraint Use by Areas of State Surveyed

Table C-1

1998 Child Safety Seat Use (%) in Metropolitan Areas by Area of State and Seat Position

Total Vehicle

	Northern	Eastern	Central	Western	Combined
Correct	49.2	52.7	58.0	75.6	54.9
Incorrect	28.1	14.2	21.7	9.8	19.7
None	22.7	33.1	20.3	14.6	25.4

Front Seat

	Northern	Eastern	Central	Western	Combined
Correct	33.3	50.0	20.0	50.0	42.9
Incorrect	33.3	18.8	60.0	0.0	25.0
None	33.3	31.3	20.0	50.0	32.1

Rear Seat

	Northern	Eastern	Central	Western	Combined
Correct	49.6	53.0	60.9	78.4	55.9
Incorrect	28.0	13.6	18.8	10.8	19.3
None	22.4	33.3	20.3	10.8	24.9

Table C-2

1998 Child Safety Seat Use (%) in Mid-Size Cities by Locality and Seat Position

Total Vehicle

	Danville	Lynchburg	Charlottesville	Combined
Correct	30.0	36.8	76.6	57.0
Incorrect	15.0	36.8	6.4	15.1
None	55.0	26.3	17.0	27.9

Front Seats

	Danville	Lynchburg	Charlottesville	Combined
Correct	25.0	0.0	28.6	23.1
Incorrect	25.0	0.0	14.3	15.4
None	50.0	100.0	57.1	61.5

Rear Seats

	Danville	Lynchburg	Charlottesville	Combined
Correct	31.3	41.2	85.0	63.0
Incorrect	12.5	41.2	5.0	15.1
None	56.3	17.6	10.0	21.9

Table C-3

1998 Safety Restraint Use (%) by Occupants 4 to 16 Years of Age in the Metropolitan Areas

Total Vehicle

	Northern	Eastern	Central	Western	Combined
Correct	50.6	54.5	37.1	45.9	49.0
Incorrect	15.2	11.3	15.6	21.4	14.3
None	34.2	34.2	47.3	32.7	36.7

Front Seats

	Northern	Eastern	Central	Western	Combined
Correct	61.4	64.6	49.4	52.8	59.1
Incorrect	18.1	11.8	22.1	30.6	17.6
None	20.5	23.6	28.6	16.7	23.2

Rear Seats

	Northern	Eastern	Central	Western	Combined
Correct	47.1	49.7	30.6	41.9	44.5
Incorrect	14.3	11.1	12.2	16.1	12.8
None	38.6	39.3	57.1	41.9	42.7

Table C-4

1998 Safety Restraint Use (%) by Occupants 4 to 16 Years of Age in Mid-Size Cities

Total Vehicle

	Danville	Lynchburg	Charlottesville	Combined
Correct	29.9	40.8	51.8	42.2
Incorrect	13.0	26.5	15.8	18.7
None	57.1	32.7	32.5	39.1

Front Seats

	Danville	Lynchburg	Charlottesville	Combined
Correct	27.8	43.2	43.3	40.0
Incorrect	16.7	32.4	33.3	29.4
None	55.6	24.3	23.3	30.6

Rear Seats

	Danville	Lynchburg	Charlottesville	Combined
Correct	30.5	39.3	54.8	43.1
Incorrect	11.9	23.0	9.5	14.2
None	57.6	37.7	35.7	42.6

Table C-5

1997 Child Safety Seat Use (%) in Metropolitan Areas by Area of State and Seat Position

Total Vehicle

	Northern	Eastern	Central	Western	Combined
Correct	57.0	53.1	58.7	32.1	54.1
Incorrect	18.5	17.8	14.1	17.9	17.4
None	24.5	29.1	27.2	50.0	28.5

Front Seats

	Northern	Eastern	Central	Western	Combined
Correct	38.5	41.0	45.5	0.0	37.9
Incorrect	23.1	20.5	13.6	25.0	20.0
None	38.5	38.5	40.9	75.0	42.1

Rear Seats

	Northern	Eastern	Central	Western	Combined
Correct	60.8	55.7	62.9	45.0	58.1
Incorrect	17.6	17.2	14.3	15.0	16.7
None	21.6	27.0	22.9	40.0	25.2

Table C-6

1996 Child Safety Seat Use (%) in Metropolitan Areas by Area of State and Seat Position

Total Vehicle

	Northern	Eastern	Central	Western	Combined
Correct	61.2	52.2	47.4	52.8	55.0
Incorrect	6.1	11.5	9.8	5.6	8.5
None	32.7	36.3	42.9	41.7	36.5

Front Seats

	Northern	Eastern	Central	Western	Combined
Correct	50.0	44.6	35.1	47.4	44.4
Incorrect	6.0	14.3	13.5	5.3	10.5
None	44.0	41.1	51.4	47.4	45.1

Rear Seats

	Northern	Eastern	Central	Western	Combined
Correct	63.3	54.2	52.1	54.7	57.7
Incorrect	6.2	10.7	8.3	5.7	8.0
None	30.5	35.0	39.6	39.6	34.2

Table C-7

1994 Child Safety Seat Use (%) in Metropolitan Areas by Area of State and Seat Position

Total Vehicle

	Northern	Eastern	Central	Western	Combined
Correct	59.6	78.6	48.8	58.6	64.0
Incorrect	10.3	7.6	12.2	20.7	10.4
None	30.1	13.8	39.0	20.7	25.7

Front Seats

	Northern	Eastern	Central	Western	Combined
Correct	45.6	58.1	43.8	50.0	49.3
Incorrect	12.3	14.0	9.4	20.0	12.7
None	42.1	27.9	46.9	30.0	38.0

Rear Seats

	Northern	Eastern	Central	Western	Combined
Correct	64.7	86.2	52.0	63.2	70.1
Incorrect	9.6	5.2	14.0	21.1	9.4
None	25.6	8.6	34.0	15.8	20.5

Table C-8

1993 Child Safety Seat Use (%) in Metropolitan Areas by Area of State and Seat Position

Total Vehicle

	Northern	Eastern	Central	Western	Combined
Correct	41.9	57.5	47.5	44.4	48.9
Incorrect	21.9	10.1	13.9	33.3	17.5
None	36.3	32.4	38.6	22.2	33.6

Front Seats

	Northern	Eastern	Central	Western	Combined
Correct	27.6	46.0	55.2	23.5	40.8
Incorrect	27.6	16.0	6.9	17.7	16.8
None	44.8	38.0	37.9	58.8	42.4

Rear Seats

	Northern	Eastern	Central	Western	Combined
Correct	45.0	62.0	44.4	52.2	51.6
Incorrect	20.6	7.8	16.7	39.1	17.7
None	34.4	30.2	38.9	8.7	30.7

Table C-9

1997 Child Safety Seat Use (%) in Mid-size Cities by Locality and Seat Position

Total Vehicle

	Danville	Lynchburg	Charlottesville	Combined
Correct	23.8	48.4	51.7	43.2
Incorrect	14.3	16.1	13.8	14.8
None	61.9	35.5	34.5	42.0

Front Seats

	Danville	Lynchburg	Charlottesville	Combined
Correct	0.0	60.0	33.3	33.3
Incorrect	0.0	0.0	0.0	0.0
None	100.0	40.0	66.7	66.7

Rear Seats

	Danville	Lynchburg	Charlottesville	Combined
Correct	29.4	46.2	53.8	44.9
Incorrect	17.6	19.2	15.4	17.4
None	52.9	34.6	30.8	37.7

Table C-10

1997 Safety Restraint Use (%) by Occupants 4 to 16 Years of Age in Metropolitan Areas

Total Vehicle

	Northern	Eastern	Central	Western	Combined
Correct	47.1	44.2	47.8	32.9	44.7
Incorrect	5.9	3.6	3.7	5.6	4.5
None	47.1	52.2	48.5	61.5	50.8

Front Seats

	Northern	Eastern	Central	Western	Combined
Correct	59.9	56.0	53.1	44.1	55.5
Incorrect	9.0	6.3	6.9	2.9	6.8
None	31.1	37.8	40.0	52.9	37.7

Rear Seats

	Northern	Eastern	Central	Western	Combined
Correct	36.0	33.2	42.8	22.7	34.9
Incorrect	3.2	1.1	0.7	8.0	2.3
None	60.7	65.6	56.6	69.3	62.9

Table C-11

1997 Safety Restraint Use (%) by Occupants 4 to 16 Years of Age
in Mid-size Cities

Total Vehicle

	Danville	Lynchburg	Charlottesville	Combined
Correct	14.3	32.6	42.8	31.9
Incorrect	1.0	3.0	5.3	3.4
None	84.7	64.4	52.0	64.7

Front Seats

	Danville	Lynchburg	Charlottesville	Combined
Correct	14.3	40.0	51.4	38.5
Incorrect	2.4	6.2	6.9	5.6
None	83.3	53.8	41.7	55.9

Rear Seats

	Danville	Lynchburg	Charlottesville	Combined
Correct	14.3	25.7	35.0	26.2
Incorrect	0.0	0.0	3.8	1.5
None	85.7	74.3	61.3	72.3

Appendix D

A Comparison of the 1998 Child Safety Seat Use Rates With those from 1993 and 1997 by Area of State and Seat Position in the Vehicle

Table D-1

A Comparison of the 1997 and 1998 Child Safety Seat Use Rates for the Front Seats in all Metropolitan Areas Combined

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	36	37.9	12	42.9	+5.0	+13.2
Incorrect	19	20.0	7	25.0	+5.0	+25.0
None	40	42.1	9	32.1	-10.0	-23.8

X^2 probability = Not significant

Table D-2

A Comparison of the 1997 and 1998 Child Safety Seat Use Rates for the Rear Seats in all Metropolitan Areas Combined

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	226	58.1	200	55.9	-2.2	-3.8
Incorrect	65	16.7	69	19.3	+2.6	+15.6
None	98	25.2	89	24.9	-0.3	-1.2

X^2 probability = Not significant

Table D-3

A Comparison of the 1993 and 1998 Child Safety Seat Use Rates for the Front Seats in all Metropolitan Areas Combined

	1993		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	51	40.8	12	42.9	+2.1	+5.1
Incorrect	21	16.8	7	25.0	+8.2	+48.8
None	53	42.4	9	32.1	-10.3	-24.3

X^2 probability = Not significant

Table D-4

A Comparison of the 1993 and 1998 Child Safety Seat Use Rates for the Rear Seats in all Metropolitan Areas Combined

	1993		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	195	51.6	200	55.9	+4.3	+8.3
Incorrect	67	17.7	69	19.3	+1.6	+9.0
None	116	30.7	89	24.9	-5.8	-18.9

X^2 probability = Not significant

Table D-5

A Comparison of the 1997 and 1998 Child Safety Seat Use Rates for the Rear Seats in the Northern Metropolitan Area

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	76	60.8	62	49.6	-11.2	-18.4
Incorrect	22	17.6	35	28.0	+10.4	+59.1
None	27	21.6	28	22.4	+0.8	+3.7

X^2 probability = Not significant

Table D-6

A Comparison of the 1997 and 1998 Child Safety Seat Use Rates for the Rear Seats in the Eastern Metropolitan Area

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	97	55.7	70	53.0	-2.7	-4.8
Incorrect	30	17.2	18	13.6	-3.6	-20.9
None	47	27.0	44	33.3	+6.3	+23.3

X^2 probability = Not significant

Table D-7

A Comparison of the 1997 and 1998 Child Safety Seat Use Rates for the Rear Seats in the Central Metropolitan Area

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	44	62.9	39	60.9	-2.0	-3.2
Incorrect	10	14.3	12	18.8	+4.5	+31.5
None	16	22.9	13	20.3	-2.6	-11.4

X^2 probability = Not significant

Table D-8

A Comparison of the 1997 and 1998 Child Safety Seat Use Rates for the Rear Seats in the Western Metropolitan Area

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	9	45.0	29	78.4	+33.4	+74.2
Incorrect	3	15.0	4	10.8	- 4.2	-28.0
None	8	40.0	4	10.8	-29.2	-73.0

X^2 probability = Significant at 5%

Table D-9

A Comparison of the 1993 and 1998 Child Safety Seat Use Rates for the Rear Seats in the Northern Metropolitan Area

	1993		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	59	45.0	62	49.6	+4.6	+10.2
Incorrect	27	20.6	35	28.0	+7.4	+35.9
None	45	34.4	28	22.4	-12.0	-34.9

X^2 probability = Not significant

Table D-10

A Comparison of the 1993 and 1998 Child Safety Seat Use Rates for the Rear Seats in the Eastern Metropolitan Area

	1993		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	80	62.0	70	53.0	-9.0	-14.5
Incorrect	10	7.8	18	13.6	+5.8	+74.4
None	39	30.2	44	33.3	+3.1	+10.3

X^2 probability = Not significant

Table D-11

A Comparison of the 1993 and 1998 Child Safety Seat Use Rates for the Rear Seats in the Central Metropolitan Area

	1993		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	32	44.4	39	60.9	+16.5	+37.2
Incorrect	12	16.7	12	18.8	+2.1	+12.6
None	28	38.9	13	20.3	-18.6	-47.8

X^2 probability = Not significant

Table D-12

A Comparison of the 1993 and 1998 Child Safety Seat Use Rates for the Rear Seats in the Western Metropolitan Area

	1993		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	24	52.2	29	78.4	+26.2	+50.2
Incorrect	18	39.1	4	10.8	-28.3	-72.4
None	4	8.7	4	10.8	+2.1	+24.1

X^2 probability = Significant at 5%

Table D-13

A Comparison of the 1997 and 1998 Child Safety Seat Use Rates for the Rear Seats in all Mid-Size Cities Combined

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	31	44.9	46	63.0	+18.1	+40.3
Incorrect	12	17.4	11	15.1	-2.3	-13.2
None	26	37.7	16	21.9	-15.8	-41.9

X^2 probability = Not significant

Appendix E

A Comparison of the 1997 and 1998 Safety Restraint Rates in the Metropolitan Areas by Occupants Between 4 and 16 Years of Age by Area of State and Seat Position in the Vehicle

Table E-1

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for all Seat Positions in all Four Metropolitan Areas Combined

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	712	44.7	542	49.0	+4.3	+9.6
Incorrect	71	4.5	158	14.3	+9.8	+217.8
None	810	50.8	406	36.7	-14.1	-27.8

X^2 probability = Significant at 1%

Table E-2

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for all Seat Positions in the Northern Metropolitan Area

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	216	47.1	173	50.6	+3.5	+7.4
Incorrect	27	5.9	52	15.2	+9.3	+157.6
None	216	47.1	117	34.2	-12.9	-27.4

X^2 probability = Significant at 1%

Table E-3

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for all Seat Positions in the Western Metropolitan Area

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	47	32.9	45	45.9	+13.0	+39.5
Incorrect	8	5.6	21	21.4	+15.8	+282.1
None	88	61.5	32	32.7	-28.8	-46.8

X^2 probability = Significant at 1%

Table E-4

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for all Seat Positions in the Central Metropolitan Area

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	142	47.8	83	37.1	-10.7	-22.4
Incorrect	11	3.7	35	15.6	+11.9	+321.6
None	144	48.5	106	47.3	-1.2	-2.5

X^2 probability = Significant at 1%

Table E-5

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for all Seat Positions in the Eastern Metropolitan Area

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	307	44.2	241	54.5	+10.3	+23.3
Incorrect	25	3.6	50	11.3	+7.7	+213.9
None	362	52.2	151	34.2	-18.0	-34.5

X^2 probability = Significant at 1%

Table E-6

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for the Front Seats in all Metropolitan Areas Combined

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	422	55.5	201	59.1	+3.6	+6.5
Incorrect	52	6.8	60	17.6	+10.8	+158.8
None	287	37.7	79	23.2	-14.5	-38.5

X^2 probability = Significant at 1%

Table E-7

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for the Front Seats in the Northern Metropolitan Area

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	127	59.9	51	61.4	+1.5	+2.5
Incorrect	19	9.0	15	18.1	+9.1	+101.1
None	66	31.1	17	20.5	-10.6	-34.1

X^2 probability = Significant at 5%

Table E-8

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for the Front Seats in the Western Metropolitan Area

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	30	44.1	19	52.8	+8.7	+19.7
Incorrect	2	2.9	11	30.6	+27.7	+955.2
None	36	52.9	6	16.7	-36.2	-68.4

X^2 probability = Significant at 1%

Table E-9

A Comparison of the 1997 and 1998 Safety Restraint Use Rates
for the Front Seats in the Central Metropolitan Area

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	77	53.1	38	49.4	-3.7	-7.0
Incorrect	10	6.9	17	22.1	+15.2	+220.3
None	58	40.0	22	28.6	-11.4	-28.5

X^2 probability = Significant at 1%

Table E-10

A Comparison of the 1997 and 1998 Safety Restraint Use Rates
for the Front Seats in the Eastern Metropolitan Area

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	188	56.0	93	64.6	+8.6	+15.4
Incorrect	21	6.3	17	11.8	+5.5	+87.3
None	127	37.8	34	23.6	-14.2	-37.6

X^2 probability = Significant at 1%

Table E-11

A Comparison of the 1997 and 1998 Safety Restraint Use Rates
for the Rear Seats in all Metropolitan Areas Combined

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	290	34.9	341	44.5	+9.6	+27.5
Incorrect	19	2.3	98	12.8	+10.5	+456.5
None	523	62.9	327	42.7	-20.2	-32.1

X^2 probability = Significant at 1%

Table E-12

A Comparison of the 1997 and 1998 Safety Restraint Use Rates
for the Rear Seats in the Northern Metropolitan Areas

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	89	36.0	122	47.1	+11.1	+30.8
Incorrect	8	3.2	37	14.3	+11.1	+346.9
None	150	60.7	100	38.6	-22.1	-36.4

X^2 probability = Significant at 1%

Table E-13

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for the Rear Seats in the Western Metropolitan Areas

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	17	22.7	26	41.9	+19.2	+84.6
Incorrect	6	8.0	10	16.1	+8.1	+101.3
None	52	69.3	26	41.9	-27.4	-39.5

X^2 probability = Significant at 1%

Table E-14

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for the Rear Seats in the Central Metropolitan Areas

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	65	42.8	45	30.6	-12.2	-28.5
Incorrect	1	0.7	18	12.2	+11.5	+1642.9
None	86	56.6	84	57.1	+0.5	+0.9

X^2 probability = Not significant

Table E-15

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for the Rear Seats in the Eastern Metropolitan Areas

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	119	33.2	148	49.7	+16.5	+49.7
Incorrect	4	1.1	33	11.1	+10.0	+909.1
None	235	65.6	117	39.3	-26.3	-40.1

X^2 probability = Significant at 1%

Appendix F

A Comparison of the 1997 and 1998 Safety Restraint Use Rates in the Mid-Size Cities by Occupants Between 4 and 16 Years of Age by Locality and Seat Position in the Vehicle

Table F-1

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for All Seat Positions in All Mid-Size Cities Combined

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	123	31.9	122	42.2	+10.3	+32.3
Incorrect	13	3.4	54	18.7	+15.3	+450.0
None	249	64.7	113	39.1	-25.6	-39.6

X^2 probability = Significant at 1%

Table F-2

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for All Seat Positions in Charlottesville

	1997		1998		Difference in Percentages	Percent Difference
	No.	**%**	**No.**	**%**		
Correct	65	42.8	59	51.8	+9.0	+21.0
Incorrect	8	5.3	18	15.8	+10.5	+198.1
None	79	52.0	37	32.5	-19.5	-37.5

X^2 probability = Significant at 1%

Table F-3

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for All Seat Positions in Danville

	1997		1998		Difference in Percentages	Percent Difference
	No.	**%**	**No.**	**%**		
Correct	14	14.3	23	29.9	+15.6	+109.1
Incorrect	1	1.0	10	13.0	+12.0	N/A
None	83	84.7	44	57.1	-27.6	-32.6

X^2 probability = Significant at 1%

Table F-4

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for All Seat Positions in Lynchburg

	1997		1998		Difference in Percentages	Percent Difference
	No.	**%**	**No.**	**%**		
Correct	44	32.6	40	40.8	+8.2	+25.2
Incorrect	4	3.0	26	26.5	+23.5	+783.3
None	87	64.4	32	32.7	-31.7	-49.2

X^2 probability = Significant at 1%

Table F-5

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for the Front Seats in all Three Mid-Size Cities Combined

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	69	38.5	34	40.0	+1.5	+3.9
Incorrect	10	5.6	25	29.4	+23.8	+425.0
None	100	55.9	26	30.6	-25.3	-45.3

X^2 probability = Significant at 1%

Table F-6

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for the Front Seats in Charlottesville

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	37	51.4	13	43.3	-8.1	-15.8
Incorrect	5	6.9	10	33.3	+26.4	+382.6
None	30	41.7	7	23.3	-18.4	-44.1

X^2 probability = Significant at 1%

Table F-7

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for the Front Seats in Danville

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	6	14.3	5	27.8	+13.5	+94.4
Incorrect	1	2.4	3	16.7	+14.3	+595.8
None	35	83.3	10	55.6	-27.7	-33.3

X^2 probability = Significant at 5%

Table F-8

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for the Front Seats in Lynchburg

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	26	40.0	16	43.2	+3.2	+8.0
Incorrect	4	6.2	12	32.4	+26.2	+422.6
None	35	53.8	9	24.3	-29.5	-54.8

X^2 probability = Significant at 1%

Table F-9

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for the Rear Seats in all Three Mid-Size Cities Combined

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	54	26.2	88	43.1	+16.9	+64.5
Incorrect	3	1.5	29	14.2	+12.7	+846.7
None	149	72.3	87	42.6	-29.7	-41.1

X^2 probability = Significant at 1%

Table F-10

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for the Rear Seats in Charlottesville

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	28	35.0	46	54.8	+19.8	+56.6
Incorrect	3	3.8	8	9.5	+5.7	+150.0
None	49	61.3	30	35.7	-25.6	-41.8

X^2 probability = Significant at 1%

Table F-11

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for the Rear Seats in Danville

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	8	14.3	18	30.5	+16.2	+113.3
Incorrect	0	0.0	7	11.9	+11.9	N/A
None	48	85.7	34	57.6	-28.1	-32.8

X^2 probability = Significant at 1%

Table F-12

A Comparison of the 1997 and 1998 Safety Restraint Use Rates for the Rear Seats in Lynchburg

	1997		1998		Difference in Percentages	Percent Difference
	No.	%	No.	%		
Correct	18	25.7	24	39.3	+13.6	+52.9
Incorrect	0	0.0	14	23.0	+23.0	N/A
None	52	74.3	23	37.7	-36.6	-49.3

X^2 probability = Significant at 1%