

Report No. VTRC 89-R28	Report Date May 1989	No. Pages 55	Type Report: Final Period Covered: June 1983 - June 1988	Project No. 9225-452-940 Contract No.: DE88-04-54004
Title and Subtitle An Observational Survey of Safety Belt and Child Safety Seat Use in Virginia - The 1988 Update			Key Words Safety Belts Child(ren) Seats Usage Drivers Passengers Sex Age	
Author(s) C. B. Stoke				
Performing Organization Name and Address Virginia Transportation Research Council Box 3817, University Station Charlottesville, Virginia 22903-0817				
Sponsoring Agencies' Names and Addresses Va. Dept. of Transportation 1221 E. Broad Street Richmond, Virginia 23219			University of Virginia Charlottesville Virginia 22903	
Supplementary Notes Project funded by: Virginia Department of Motor Vehicles P.O. Box 27412 Richmond, VA 23269				
Abstract Observational surveys of safety belt use in Virginia have been conducted in two series. The first covered 1974 through 1977, and the second 1983 through 1988. This report is concerned only with the latter series and encompasses use rates that are the result of passage of the Child Safety Seat Law (Senate Bill 413), which went into effect on January 1, 1983, and the Mandatory Use Law (MUL) (House Bill 1210), which went into effect on January 1, 1988. Observed belt usages are analyzed according to a number of occupant, vehicle, and geographic characteristics. Each of these is discussed in a separate section of the report. There were gradual increases in safety belt use in the urban areas between 1983 and 1987. Subsequent to the effective date of the state MUL, there was a sharp rise in use rates. In 1988, 68.9% of the urban drivers and 50.8% of the urban passengers used a safety belt. Use rates in the towns were much lower than those for the urban areas, but there also was a large increase in usage rates subsequent to the MUL. Although there were large differences in the belt use rates among the towns surveyed, 55.8% of the town drivers and 37.1% of the town passengers were belt users in 1988. The combined statewide rates were 65.5% for drivers and 46.8% for passengers--rates of use nearly double the pre-MUL rates of 34.3% and 28.9%. A number of other findings are presented in the report. Among these are the following: (1) belt use was highest in the northern area of the state; (2) there was little difference in use rates throughout the day; (3) approximately two-thirds of all the infants were in safety seats; (4) 37.5% (1987) and 21.4% (1988) of the child seats were misused in an obvious way; and (5) with the exception of infants, older adults had the highest rates of use in 1988. It was concluded that passage of the Child Safety Seat Law and the MUL had a major positive influence on safety belt use rates in Virginia. It is recommended that efforts to bolster the belt-wearing habits of Virginians should be directed to the residents of the smaller communities and rural areas. Efforts should also be directed at occupants of the rear seating positions of automobiles and at males 17 through 30 years old. Finally, programs and expenditures of funds should be initiated in areas where use rates have started to decline or have remained below one-half of those observed.				

AN OBSERVATIONAL SURVEY OF SAFETY BELT AND
CHILD SAFETY SEAT USE IN VIRGINIA

The 1988 Update

Charles B. Stoke
Research Scientist

A report prepared by the Virginia Transportation Research Council
under the sponsorship of the Transportation Safety Administration
of the Department of Motor Vehicles

(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)

May 1989
VTRC 89-R28

SAFETY RESEARCH ADVISORY COMMITTEE

- P. S. MCCREREY, Chairman, Director, Planning & Program Development,
Department of Motor Vehicles
- R. J. BREITENBACH, Director, Transportation Safety Training Center,
Virginia Commonwealth University
- V. M. BURGESS, Transportation Safety Administrator, Department of Motor
Vehicles
- J. T. HANNA, Deputy Commissioner, Department of Motor Vehicles
- C. P. HEITZLER, JR., Program Manager, Department of Information
Technology
- D. R. HENCK, Executive Director, Commission on VASAP
- T. A. JENNINGS, Safety/Technology Transfer Coordinator, FHWA
- B. G. JOHNSON, Supervisor, Driver Education, Department of Education
- B. D. LEAP, Driver Services Administrator, Department of Motor
Vehicles
- C. W. LYNN, Reseach Scientist, VTRC
- R. P. MINER, Commander, Traffic Division, Fairfax County Police
Department
- J. T. PHIPPS, Director, Roanoke Valley Alcohol Safety Action Project
- C. M. ROBINSON, Director, Bureau of Field Operations, Virginia
Department of State Police
- C. H. SIMPSON, JR., Division Manager, Planning and Evaluation,
Department of Motor Vehicles
- F. F. SMALL, Assistant State Traffic Engineer, VDOT
- J. A. SPENCER, Assistant Attorney General, Office of the Attorney
General
- E. W. TIMMONS, Director of Public Affairs, Tidewater AAA of Virginia,
Norfolk, Virginia

SUMMARY OF FINDINGS

Observational surveys of safety belt use in Virginia have been conducted in two series. The first covered 1974 through 1977, and the second 1983 through 1988. This report is concerned only with the second series and encompasses use rates that are the result of passage of the Child Safety Seat Law (Senate Bill 413), which went into effect on January 1, 1983, and the Mandatory Use Law (House Bill 1210), which went into effect on January 1, 1988.

The data that form the basis for this summary are contained in the Appendices. Data on the safety belt use rates in urban areas are contained in Table 1 of the Appendix. Use rates from the town surveys, and the combined urban and town rates that are considered statewide rates are shown in Table 2 of the Appendix. Among the data contained in Appendix Tables 1 and 2 are those associated with the sex and age of the occupant, the time of day the data were collected, and the geographic area of the state surveyed. The data for the rates of belt use by occupant seat position for each of the communities surveyed are contained in Table 3 of the Appendix. From these figures, the actual rates of use can be determined, and this information can be used by state and local officials to design and evaluate special programs to increase safety belt use in designated areas. Because some of the rates of use reported in Table 3 are either very high or very low, Table 4 of the Appendix, which shows the actual number of persons who were using safety belts, has been included. In this way, the reader can determine the relative significance of the rates of use shown. In addition, each section of this report--urban, town, and statewide--contains a detailed summary of the findings identified in the section narrative.

The following are the major study findings.

1. There were gradual increases in urban area safety belt use by drivers and passengers from 1983 through 1987, but in 1988, subsequent to passage of the state Mandatory Use Law (MUL), there was a sharp rise in the use of safety belts by motor vehicle occupants (see Figure i).
2. For each age classification of urban occupant, except infants who had a nearly level longitudinal usage rate, belt use rates gradually rose between 1983 and 1987, and sharply increased following implementation of the state MUL on January 1, 1988 (see Figure ii).
3. When data were categorized by urban area of the state, the rates followed the same gradual five-year rise and sharp increase after the MUL's effective date (see Figure iii).
4. Driver, passenger, and total use rates in towns were much lower than those for the urban area occupants during both years these data were collected. Town data also show the large increase in rates subsequent to the MUL (see Figure iv).

5. Between 1987 (pre-MUL) and 1988 (post-MUL), there was a large increase in statewide use rates for drivers, passengers, and all occupants (see Figure v).

6. Among the urban communities surveyed, 1987 belt use rates varied from 23.7% to 59.6% for drivers and from 14.9% to 56.9% for passengers. The 1988 rates varied from 56.1% to 79.3% for drivers and from 39.5% to 68.2% for passengers.

7. In 1987, belt use rates in towns varied from 11.6% to 31.6% for drivers and from 6.8% to 32.3% for passengers. In 1988, driver rates varied from 46.8% to 66.4%, and the rates for passengers ranged from 29.3% to 46.8%.

8. Of the infants observed statewide, 37.5% (1987) and 21.4% (1988) were categorized as being incorrectly restrained in a child safety seat.

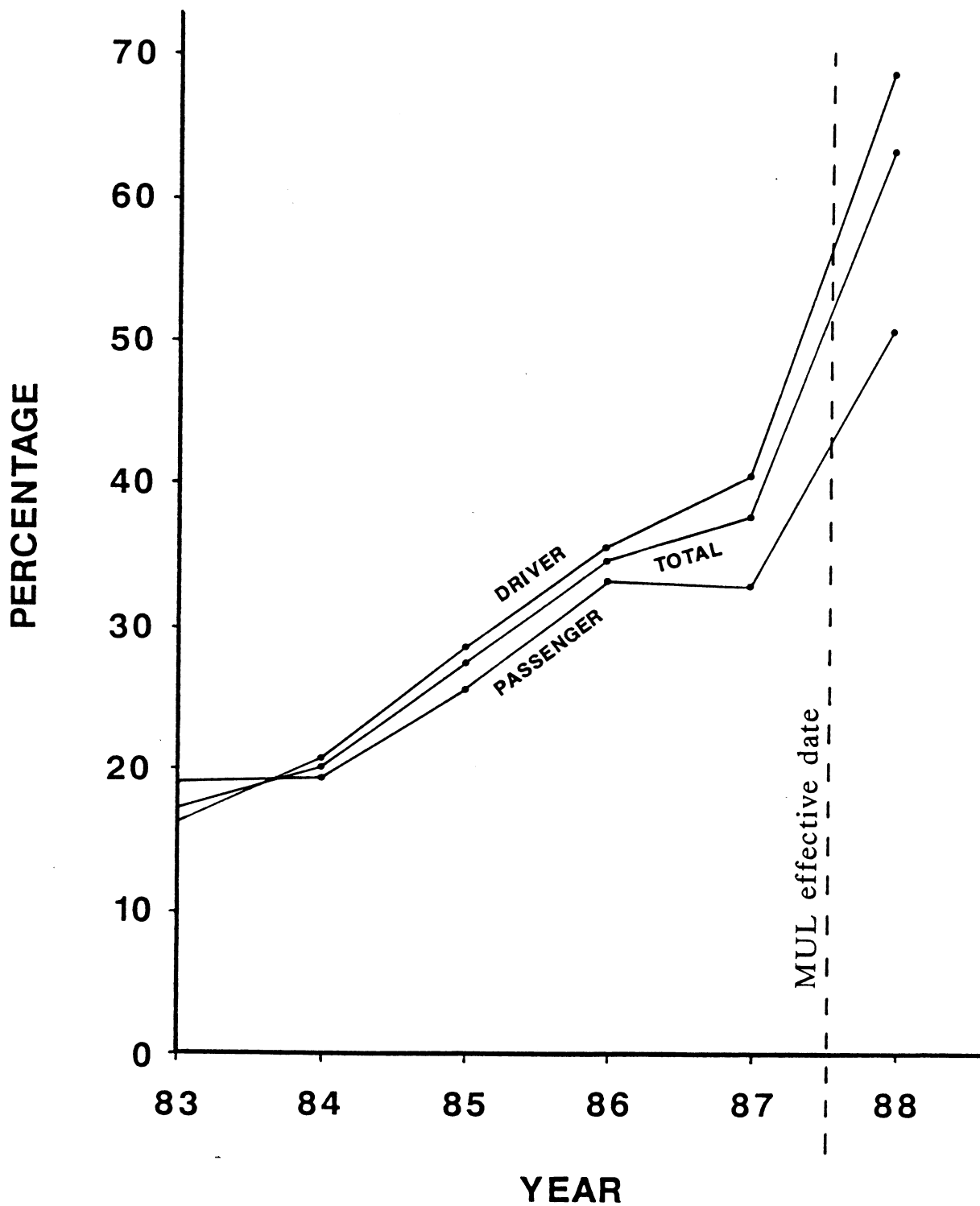


Figure i. Urban Safety Belt Use by Occupant Seat Position

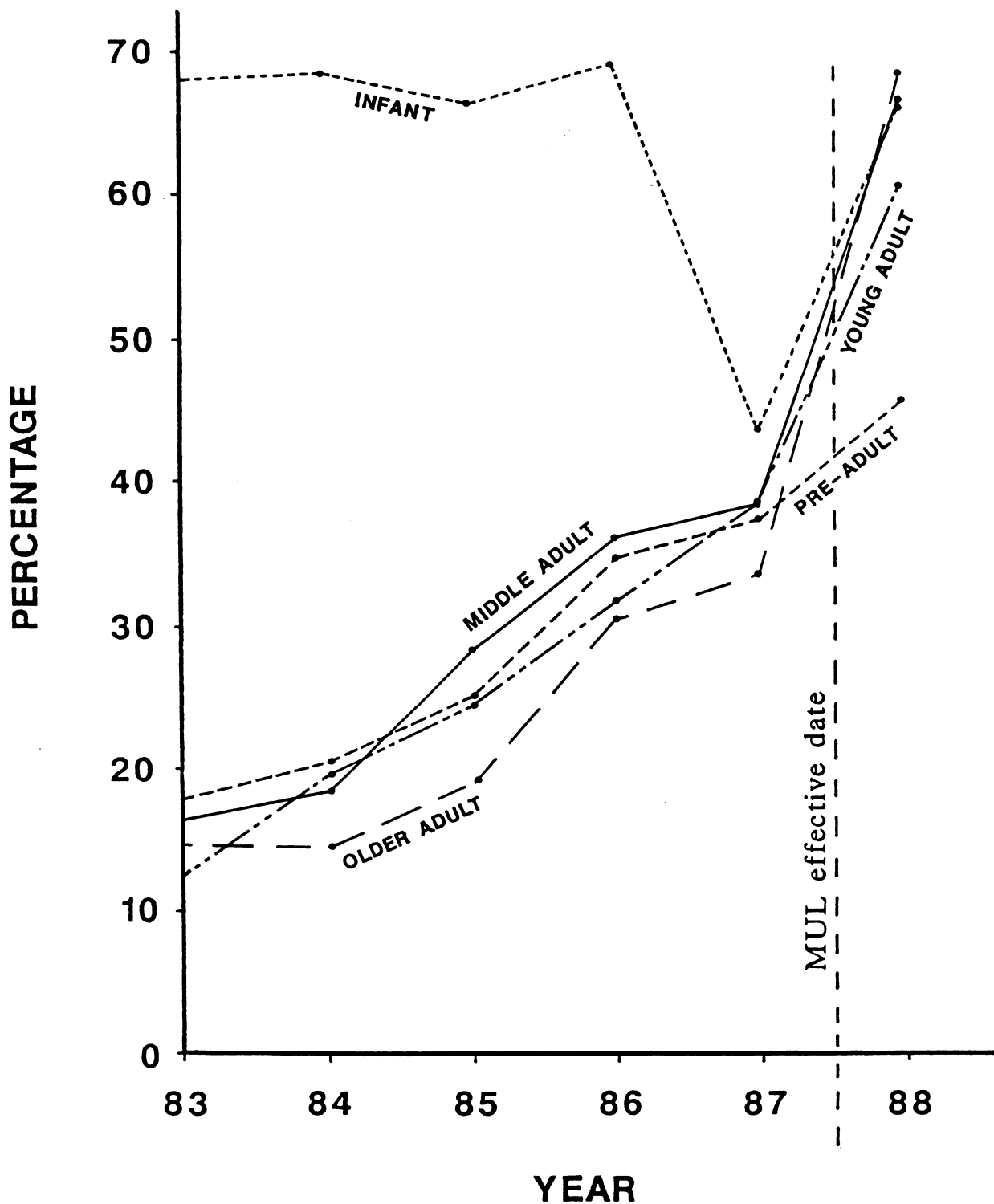


Figure ii. Urban Safety Belt Use by Occupant Age

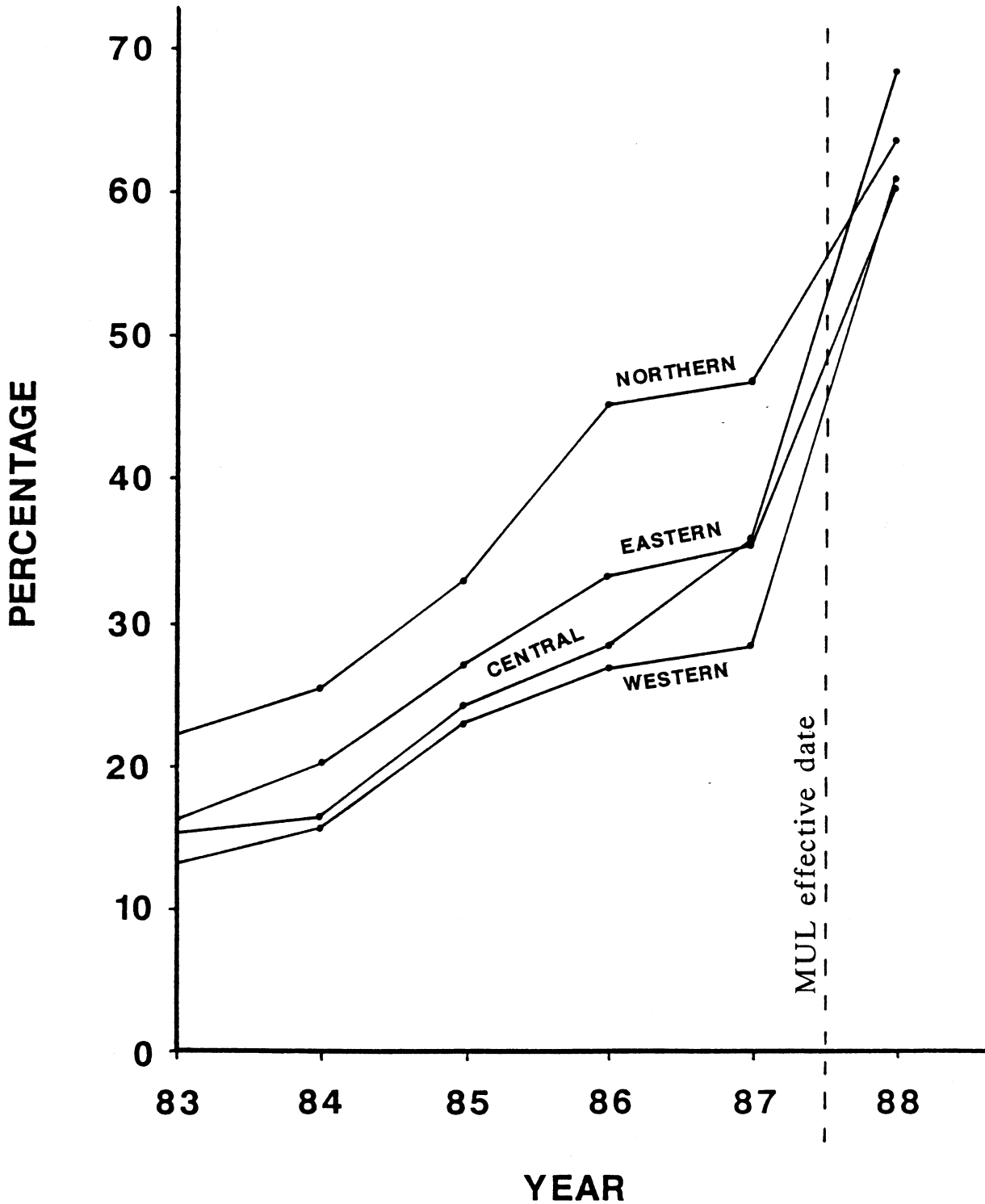


Figure iii. Urban Safety Belt Use by Area of the State

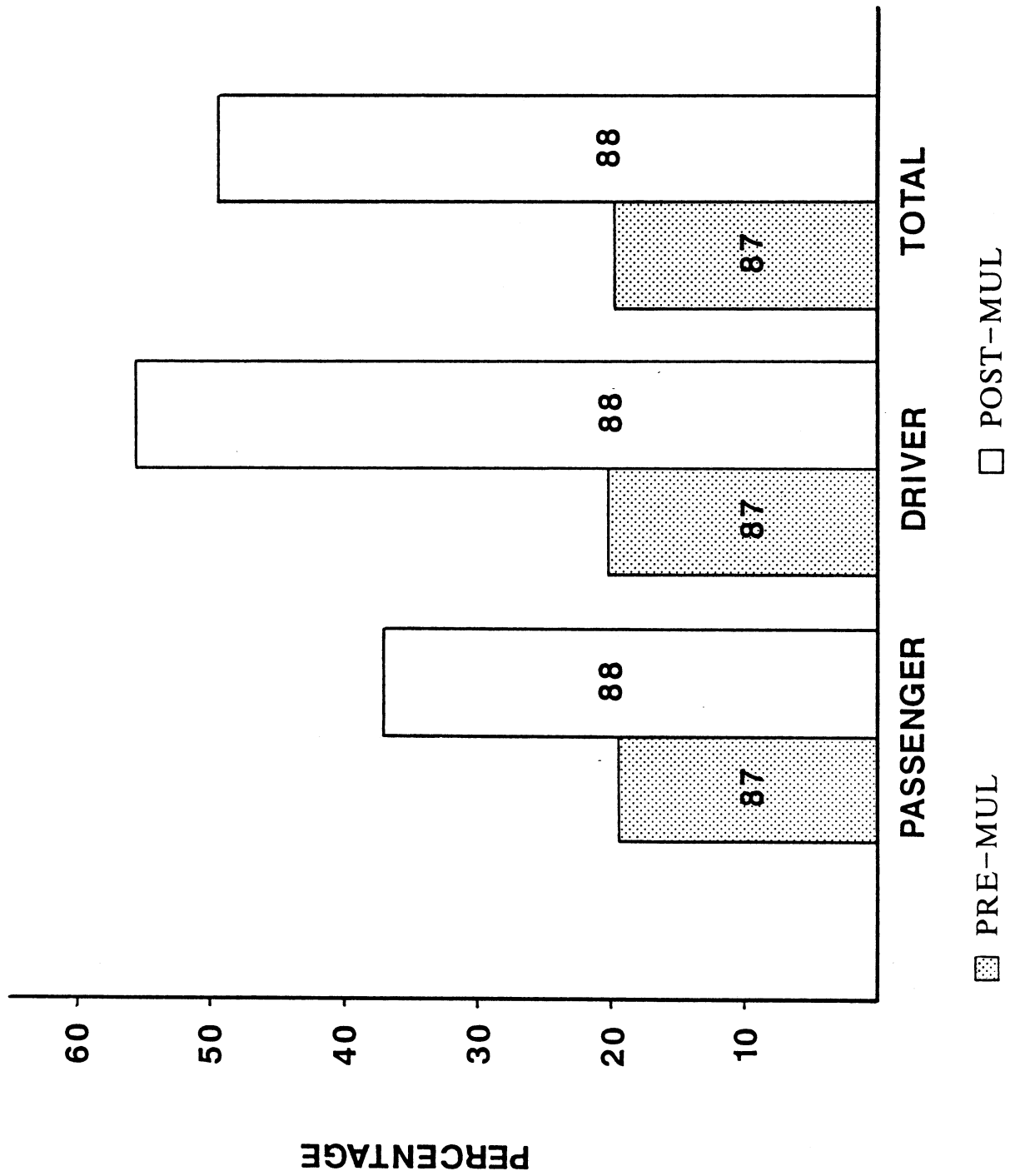


Figure iv. Town Safety Belt Use by Occupant Seat Position

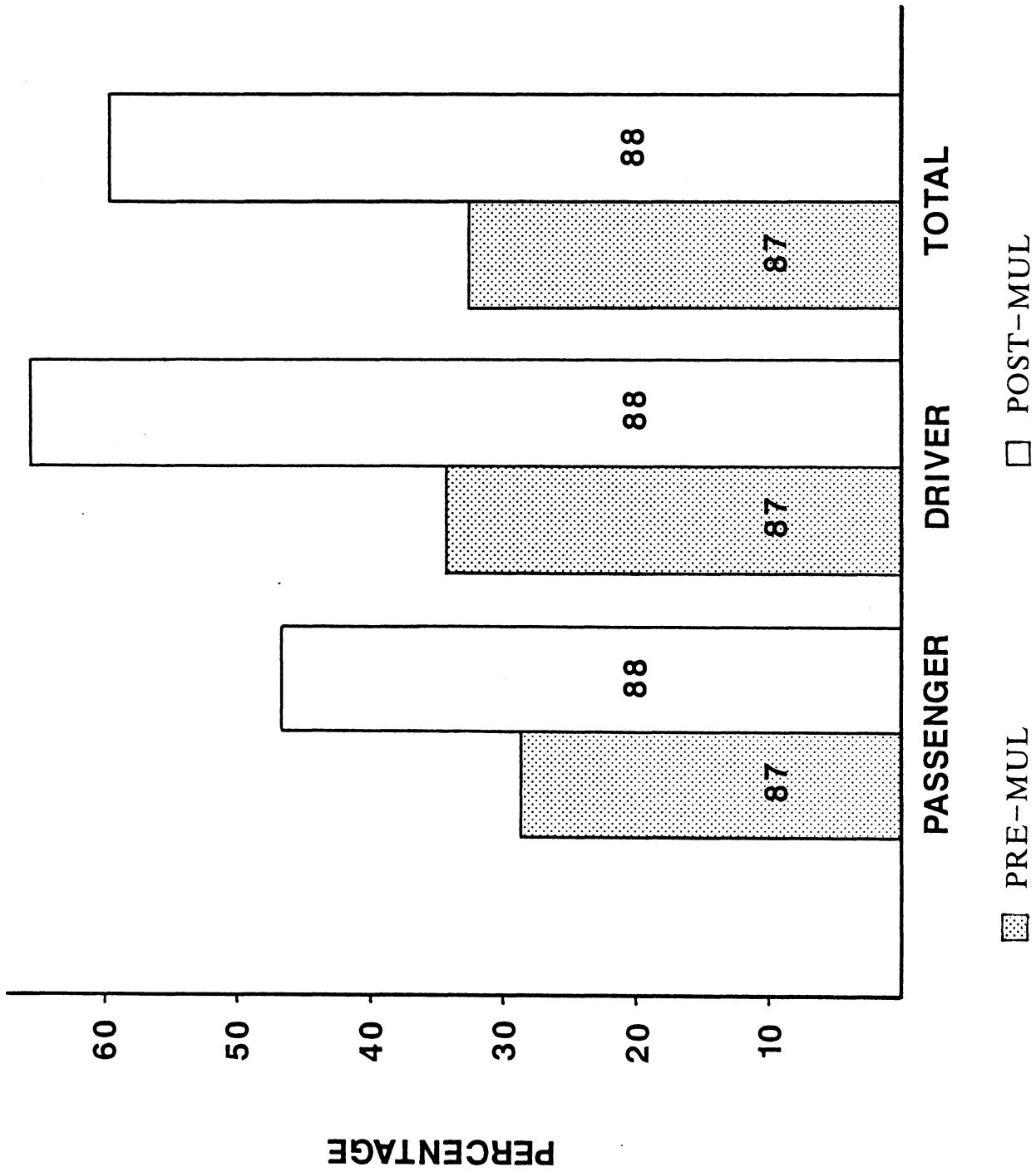


Figure v. Statewide Safety Belt Use by Occupant Seat Position

CONCLUSIONS

From 1983 through 1987, there were yearly increases in driver and passenger safety belt usage in urban areas. The precise reasons for these changes cannot be determined from the data collected. Some of this increase could have resulted from increased publicity and some from the passage of the Child Safety Seat Law which may have had an accompanying spillover effect on other vehicle occupants. The sharp rise in belt usage between 1987 and 1988 resulted from the implementation of the state Mandatory Use Law on January 1, 1988.

The high rate of child safety seat use is attributable to the passage of the safety seat statute during the 1982 session of the legislature. Prior to 1983, fewer than 20% of the infants in surveyed automobiles were restrained in safety seats. Subsequent to the effective date of the statute, approximately two-thirds of the infants were in child safety seats, and the rate has remained relatively stable over the six-year period.

The decline in 1987 in the rate of correct child seat usage was the result of a change in the data collection process. A special training session on the identification of correct use patterns resulted in the observers being less lenient in their recording of correct child seat use. The combined correct and incorrect use in 1987 was similar to the rates from the previous four years. In 1988, child safety seat use was similar to the years prior to 1987. Although special training in correct usage was given to the field observation personnel, the process was not as strongly emphasized as in 1987.

There was a considerable difference between the safety belt usage rates in the urban areas and those in the towns. There also were large differences in the rates within the four urban areas and among the towns surveyed. The data do not identify the reasons for these differences.

RECOMMENDATIONS

Belt use patterns in the state indicate that most efforts to bolster the wearing habits of Virginians should be directed to the residents of the smaller communities and rural areas. Efforts should also be directed to occupants of the rear seating positions of automobiles and to younger males (17 through 30 years of age). In addition, state and local governments should emphasize safety belt programs and the expenditure of funds in all areas in which use rates have started to decline or have remained below one-half of those observed.

AN OBSERVATIONAL SURVEY OF SAFETY BELT AND
CHILD SAFETY SEAT USE IN VIRGINIA

The 1988 Update

Charles B. Stoke
Research Scientist

INTRODUCTION

Safety officials and the motoring public have generally agreed that the use of automobile safety belts is one of the easiest and most efficient methods of preventing the deaths and injuries that result from motor vehicle crashes. It is unfortunate that this consensus has not yielded an improvement in the belt use habits of motorists. Because motor vehicle occupants are frequently not belt users, a number of activities have been initiated on the local, state, and national level in an attempt to bolster the use of these safety devices. These initiatives have had varying degrees of success.

In an effort to determine various characteristics of belt use and belt users and to obtain data for use in the evaluation of countermeasure programs to increase use, both federal and state governmental agencies have conducted a variety of surveys of belt usage. The early studies used questionnaire and interview formats, whereas the more recent and more sophisticated studies have used observational techniques.

Observational surveys of safety belt use in Virginia have been conducted in two series. The first series covered 1974 through 1977, and the second covered 1983 through 1988. Data were collected in February of 1974, 1975, and 1976 and in June of each of the other seven years. The surveys were originally designed to determine whether there were fluctuations over time in the percentages of persons using seat belts and shoulder straps. The fourth survey, conducted during June 1977, was the first to include observations of the use of child restraints. After the 1977 survey, it was determined by transportation safety management that annual updates were not necessary and that surveys would be conducted following events expected to change the pattern of safety belt usage.

The first significant event to occur after the 1977 survey was passage of the Child Safety Seat Law (Senate Bill 413) during the 1982 session of the Virginia General Assembly. This statute went into effect January 1,

1983, and in June, observers were in the field collecting data on the use of child restraints. At the same time, data were collected on the use of safety belts by other vehicle occupants. Belt use data have been collected each summer since 1983 because efforts by various state and private groups, members of the legislature, and both the print and electronic media should have influenced user rates and patterns.

PURPOSES

This study has three purposes: (1) to determine the extent to which the law mandating the use of child safety seats has affected usage rates, (2) to determine the extent to which the law mandating the use of belts by front seat occupants has changed usage rates, and (3) to determine user (and nonuser) characteristics for use in the subsequent efforts to increase belt usage.

SURVEY METHODOLOGY

In June of each year since 1983, observers surveyed vehicle occupants in the four major metropolitan areas of the state. Surveys were conducted for two days in the Roanoke-Salem area (Western Urban), three days in the Alexandria-Arlington-Fairfax County area (Northern Urban), two days in the Richmond-Henrico-Chesterfield area (Central Urban), and two days in the Norfolk-Hampton-Newport News area (Eastern Urban).

Three sites located in different sections of the survey areas were used each day. The sites were chosen because they carried relatively high traffic volumes and provided adequate and safe vantage points for the observers. On each day that data were collected, both primary and secondary routes were sampled. Although the study sites did not include any interstate highways, vehicles going to and from such roadways were surveyed. The observers worked three periods of two and one-half hours each: (1) morning rush hour, (2) mid-day shopping/lunch hour, and (3) afternoon rush hour. Data were collected on each day of the week.

The survey procedures limited the types of vehicles included in the observation sample. Only occupants riding in passenger cars with Virginia license plates were included in the survey sample. State, municipal, and company vehicles were excluded because the use of safety belts by the occupants of these vehicles might be mandated by the employers.

Data collection procedures were modified by the addition of nine small jurisdictions to the survey sites beginning with the June 1987 survey. Throughout this report, these localities will be referred to as towns even though some are actually small cities. During one week in June, one day was worked in Marion, Wytheville, and Galax (Western Town), one in Covington,

Lexington, and Harrisonburg (Valley Town), and one in Emporia, South Boston, and Farmville (Southside Town). Data were collected during two-hour periods in each community and the survey time periods were selected based on the traffic patterns and traffic volumes within the community and the time of day the major employment centers began and ended the work day. In addition, because each set of towns was dispersed over a wide geographic area, time had to be allowed for travel from one survey location to the next. The three time periods used were: (1) morning rush hour, (2) mid-day shopping/lunch hour, and (3) afternoon rush hour.

All observations were made at signalized intersections. Usually occupants of vehicles in the lane adjacent to the curb were surveyed, although traffic flow dictated the use of other lanes in some instances. A clipboard bearing the question "Are you wearing safety belts?" was displayed by the observer to alert travelers to the purpose of the survey. After the clipboard was presented, the observer approached the car at the right front fender, and walked along the side and past the vehicle recording the use of safety restraints. Often the occupants of the vehicle would reply to the question on the clipboard, but only information verified by the observer was recorded. Persons volunteering information were acknowledged, but their comments were recorded only when their vehicles were within the guidelines specified for data collection.

At each site, the observers recorded whether the driver and all passengers were using only a lap belt, both the lap and shoulder belts, or no form of safety restraint. In addition, they recorded whether there were any infants in the car and whether they were in safety seats. In years prior to 1986, any incorrect child seat use was recorded as if the seat was not being used. For 1986, 1987, and 1988, child safety seat use was categorized as follows: (1) a child in the seat, and the seat correctly used (the "A" answer); (2) a child in the seat, and the seat incorrectly used (the "Z" answer); and (3) a child in the car, and the restraint not being used (the "N" answer). The survey personnel also recorded the sex and approximate age of each occupant in the vehicle. Occupant age was divided into five categories: (1) infants (up to 4 years old), (2) pre-adult (4 to 16 years), (3) young adults (17 to 30 years), (4) middle adults (31 to 60 years), and (5) older adults (over 60 years). Figure 1 is a copy of the data collection form used.

One major change was made in the survey procedures in 1987 involving the recording of correct or incorrect use of child safety seats. This change came about because of concerns expressed on both a state and national level that the observers from previous surveys were being too lenient in their recording of correct usage. The members of the observation teams were given special instructions to make them aware of features of child seat use that should lead to the use being recorded as incorrect. A number of items were discussed and examples were studied. In addition, sample seats were used to demonstrate various principles. Among the items that would de-

SAFETY BELT USAGE SURVEY FORM

DATE _____ START TIME _____ LOCATION _____
 SHEET NO. _____ STOP TIME _____ AT _____

DRIVER	MID FRONT	RIGHT FRONT	LEFT REAR	MID REAR	RIGHT REAR
BELT SEX AGE	BELT SEX AGE	BELT SEX AGE	BELT SEX AGE	BELT SEX AGE	BELT SEX AGE
L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y
S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O
L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y
S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O
L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y
S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O
L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y
S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O
L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y
S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O
L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y
S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O
L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y
S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O
L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y
S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O
L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y
S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O
L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y	L A M I P Y
S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O	S Z F M O

RESTRAINT USAGE:

- L - LAP BELT
- S - LAP/SHOULDER
- N - NONE
- A - CHILD SEAT
- CORRECTLY USED
- Z - CHILD SEAT
- INCORRECTLY USED

OCCUPANT AGE:

- I - INFANT (0-3 YRS.)
- P - PRE-ADULT (4-16 YRS)
- Y - YOUNG ADULT (17-30 YRS.)
- M - MIDDLE ADULT (31-60 YRS.)
- O - OLDER ADULT (61+ YRS.)

Figure 1: Sample Survey Form

termine use patterns were: (1) the routing of the lap belt through the seat structure, (2) the orientation of the seat (whether it was facing the proper direction for the age of the occupant), (3) the use of the child seat harness (assuring that it was clipped together and that the occupant was properly within it), (4) the presence of a locking clip and top tether strap (and the style of seat where they might be expected), and (5) the use (or non-use) of arm bars or shields. In previous years, only the belt routing and use of arm bars/shields were closely observed.

Because of the changes added in 1987, it was very likely that subsequent correct belt use would be lower than in previous years. If by adding correct and incorrect use rates for each of the six years (1983-1988), the totals for 1987 and 1988 were similar to those in the other years (but correct usage was dissimilar), it could then be assumed that the new, more stringent procedures were responsible for any difference in the correct use rates.

ANALYSIS

The survey data in this report are discussed in three sections. In the first, data from the urban areas are analyzed. These data are a continuation of data collected at the same sites used since 1974. Only the data collected since 1983 are included in this report. The second section discusses data collected in nine small towns located in three different geographic areas of the state. Small town data collection was added in 1987; therefore, there are no comparable figures from previous years. In the third section, the combined urban and small town data are treated as statewide data. These combined data are available only for 1987 and 1988.

Safety Belt Usage in Urban Areas

At the outset, it should be noted that large percentage increases in safety belt usage from year to year and over the six years could be the result of small numerical increases in very small survey samples. They also could be the result of a change in the actual use patterns. The reader is cautioned to view large percentage rates of change in use patterns in light of the overall percentage of use for the category under discussion.

The data in Table 1 show the rates of safety belt use by drivers and passengers. Rates of use for the occupants of each seat position are based on the number of occupants in that position. Thus, the figures in Table 1 make it appear that the use of child restraints is very low because these use rates are not restricted to those for occupants in the 0-4 age group. Subsequent tables in the report show age group usage rates.

There has been a significant increase in safety belt use by urban area drivers over these six years. The use of lap belts has remained at a

TABLE 1
Use of Safety Belts
Urban Areas

Occupant Seat Position	Belt Used	1983		1984		1985	
		Number	Percent	Number	Percent	Number	Percent
Driver	Lap Only	132	2.0	165	2.8	128	2.4
	Lap/Shoulder	936	14.4	1,030	17.7	1,415	26.0
	None	5,427	83.6	4,656	79.5	3,893	71.6
Right Front Passenger	Lap Only	51	2.5	59	3.0	64	3.7
	Lap/Shoulder	246	12.1	247	12.5	322	18.8
	Child "A" ¹	33	1.6	24	1.2	37	2.2
	Child "Z" ²	N/A ³	----	N/A	----	N/A	----
	None	1,700	83.7	1,653	83.4	1,292	75.3
Remaining Passengers	Lap Only	82	6.8	139	12.1	108	11.0
	Lap/Shoulder	13	1.1	7	0.6	20	2.0
	Child "A"	190	15.7	131	11.4	142	14.4
	Child "Z"	N/A	----	N/A	----	N/A	----
	None	922	76.4	870	75.9	714	72.6

Occupant Seat Position	Belt Used	1986		1987		1988	
		Number	Percent	Number	Percent	Number	Percent
Driver	Lap Only	156	2.5	93	1.5	178	2.5
	Lap/Shoulder	2,033	33.0	2,339	38.9	4,742	66.4
	None	3,966	64.4	3,588	59.6	2,217	31.1
Right Front Passenger	Lap Only	80	4.0	66	3.5	96	4.7
	Lap/Shoulder	524	26.5	575	30.3	1,084	52.6
	Child "A"	33	1.7	37	2.0	49	2.4
	Child "Z"	4	0.2	15	0.8	11	0.5
	None	1,337	67.6	1,202	63.4	820	39.8
Remaining Passengers	Lap Only	224	20.3	212	19.2	171	15.1
	Lap/Shoulder	24	2.2	14	1.3	41	3.6
	Child "A"	135	12.3	95	8.6	182	16.0
	Child "Z"	27	2.4	68	6.1	38	3.4
	None	692	62.8	718	64.9	702	61.9

¹ Child in seat, and seat correctly used.

² Child in seat, and seat incorrectly used.

³ N/A = data not categorized in this manner.

relatively stable level of less than 3% over the period. Part of this stability is accounted for by the limited number of vehicles equipped with this belt system, and the fact that there is little change in vehicle ownership from year to year. Driver use of the lap/shoulder (L/S) system increased from 14.4% in 1983 to 66.4% in 1988. In the five years prior to the passage of the state's MUL in 1987, there were gradual increases in yearly usage rates; but between January 1, 1988, and June 30, 1988, the usage rate increased by just over 70%, from 40.4% to 68.9%

Right front passenger (RFP) belt use increased each year, with most of this usage accounted for by the use of the L/S belt system. There was an increase in L/S usage in each of the successive surveys, rising from 12.1% in 1983 to 52.6% in 1988. The use of lap belts has been in the 3.0% to 5.0% range over this period. The percentage of correctly used child safety seats has remained stable at nearly 2.0% of all occupants observed each year. As with drivers, there was a large increase in RFP usage after the law became effective: from 35.8% in 1987 to 59.7% in 1988.

From 1986 through 1988, the data included a new usage classification: incorrectly used child safety seats. Because this was an in-traffic survey, the observation team could not enter vehicles to check for certain installation characteristics. In 1986, only the most obviously misused systems were identified; but in 1987 and 1988, the observers received special training and were less lenient in attributing usages as correct. In 1986, only four of the thirty-seven infants in child safety seats in the RFP seat position were classified as being incorrectly restrained in a child safety seat. In 1987, 15 of the 52 infants were categorized as in incorrectly used child safety seats. In 1988, 11 of the 60 infants were so classified. This misuse of child seats was nearly 11.0% in 1986, almost 29% in 1987, and just over 18% in 1988.

Belt use by the remaining passengers (RPs) was 23.6% in 1983, and it increased each year until it reached 34.8% in 1986, dropped to 29.1% in 1987, and rose to 34.7% in 1988. Use of the L/S system was relatively low and ranged from less than 1% to nearly 4% because only a few vehicle models have these L/S belt systems installed for RPs. The use of lap belts peaked at 20.3% in 1986, and had decreased to 15.1% in 1988. The rates for correctly used child seats were the most variable of any of these data, ranging from 8.6% to 16.0%, with the extremes occurring in the last two years. Of the 162 infants in child safety seats, 27 were categorized as incorrectly restrained in 1986. In 1987, 68 of the 163 infants were so categorized, and in 1988, 38 of 220 infants were incorrectly restrained. Although the incorrect use of child seats by RPs for the last three years accounted for only 2.4%, 6.1%, and 3.4% of all occupants; this incorrect safety seat use involved 16.7%, 41.7%, and 17.3% of the infant occupants in these seat positions. This is a relatively high misuse rate and indicates there is work to be done in solving this problem.

Data collected during the six surveys reported here show that safety belt usage has increased each year, with a major increase occurring

immediately after passage of the state's MUL. This increase in usage in Virginia is consistent with data collected on a nationwide basis. The U.S. DOT has released the results of the most recent 19-city survey (June through August 1988). Belt use rates varied from 17.6% in Providence, Rhode Island to 67.8% in Houston, Texas. The overall rate was 45.6%, and the rate for all cities in states with an MUL was 51%. Both the U.S. overall and MUL rates were exceeded by the rate of use in Virginia in June, 1988.

Data on the association between driver and passenger uses of safety belts are contained in Table 2. The survey results from all six years indicate that when the driver was not using safety belts most of the RFPs also were not using safety belts. Although there were increases in belt usage each year between 1983 (5.4%) and 1988 (15.1%), over 85% of all the RFPs riding in cars with unbelted drivers were not using the safety restraints available to them. The belt use figures for the RPs were only slightly different than those for the RFPs, but a large majority (over 83%) of these passengers also were not using safety belts when riding with unbelted drivers. While the RP use rates have varied over the years, the greatest rate of use (17.2%) was in 1983. The RP use rate in 1988 was 13.2%, a rate lower than all previous years except 1987. A low RP rate is cause for concern because these are the seat positions used primarily by infants and young children. Although adults might elect not to protect themselves, it should be expected that they would protect their children, especially in light of a statute requiring the use of child safety seats for children younger than 5 years of age.

The data were also categorized according to RFP and RP use patterns when the driver was using a safety belt system. Since 1984, an increasing percentage of RFPs have been using safety belts when riding with drivers who were using their belts. In 1988, over 81% of these occupants were using safety belts. The figures for the RPs were not nearly as high as those for the RFPs. The rates have varied from just over one-half of the RP occupants in 1983 and 1984 who were using belts to over 60% in 1985, 1986, and 1987. The rate in 1988 (45.2%), however, was the lowest of the six years.

The survey data presented in Table 2 indicate that when drivers were using safety belts a very large proportion of the passengers were also using safety belts. Conversely, when drivers were not using a belt system, a very large proportion of the passengers also were not using a belt system. These data do not show whether driver use caused passenger use or whether passenger use caused driver use; they do, however, indicate that if one vehicle occupant uses a belt system, there is a high probability that other occupants will also use them.

The data in Table 3 depict safety belt use according to the sex of the occupant. Belt usage increased in each succeeding year for both male and female drivers. There was a major change in the belt use habits of drivers between 1987 and 1988. This was more than likely the result of HB 1210

TABLE 2

Association Between Driver and Passenger Uses of Safety Belts
Urban Areas

WHEN DRIVERS NOT USING SAFETY BELTS

Occupant Seat Position	Occupant Use of Belts	1983		1984		1985	
		Number	Percent	Number	Percent	Number	Percent
Right Front Passenger	Belted	92	5.4	97	6.0	92	7.3
	Not Belted	1,598	94.6	1,528	94.0	1,176	92.7
Remaining Passengers	Belted	173	17.2	138	15.4	93	13.4
	Not Belted	830	82.8	760	84.6	600	86.6

Occupant Seat Position	Occupant Use of Belts	1986		1987		1988	
		Number	Percent	Number	Percent	Number	Percent
Right Front Passenger	Belted	127	9.6	142	12.0	102	15.1
	Not Belted	1,199	90.4	1,046	88.0	574	84.9
Remaining Passengers	Belted	118	16.6	83	11.6	49	13.2
	Not Belted	591	83.4	632	88.4	321	86.8

WHEN DRIVERS USING SAFETY BELTS

Occupant Seat Position	Occupant Use of Belts	1983		1984		1985	
		Number	Percent	Number	Percent	Number	Percent
Right Front Passenger	Belted	238	70.4	233	65.1	331	74.0
	Not Belted	100	29.6	125	34.9	116	26.0
Remaining Passenger	Belted	111	54.7	139	55.8	177	60.8
	Not Belted	92	45.3	110	44.2	114	39.2

Occupant Seat Position	Occupant Use of Belts	1986		1987		1988	
		Number	Percent	Number	Percent	Number	Percent
Right Front Passenger	Belted	510	77.3	536	75.8	1,127	81.4
	Not Belted	150	22.7	171	24.2	257	18.6
Remaining Passenger	Belted	265	67.4	238	60.7	345	45.2
	Not Belted	128	32.6	154	39.3	419	54.8

TABLE 3
Belt Use by Sex of Occupant
Urban Areas

Occupant Seat Position	Sex of Occupant	1983		1984		1985	
		Number	Percent	Number	Percent	Number	Percent
Driver	Male	538	15.5	638	19.5	752	26.4
	Female	530	17.5	565	21.9	791	30.6
Right Front Passenger	Male	98	15.0	97	14.2	143	25.4
	Female	232	16.9	233	17.9	280	24.3
Remaining Passenger	Male	120	24.0	139	27.8	143	31.8
	Female	165	23.4	138	21.3	127	23.7

Occupant Seat Position	Sex of Occupant	1986		1987		1988	
		Number	Percent	Number	Percent	Number	Percent
Driver	Male	1,064	33.1	1,071	36.0	2,232	63.5
	Female	1,125	38.2	1,361	44.7	2,688	74.2
Right Front Passenger	Male	185	29.0	212	34.4	343	51.5
	Female	452	33.8	466	36.4	886	63.6
Remaining Passenger	Male	157	34.5	147	27.8	185	34.2
	Female	226	34.9	164	28.4	209	35.2

(1987 Session), the state's MUL. Belt use by male drivers increased from 15.5% in 1983 to 63.5% in 1988. Belt use by female drivers increased from 17.5% in 1983 to 74.2% in 1987. Each year, female drivers used safety belts at a higher rate than did males.

While belt use by male and female RFPs was lower each year than that for drivers, there was an increase in the rate of use each year except for males in 1984. Belt use by male RFPs increased from 15.0% in 1983 to 51.5% in 1988. Belt use by female RFPs increased from 16.9% in 1983 to 63.6% in 1988. Female RFP belt use rates were higher than those for males each year with the exception of 1985. As with drivers, there was a major increase in belt use by both male and female RFPs between 1987 and 1988.

The survey data indicate that belt use rates by male and female RPs were less variable than those for occupants of the other seat positions. The male RP rate increased from 24.0% in 1983 to 34.5% in 1986, decreased to 27.8% in 1987, and rose to 34.2% in 1988. The female RP rate increased from 23.4% in 1983 to 34.9% in 1986, decreased in 1987 to 28.4%, and then rose to 35.2% in 1988. Female RP use was lower than that for males in 1984 and 1985 but was nearly the same in the other four years. In 1988, over one-third of the male and female RPs were observed to be using a safety belt system. This is only a 10 to 12 percentage point increase in usage over the six-year period. Over this same period, there was a significant increase in belt use rates by male and female drivers and RFPs, and in 1988, over half of these occupants were using a safety belt system. It is also interesting to note that there was no large increase in RP use between 1987 and 1988. The Virginia MUL does not apply to occupants in the rear seats of automobiles, a factor that probably accounts for the small change in use rates between the two years.

Table 4 contains safety belt use data according to the ages of the occupant. Except for 1987 and 1988, there were too few pre-adult drivers in the survey samples for percentages of use to provide meaningful information. In the last two years, over half of the drivers under 18 who were surveyed were using safety belts. For the three other driver age categories, there was an increase in belt usage in each successive survey. Belt use by young adult drivers increased from 14.3% to 65.8%, that by middle adult drivers from 17.3% to 69.7%, and the rate for older adults increased from 16.3% to 74.3%. During the 1983-1986 period, middle adult drivers had higher rates of use than did young and older adults. In 1987, as age increased, belt use declined, but in 1988, except for pre-adults, as age increased, so did belt use. The most interesting result in the 1988 data is that nearly three-fourths of the older adult drivers were using safety belts. This age group has traditionally been the group with the lowest use rates.

When belt use by RFPs was categorized by the age of the occupant, the data provided interesting similarities and contrasts. For occupants younger than five years of age, there was little difference in use rates over the

TABLE 4
Belt Use by Age of Occupant
Urban Areas

Occupant Seat Position	Age of Occupant	1983		1984		1985	
		Number	Percent	Number	Percent	Number	Percent
Driver	Pre-Adult	0	----	1	20.0	2	50.0
	Young Adult	254	14.3	457	22.4	428	27.6
	Middle Adult	777	17.3	652	25.1	989	29.9
	Older Adult	37	16.3	93	16.6	124	21.9
Right Front Passenger	Infant	38	76.0	33	78.6	42	76.4
	Pre-Adult	64	21.8	64	20.1	92	30.0
	Young Adult	60	11.0	87	14.9	80	19.1
	Middle Adult	144	14.7	116	14.7	174	25.1
	Older Adult	24	15.0	30	12.1	35	14.6
Remaining Passengers	Infant	191	66.8	140	66.7	145	64.4
	Pre-Adult	81	15.7	116	20.8	102	21.7
	Young Adult	7	3.7	6	3.8	5	4.5
	Middle Adult	4	2.3	11	7.3	15	11.1
	Older Adult	2	5.0	4	6.0	3	6.8

Occupant Seat Position	Age of Occupant	1986		1987		1988	
		Number	Percent	Number	Percent	Number	Percent
Driver	Pre-Adult	4	28.6	25	51.0	14	56.0
	Young Adult	626	34.6	945	42.4	1,502	65.8
	Middle Adult	1,227	37.2	1,159	40.4	2,792	69.7
	Older Adult	332	32.1	294	34.6	612	74.3
Right Front Passenger	Infant	33	75.0	37	56.9	49	73.1
	Pre-Adult	122	39.1	160	47.1	198	64.3
	Young Adult	123	24.5	170	29.3	319	54.8
	Middle Adult	227	33.4	185	33.2	430	58.1
	Older Adult	132	30.0	126	35.8	233	64.2
Remaining Passengers	Infant	136	68.0	95	40.3	182	64.5
	Pre-Adult	194	32.6	182	30.7	167	33.9
	Young Adult	22	17.7	14	12.0	12	7.4
	Middle Adult	24	23.3	8	10.1	23	16.7
	Older Adult	7	8.9	14	12.0	12	7.4

1983 through 1986 period (76.0%, 78.6%, 76.4%, and 75.0%). There was a significant drop to 56.9% in correct usage in 1987 primarily because of changes in the observation procedures. The rate of use in 1988 (73.1%), was similar to the rates in the 1983 through 1986 period. Because the state has had a child restraint statute since 1983, these percentages probably represent the upper range of use of occupant protection devices for these passengers.

For the four other age categories, RFP use in 1988 was much greater than in the previous five years. Between 1983 and 1988, RFP use rates by pre-adults increased from 21.8% to 64.3% , those for young adults from 11.0% to 54.8%, those for middle adults from 14.7% to 58.1%, and those for older adults from 15.0% to 64.2%. The data also show that in most years, young, middle, and older adult RFPs had belt use rates lower than those for drivers of the same age groups. Although the young adult RFP rate of safety belt usage has been among the lowest each year data have been collected, by 1988 the spread had narrowed somewhat. RFP use rates are now 50% or better for each age group, which is an improvement over the rates in the low teens observed in 1983.

Belt use rates by infant RPs were relatively consistent over the first four surveys, and each year nearly two-thirds of these occupants were observed to be in safety restraints. There was a sharp decline in correct restraint of infants in 1987, but in 1988 the rate was in the mid-60s as it was in the earlier years. In addition, belt use rates by other age groups of RPs increased each year from 1983 to 1986. In 1987, the belt use rates for pre-adult, young adult, and middle adult RPs decreased from 1986 levels. In 1988, the rates for pre-adults and middle adults rose, whereas those for young and older adults declined further. The changes in the procedures for the recording of correct and incorrect child seat use seems to account for the 1987 drop in infant RP use rates, but there is no ready explanation for the drop in the rates for the other age groups. Over the entire six-year period, RP usage rates have been much lower than those of drivers and RFPs. In addition, the state's MUL does not apply to rear seat occupants, and therefore there was no sharp increase in use rates between 1987 and 1988 as was seen for drivers and RFPs. The data for the three age groups of occupants sixteen years of age and older do, however, provide an indication of just how few passengers were actually in these seating positions on a day-to-day basis.

Data on safety belt usage by survey time period are contained in Table 5. As with the other variables, driver use rates were higher in each successive year, with a sharp rise in 1988. During any single year of the survey, driver use rates varied by fewer than four percentage points among the three time periods. The small variance by time period indicates a relatively stable rate of use throughout the day, and changes in the rate at any one site would not significantly change overall belt use rates.

TABLE 5
Belt Use by Time Period
Urban Areas

Occupant Seat Position	Time Period	1983		1984		1985	
		Number	Percent	Number	Percent	Number	Percent
Driver	A.M.	287	16.5	331	20.7	506	30.4
	Mid.	324	14.5	369	18.5	493	27.9
	P.M.	457	18.1	503	22.1	544	27.1
Right Front Passenger	A.M.	71	16.3	82	19.6	106	27.7
	Mid.	114	15.0	119	15.4	155	25.5
	P.M.	145	17.3	129	16.3	162	22.4
Remaining Passenger	A.M.	86	35.1	80	34.9	77	39.3
	Mid.	97	20.1	90	19.1	91	25.1
	P.M.	102	21.3	107	24.0	102	24.0

Occupant Seat Position	Time Period	1986		1987		1988	
		Number	Percent	Number	Percent	Number	Percent
Driver	A.M.	703	36.5	837	39.8	1,648	70.6
	Mid.	688	35.6	753	41.0	1,464	67.2
	P.M.	798	34.8	842	40.5	1,808	68.8
Right Front Passenger	A.M.	152	33.4	199	35.9	294	60.7
	Mid.	218	30.7	235	37.5	404	58.0
	P.M.	267	32.9	244	34.2	531	60.3
Remaining Passenger	A.M.	86	42.4	91	29.4	79	35.0
	Mid.	132	32.0	122	29.8	161	38.7
	P.M.	165	33.9	98	25.3	154	31.3

When the data were considered on a longitudinal basis, there was an increase in belt use during each time period from 1983 to 1988. During the morning rush hour, driver use increased from 16.5% in 1983 to 70.6% in 1988. During the mid-day shopping/lunch period, driver use increased from 14.5% to 67.2%. During the afternoon rush hour, driver use increased from 18.1% to 68.8%.

When categorized according to survey time period, RFP belt use increased each year with the exception of the afternoon period in 1984. During the morning survey period, RFP belt use increased from 16.3% in 1983 to 60.7% in 1988. For the midday period, the increase was from 15.0% to 58.0%. For the afternoon period, belt use increased from 17.3% to 60.3%. As with drivers, these data show a positive, upward trend in belt use patterns with the greatest change occurring after passage of the state's MUL in 1987. As also seen in the driver use data, RFP belt usage was relatively consistent across all three time periods during any single year, with the greatest variability (just over five percentage points) occurring in 1985.

There was a general increase in RP belt use during all three survey time periods over the 1983 through 1986 observation period. In 1987, however, there was a drop in the usage rate during all three periods from those observed in 1986. These drops were 13 percentage points for the morning, just over 2 points for midday, and 8.5 points for the afternoon. The results of the 1988 survey show that rates have increased by 5.6, 8.9, and 6.0 percentage points over the 1987 rates. In each year of the first four years, there was more variability in RP belt usage among the three survey time periods than there was in the last two years. These differences were 15.0 percentage points in 1983, 15.8 in 1984, 15.3 in 1985, and 10.4 in 1986. The 1987 survey results show a difference of only 4.5 percentage points between the highest and lowest daily use rates, and the 1988 variance was 7.4 percentage points. These data show that the variance in use rates throughout the day were greater for RPs than for drivers and RFPs. Because there are significantly fewer RP occupants than drivers or RFPs, these variances have a minimal effect on daily use rates.

The driver and RFP data from 1986, 1987, and 1988 and the RP data from 1987 and 1988 indicate that the results of observational surveys of safety belt use were not dependent on the time of day the data were collected. This is an important implication in the conduct of surveys because it permits a greater latitude in selecting observational sites in the various communities that might participate in special programs to increase the use of safety belts by their residents. Thus, it matters little what time of day the occupants are surveyed for their belt-wearing habits because if previous patterns continue, the survey team will find the same general rate of use throughout the day.

Table 6 presents data on safety belt use according to the area of the state surveyed. From 1983 through 1987, driver use rates were highest in the northern area of the state and lowest in the western area. For the 1988

TABLE 6

Belt Use by Areas Surveyed
Urban Areas

Occupant Seat Position	Survey Area	1983		1984		1985	
		Number	Percent	Number	Percent	Number	Percent
Driver	Western	148	11.3	221	15.6	286	24.3
	Northern	468	22.7	505	27.3	597	33.8
	Central	232	13.9	232	16.6	334	24.7
	Eastern	220	15.1	245	20.5	326	28.5
Right Front Passenger	Western	53	13.5	62	13.1	70	19.0
	Northern	135	20.9	132	20.9	163	31.2
	Central	65	14.5	51	13.6	79	21.9
	Eastern	77	14.2	85	16.8	111	24.0
Remaining Passengers	Western	54	23.8	56	22.1	50	24.3
	Northern	81	21.7	100	24.6	91	31.3
	Central	68	25.8	40	21.1	48	26.5
	Eastern	82	24.0	81	27.3	31	26.5

Occupant Seat Position	Survey Area	1986		1987		1988	
		Number	Percent	Number	Percent	Number	Percent
Driver	Western	375	26.7	405	29.1	1,004	65.4
	Northern	960	47.1	1,052	50.7	1,603	68.4
	Central	403	29.2	509	38.1	1,204	74.0
	Eastern	451	33.9	466	38.3	1,109	68.0
Right Front Passenger	Western	111	24.3	120	27.6	240	57.0
	Northern	273	43.8	292	44.2	396	60.8
	Central	87	23.7	105	30.8	234	62.2
	Eastern	166	31.3	161	35.1	359	58.7
Remaining Passengers	Western	84	33.5	71	26.8	77	36.8
	Northern	132	36.8	118	30.3	136	38.3
	Central	63	33.5	62	30.1	74	36.6
	Eastern	104	34.2	60	24.3	107	29.1

survey, however, the driver use rate was highest in the central area. Over the 1983 through 1988 period, there was a significant increase in driver use rates in all four areas of the state. In the western area, the rate rose from 11.3% to 65.4%; in the northern area, from 22.7% to 68.4%; in the central area, from 13.9% to 74.0%; and in the eastern area, from 15.1% to 68.0%. In all four survey areas, driver belt use increased in each successive year, with a very large increase in 1988 subsequent to passage of the state's MUL. In 1988, there was little diversity in the rates of belt use in the four survey areas. Just over 65% of all observed drivers in the western area were using safety belts; nearly 68% of the drivers in the northern and eastern areas were using them; and slightly less than 75% of the drivers were belted in the central area.

From 1984 through 1988, there was a steady increase in belt use by RFPs in each of the four survey areas. The RFP use rates followed the same trends as that for drivers, highest in the northern area from 1983 to 1987 and highest in the central area in 1988, and lowest in the western area all six years, with a major increase in usage in 1988 in each area. Over the six years, belt use rates by RFPs rose from 13.5% to 57.0% in the western area, from 20.9% to 60.8% in the northern area, from 14.5% to 62.2% in the central area, and from 14.2% to 58.7% in the eastern area. RFP use was not as high as that for drivers in any of the four survey areas from 1984 through 1988. The results in 1983 were mixed: RFP use was higher in the central and western areas. With RFPs using safety belts at nearly a 60% rate in 1988 (the year with the highest use rates), there appears to be ample opportunity for both a state and community effort aimed at increasing passenger belt usage.

Over the 1983 through 1986 survey period, RP belt use had increased in all four areas of the state. In 1987, however, there was a drop in use rates in all four areas, but in 1988 the rates increased from those of the previous years. These changes resulted in a 13 percentage point six-year increase in RP use in the western area, a 16.6 percentage point increase in the northern area, a 10.8 percentage point increase in the central area, and a 5.1 percentage point increase in the eastern area. These long-term rates of use were much less than those for drivers and RFPs when categorized by area of the state. Except for the northern area in 1986, use rates by RPs were higher than those for RFPs during the period from 1983 through 1986. In 1987 and 1988, the RP rates were lower than RFP rates in all areas of the state. When RP and driver belt use rates were compared, there were mixed results during the six-year period. In general, RP rates were higher than those for drivers in 1983 and 1984, nearly the same in 1985 and 1986, and lower in 1987 and 1988. Although RP rates had increased over the six-year period, the rates for drivers had increased a greater amount. The current rate of RP use is such that state occupant protection program officials should make a strong effort in the child restraint area in an attempt to bolster current use patterns.

These driver and passenger use data have several implications for state highway safety officials, among which are those dealing with the need to direct specific programs, public information campaigns, and other specialized activities to increase belt use in a manner that will yield maximum benefits. These data indicate that little effort should be directed at front seat occupants, and an increased effort should be directed to rear seat occupants and to the correct use of child safety seats.

Urban Area Summary

Safety belt usage data collected in the urban areas can be summarized as follows:

1. The percentage of drivers using safety belts increased each year and was 68.9% in 1988.
2. The percentage of RFPs using safety belts increased each year and was 59.7% in 1988.
3. The percentage of RPs using safety belts increased each year through 1986, dropped in 1987, and was 34.7% in 1988.
4. Each year, over two-thirds of the infants were in safety seats or safety belts.
5. In 1988, just over 18% of the RFP and 17% of the RP child seats were incorrectly used.
6. There was a considerable increase in belt use by front seat occupants after passage of the MUL.
7. There was little change in belt use rates by rear seat occupants after passage of the MUL.
8. There was a positive association between driver and passenger use of safety belts: if one vehicle occupant used a safety belt there was an increased probability that other occupants also would use one.
9. A greater percentage of female drivers and passengers used safety belts than did male drivers and passengers.
10. For drivers and RFPs, the greatest increase in 1988 belt use rates was by older adults.
11. Fewer than 8% of the young and older adult RPs used a safety belt in 1988.
12. In the last three years, there was little difference in belt use by the time of the day the survey was conducted.

13. In general, belt use by drivers and passengers is greatest in the northern area and lowest in the western area.

Safety Belt Usage in Smaller Communities

In 1987, data collection was initiated in communities other than the major metropolitan centers of Virginia. Every town (and most of the smaller cities) in the state was considered for inclusion in the sample (the term "town" is used to refer to all of these localities). Time, travel limitations, and costs prevented the collection of data in each of them. Several were eliminated because it was known that they were part of special community programs to raise the belt use of their residents, and this would bias the results of observed baseline use. Others were eliminated because of other characteristics such as the absence of traffic signals where observers could stand to collect data in accordance with previously established procedures or because of their distance from the next closest town (travel time in excess of two hours between sites eliminated some towns from consideration). Once this disqualification process was accomplished, the author visited 30 towns and observed the traffic flow at every signalized intersection in each (see Figure 2). In addition, tables published by the VDOT that listed the vehicle traffic counts for the major thoroughfares approaching each town were reviewed. Several of these towns had very little traffic during the survey hours, and others lacked a safe observation site for the survey team to collect data. Nine towns in three different geographic regions of the state were chosen to be included in the survey sample. In reality, there were only a few other towns that could have been included in addition to these nine. The survey hours were: 7:00 a.m. to 9:00 a.m., 11:00 a.m. to 1:00 p.m., and 4:00 p.m. to 6:00 p.m.--hours of observation similar to but not identical with those in the urban areas. These hours were selected because of the special travel circumstances in these areas.

- | | |
|-------------------|------------------|
| 1. Bluefield | 16. Covington |
| 2. Tazewell | 17. Waynesboro |
| 3. Marion | 18. Staunton |
| 4. Wytheville | 19. Harrisonburg |
| 5. Hillsville | 20. Strasburg |
| 6. Galax | 21. Front Royal |
| 7. Blacksburg | 22. Warrenton |
| 8. Christiansburg | 23. Culpeper |
| 9. Chatham | 24. Ashland |
| 10. Gretna | 25. Emporia |
| 11. Altavista | 26. South Hill |
| 12. Amherst | 27. Clarksville |
| 13. Buena Vista | 28. South Boston |
| 14. Lexington | 29. Keysville |
| 15. Clifton Forge | 30. Farmville |

Figure 2. Localities Considered for Inclusion

The data in Table 7 show the rates of belt use by the three classifications of occupants. The usage rates for towns are based on the number of occupants using safety devices as a function of all occupants in that seat position. Driver belt use was 20.2% prior to the MUL and 55.8% after the law went into effect. The use of the L/S combination accounted for nearly all of the driver usage of safety belts: 19.3% in 1987 and 53.0% in 1988. There were large differences in driver usage rates among the towns surveyed each year (see Appendix Table 3). The rates ranged from 11.6% (Emporia) to 31.6% (Harrisonburg) in 1987, and from 46.8% (Farmville) to 66.4% (Galax) in 1988. There was also a large increase in the belt use rates for RFPs from 1987 to 1988. Only 18.2% used a safety belt in 1987, but the rate was 48.0% in 1988. Each year, the use of the L/S system (14.9% and 41.8%) accounted for nearly all of the RFP usage. There was also a decline in belt use by RPs from 1987 to 1988. Although 22.8% used a safety belt in the first year, only 18.5% did so in the second. In addition to the overall drop in RP rates, there was a drop in usage for each of the safety belt systems available for occupant use. As with drivers, there were variations in usage rates for passengers among the various towns. The rates ranged from 6.8% (Emporia) to 32.3% (Harrisonburg) in 1987, and from 29.3% (Farmville) to 46.8% (Lexington) in 1988.

TABLE 7

Use of Safety Belts
Small Towns

Occupant Seat Position	Belt Used	1987		1988	
		Number	Percent	Number	Percent
Driver	Lap Only	22	0.8	70	2.8
	Lap/Shoulder	503	19.3	1,320	53.0
	None	2,080	79.8	1,101	44.2
Right Front Passenger	Lap Only	16	1.8	41	5.0
	Lap/Shoulder	131	14.9	343	41.8
	Child "A"	13	1.5	10	1.2
	Child "Z"	4	0.5	6	0.7
	None	714	81.3	421	51.3
Remaining Passengers	Lap Only	55	12.8	52	10.7
	Lap/Shoulder	10	2.3	3	0.6
	Child "A"	33	7.7	35	7.2
	Child "Z"	20	4.7	20	4.1
	None	312	72.6	375	77.3

These data show that safety belt usage was greatest for front seat occupants: those to whom the MUL applies. The data also show the rates were lower in the smaller communities than they were in the metropolitan areas. In light of these data, the state and local governments should concentrate their efforts in the smaller communities primarily on rear seat occupants.

The association between driver and passenger use of safety belts in towns is shown by the data in Table 8. In 1987, when the driver was not using a safety belt, 95.7% of the RFPs and 90.8% of the RPs were not using their safety belts. In 1988, when the driver was not using a safety belt, 84.2% of the RFPs and 94.9% of the RPs were not using safety belts. By contrast, when town drivers were using their safety belts in 1987, so were 74.7% of the RFPs and 72.0% of the RPs. In 1988, when the driver was using a safety belt so did 79.3% of the RFPs but only 33.2% of the RPs did so. The data for the past two years show that when the driver was belted, the passengers tended to also be belted; when the driver was not, the passengers were not. The increase in belt use by RFPs in 1988, both when the driver was and was not using a safety belt, is most likely the result of the passage of an MUL in Virginia. There is no logical explanation for the decrease in belt use by RPs in 1988, although the MUL did not apply to rear seat occupants. This may have led to some occupants changing their previous belt use habits.

TABLE 8

Association Between Driver and Passenger Uses of Safety Belts
Small Towns

WHEN DRIVERS NOT USING SAFETY BELTS

Occupant Seat Position	Occupant Use of Belts	1987		1988	
		Number	Percent	Number	Percent
Right Front Passenger	Belted	30	4.3	64	15.8
	Not Belted	674	95.7	341	84.2
Remaining Passengers	Belted	31	9.2	13	5.1
	Not Belted	306	90.8	240	94.9

WHEN DRIVERS USING SAFETY BELTS

Occupant Seat Position	Occupant Use of Belts	1987		1988	
		Number	Percent	Number	Percent
Right Front Passenger	Belted	130	74.7	330	79.3
	Not Belted	44	25.3	86	20.7
Remaining Passengers	Belted	67	72.0	77	33.2
	Not Belted	26	28.0	155	66.8

Data on belt use according to the sex of the town occupants are contained in Table 9. Female drivers used belts at a higher rate than did males in both 1987 (22.2% vs. 17.8%) and 1988 (61.9% vs. 49.0%). Town male RFPs had a belt use rate higher than that for female RFPs in 1987 (20.7% vs. 16.9%), however, females had a much higher rate than males in 1988 (53.5% vs. 37.1%). There was little difference in male (22.4%) and female (21.8%) rates for RPs in the towns surveyed in 1987; but in 1988, 20.6% of the females used safety belts, whereas 16.2% of the males did so. As with other categories of data, there were major increases in belt use subsequent to passage of the MUL in Virginia for both male and female front seat occupants; but decreases in belt use were noted for both male and female rear seat occupants. Because fewer than half of the male drivers and RFPs used a safety belt in 1988, special emphasis should be directed toward them whenever the state initiates an information or enforcement program to increase belt usage.

TABLE 9

Belt Use by Sex of Occupant
Small Towns

Occupant Seat Position	Sex of Occupant	1987		1988	
		Number	Percent	Number	Percent
Driver	Male	216	17.8	574	49.0
	Female	309	22.2	816	61.9
Right Front Passenger	Male	62	20.7	102	37.1
	Female	98	16.9	292	53.5
Remaining Passengers	Male	45	22.4	37	16.2
	Female	50	21.8	53	20.6

Belt use data by age of the town occupant are contained in Table 10. The 1987 data indicate that with the exception of pre-adults, the older the age group of drivers, the lower their rate of belt use. The highest rate of driver use (23.0%) was by young adults and the lowest (14.3%) was by pre-adults. There was little practical difference in middle (19.0%) and older (18.2%) adult use rates. The 1988 belt use data show a very different use pattern: the older the driver, the higher the belt use. The lowest belt use in 1988 (34.8% by pre-adults) was greater than the highest age group use rate in 1987. Over half of the young adults (51.9%) and middle adults (56.1%) used belts in 1988, and older adults (62.7%) had the highest rate for the two years.

TABLE 10

Belt Use by Age of Occupant
Small Towns

Occupant Seat Position	Age of Occupant	1987		1988	
		Number	Percent	Number	Percent
Driver	Pre-Adult	3	14.3	8	34.8
	Young Adult	201	23.0	373	51.9
	Middle Adult	241	19.0	740	56.1
	Older Adult	80	18.2	269	62.7
Right Front Passenger	Infant	13	65.0	10	47.6
	Pre-Adult	36	18.8	91	51.4
	Young Adult	48	18.5	83	43.5
	Middle Adult	29	12.6	122	45.5
Remaining Passengers	Older Adult	34	19.1	88	53.7
	Infant	33	40.2	35	31.0
	Pre-Adult	53	20.6	44	17.6
	Young Adult	3	8.8	1	2.2
	Middle Adult	1	2.9	5	10.0
	Older Adult	3	8.8	1	2.2

Pre-adult, young adult, and older adult RFP town occupants had belt use rates within one percentage point of each other in 1987. The data indicate that 18.8% of the pre-adult, 18.5% of the young adult, and 19.1% of the older adult RFPs used safety belts. The highest rate (65.0%) was by infant RFPs and the lowest (12.6%) was by middle adult RFPs. In 1988, there was only a 10 percentage point variation in the highest and lowest belt use rates when categorized according to the age of the RFP. Slightly less than one-half of the infant (47.6%), middle adult (45.5%), and young adult (43.5%) RFPs used a safety belt; whereas slightly more than one-half of the pre-adults (51.4%) and older adults (53.7%) did so. As these data show, there was a large increase in usage by drivers and RFPs subsequent to passage of the MUL, occupants to whom the law applied.

In both 1987 and 1988, there were very few young, middle, or older RP occupants in the survey sample. In addition, very few of these occupants were safety belt users: belt use did not exceed 10% in either year. For the two remaining RP age categories, there was a decrease in belt use rates after passage of the MUL. The infant rate declined from 40.2% to 31.0% and that for pre-adults declined from 20.6% to 17.6%. Although the MUL does not apply to rear seat occupants, the child safety seat law applies to infant rear seat occupants. To have less than one-third of the infants correctly restrained in safety seats or belts in 1988, indicates that more effort needs to be expended to increase the correct use of infant safety seats.

Town belt use data by survey time period are contained in Table 11. In 1987, driver use rates were 17.1% during the morning, 19.0% during the mid-day period, and 23.8% during the afternoon. The 1988 driver use rates were not only much higher but also were less variable from time period to time period. Over half of the drivers used safety belts during each survey period. The 1988 rates were 55.8% (morning), 54.7% (mid-day), and 56.9% (afternoon).

TABLE 11

Belt Use by Time Period
Small Towns

Occupant Seat Position	Time Period	1987		1988	
		Number	Percent	Number	Percent
Driver	A.M.	123	17.1	382	55.8
	Mid.	182	19.0	496	54.7
	P.M.	220	23.8	512	56.9
Right Front Passenger	A.M.	25	14.4	75	47.5
	Mid.	56	16.8	169	51.7
	P.M.	79	21.4	150	44.6
Remaining Passengers	A.M.	8	10.0	9	15.0
	Mid.	35	24.1	29	14.6
	P.M.	52	25.4	52	23.0

In 1987, 14.4% of the RFPs used a safety belt during the morning, 16.8% at mid-day, and 21.4% in the afternoon. In 1988, after passage of the MUL, the rates were 47.5% (morning), 51.7% (mid-day), and 44.6% (afternoon). The 1987 RP rates were 10.0%, 24.1%, and 25.4%. The 1988 rates were 15.0%, 14.6%, and 23.0%. As with other categories of data, there were large increases in belt usage by front seat occupants. For the rear seat occupants, however, there was an increase in usage in the morning and decreases at mid-day and in the afternoon. It should be pointed out that variations in usage throughout the day may be less a function of the time of day the observations occurred than of the communities in which the data were collected. This appears to be verified by the data from the individual communities contained in Tables 3 and 4 of the Appendix.

Belt use data by the area of the state in which the towns were located are contained in Table 12. In 1987, no more than 25% of the drivers used safety belts in each of the three survey areas. These rates were 25.0% in the valley, 20.1% in the west, and 16.0% in the southside. In 1988, over half of the drivers used a safety belt in each of the survey areas. The rates were 59.6% (western), 57.5% (valley), and 50.5% (southside). For both years, the lowest driver use rate was in the southside area of the state. The data contained in Appendix Table 3 also indicate that in each of the three towns in the southside, the driver use rate was lower than that in each of the towns in the other two survey areas, with the exception of Lexington in 1988.

TABLE 12

Belt Use by Area Surveyed
Small Towns

Occupant Seat Position	Survey Area	1987		1988	
		Number	Percent	Number	Percent
Driver	Western	175	20.1	514	59.6
	Valley	202	25.0	439	57.5
	Southside	148	16.0	437	50.5
Right Front Passenger	Western	49	17.3	141	49.1
	Valley	59	24.0	121	53.1
	Southside	52	14.9	132	43.1
Remaining Passengers	Western	21	17.4	45	27.4
	Valley	36	35.3	24	18.8
	Southside	38	18.4	21	10.9

For RFPs, safety belt usage was lowest in the southside area and highest in the valley area for both years data were collected. In 1987, the belt use rates were 14.9% (southside), 17.3% (western), and 24.0% (valley), and in 1988, they were 43.1% (southside), 49.1% (western), and 53.1% (valley). RFP belt use rates were lower than those for the corresponding driver categories during both years, and they were marginally more variable on an area basis.

RP safety belt use rates in 1987 were 17.4% (western), 18.4% (southside), and 35.3% (valley). The 1988 use rates were 10.9% (southside), 18.8% (valley), and 27.4% (western). After passage of the MUL, RP safety belt use declined by more than 16 percentage points in the valley and by more than 7 points in the southside. There was, however, a 10 point increase in the

western area. One explanation for this increase in the western area is that two of the three communities were conducting special belt use campaigns, whereas none of the communities in the other two areas of the state was involved in such activities. In 1987, RP use rates were generally higher than those for drivers and RFPs. The one exception was for western area drivers. In 1988, RP belt use rates were much lower than those for drivers and RFPs. This was the result of the combined effects of increased driver and RFP rates and decreased RP use rates. For all three seat position categories, the 1988 RP southside rates were the lowest observed during the two years in any of the three survey areas.

The data do indicate how low the belt use rates were in the smaller jurisdictions and point out where state and community efforts might best be directed to improve the health and traffic safety of the citizens of the Commonwealth. Without a major increase in belt use by persons outside of the metropolitan areas, there is little possibility that overall belt use rates in Virginia will exceed the 70% goal for seat belt usage throughout the state.

Town Summary

The results of survey data collected from towns located in three different areas of the state can be summarized as follows:

1. In 1988, over one-half of the drivers (55.8%) and nearly one-half of the RFPs (48.0%) used a safety device. These rates were much higher than those in 1987 prior to the MUL.
2. Fewer than one-fifth (18.5%) of the RPs used a safety device in 1988. This rate was lower than that for the previous year.
3. Each year, nearly two-thirds of the infants were in safety seats or safety belts.
4. Each year, just over a one-third of the child safety seats were incorrectly used.
5. There was a positive association between driver and passenger use of safety belts: if one group used them, there was an increased tendency for the others to use them.
6. In 1988, female drivers and passengers used safety belts at a much greater rate than did males.
7. In 1987, the highest rate of driver use was by young adults (23.0%); in 1988, the highest rate of use was by older adults (62.7%).
8. In 1988, slightly less than one-half of the infant (47.6%), middle adult (45.5%), and young adult (43.5%) RFPs used safety belts, and just over one-half of the pre-adult (51.4%) and older adult (53.7%) RFPs did so.

9. There was little difference in the 1988 driver use rates by the time of day the survey was conducted.

10. Driver and passenger use rates were generally much lower in the southside area than in the western or valley areas, which had similar use rates.

Statewide Safety Belt Usage

The urban and town data were combined to produce statewide use figures. There are no data from the rural areas because data collection procedures, time, and expense mitigated against obtaining it. The inclusion of rural rates would likely lower the statewide figures reported here. The magnitude of this change is unknown, but based on a number of factors, it would probably not exceed a three to five percentage point reduction in the overall rate of use for drivers and passengers.

The statewide data in Table 13 indicate the rates of belt use by drivers, RFPs, and RPs. The various caveats for interpreting use rates have been discussed in previous sections of this report and apply to these data as well. In both 1987 and 1988, a greater percentage of drivers used occupant safety devices than did passengers. In 1987, over one-third (34.3%) of the drivers surveyed were using safety belts, whereas in 1988, nearly two-thirds (65.6%) were belt users. Although there was a major increase in driver belt use in 1988, it is still discouraging to note that nearly one-

TABLE 13

Use of Safety Belts Statewide

Occupant Seat Position	Belt Used	1987		1988	
		Number	Percent	Number	Percent
Driver	Lap Only	115	1.3	248	2.6
	Lap/Shoulder	2,842	33.0	6,062	63.0
	None	5,668	65.7	3,318	34.5
Right Front Passenger	Lap Only	82	3.0	137	4.8
	Lap/Shoulder	706	25.5	1,427	49.5
	Child "A"	50	1.8	59	2.0
	Child "Z"	19	0.7	17	0.6
	None	1,916	69.1	1,241	43.1
Remaining Passengers	Lap Only	267	17.4	223	13.8
	Lap/Shoulder	24	1.6	44	2.7
	Child "A"	128	8.3	217	13.4
	Child "Z"	88	5.7	58	3.6
	None	1,030	67.0	1,077	66.5

third were not using the most effective automobile safety device readily available. Just over 30% of the RFPs and 27% of the RPs were using safety restraints in 1987. The 1988 use rates were 56.3% (RFPs) and 29.9% (RPs). These data imply that the implementation of the state's MUL produced a major increase in the belt-wearing habits by drivers and RFPs but not by RPs. Finally, 107 of the 285 (37.5%) infant passengers in child safety seats were categorized as being incorrectly restrained in 1987, and 75 of 351 (21.4%) were so categorized in 1988.

It is apparent that additional work is necessary to educate parents in the proper installation of child safety seats in the vehicle and in the correct placement of their children within the seat itself. The primary errors in the use of childseats involved belt routing, seat orientation, and use of the arm bar/shields. It should again be pointed out that this was an in traffic survey, thus, these misuse figures represent the most obvious cases. It is entirely possible that the actual rate of child safety seat misuse is greater than that described here.

The data on the association between driver and passenger uses of safety belts are contained in Table 14. From these data, two basic findings can be drawn: (1) when the driver was not belted, nearly all of the passengers were not belted, and (2) when the driver was belted, a large percentage of the RFPs and RPs were also belted. For drivers not using their safety belts, there was a change in belt usage by RFPs from 9.1% (1987) to 15.4% (1988) and from 10.8% to 10.0% by RPs. For drivers using the safety belt systems, belt use by RFPs increased from 75.6% to 80.9%, but belt use by RPs dropped by 20 percentage points from 62.9% in 1987 to 42.4% in 1988. The RP rates were especially discouraging because these are the seat positions used primarily by occupants younger than sixteen years of age (for those younger than four years old, there is a state statute requiring safety seat use). These data do indicate, however, that any method that successfully gets one vehicle occupant to buckle up is likely to work on the other occupants in the same vehicle.

Safety belt use rates, when categorized by the sex of the occupant, are contained in Table 15. In 1987, female drivers had a belt use rate of 37.6%, whereas that for males was 30.7%. In 1988, 70.9% of the females and 59.9% of the males used safety belts. The post-MUL rates are nearly double those for the year prior to the law. There was little practical difference in the male and female use rates for RFPs in 1987, for RPs in 1987, and for RPs in 1988. There was, however, over a 13 point difference in the 1988 RFP rate for males and females. From 1987 to 1988, female RFPs had use rates of 30.4% and 60.7%, whereas the rates for males were 29.9% and 47.3%; female RPs had use rates of 26.5% and 30.8%, whereas the rates for males were 26.3% and 28.9%. RFP use rates were much higher in 1988 than in 1987 for both male and female occupants. There was only a marginal increase in the male and female RP use rates between the earlier and later surveys.

TABLE 14

Association Between Driver and Passenger Uses of Safety Belts
Statewide

WHEN DRIVERS NOT USING SAFETY BELTS

Occupant Seat Position	Occupant Use of Belts	1987		1988	
		Number	Percent	Number	Percent
Right Front Passenger	Belted	172	9.1	166	15.4
	Not Belted	1,720	90.9	915	84.6
Remaining Passengers	Belted	114	10.8	62	10.0
	Not Belted	938	89.2	561	90.0

WHEN DRIVERS USING SAFETY BELTS

Occupant Seat Position	Occupant Use of Belts	1987		1988	
		Number	Percent	Number	Percent
Right Front Passenger	Belted	666	75.6	1,457	80.9
	Not Belted	215	24.4	343	19.1
Remaining Passengers	Belted	305	62.9	422	42.4
	Not Belted	180	37.1	574	57.6

TABLE 15

Belt Use by Sex of Occupant
Statewide

Occupant Seat Position	Sex of Occupant	1987		1988	
		Number	Percent	Number	Percent
Driver	Male	1,287	30.7	2,806	59.9
	Female	1,670	37.6	3,504	70.9
Right Front Passenger	Male	274	29.9	445	47.3
	Female	564	30.4	1,178	60.7
Remaining Passengers	Male	192	26.3	222	28.9
	Female	214	26.5	262	30.8

Table 16 contains safety belt use data according to the ages of the occupants. There was significant variability in the rates of use by occupants of the various seating positions. Generally, belt use was highest for drivers and lowest for RPs. In 1987, the rate of driver belt use declined as the ages of the occupants increased; however, in 1988, belt use increased as driver age increased. Statewide use in 1987 was 40.0% for pre-adults, 37.0% for young adults, 33.8% for middle adults, and 29.0% for older adults. Statewide uses in 1988 were 45.8%, 62.5%, 66.3%, and 70.3%. In the early years of this longitudinal survey, when only urban area data were collected, middle adult drivers generally had the highest rate of belt use. In 1987, the rate for young adult drivers exceeded that for middle adults, and in 1988, the rate for older adult drivers exceeded that for middle adults. In addition, all rates in 1988 were greater than those in 1987. This improved pattern of use should yield an improvement in the morbidity and mortality rates for all drivers, especially those 17 through 30 and over 60 years of age.

TABLE 16

Belt Use by Age of Occupant
Statewide

Occupant Seat Position	Age of Occupant	1987		1988	
		Number	Percent	Number	Percent
Driver	Pre-Adult	28	40.0	22	45.8
	Young Adult	1,155	37.0	1,875	62.5
	Middle Adult	1,400	33.8	3,532	66.3
	Older Adult	374	29.0	881	70.3
Right Front Passenger	Infant	50	58.8	59	67.0
	Pre-Adult	196	36.9	289	59.6
	Young Adult	218	26.0	402	52.0
	Middle Adult	214	27.2	552	54.8
	Older Adult	160	30.2	321	60.9
Remaining Passengers	Infant	128	40.3	217	54.9
	Pre-Adult	235	27.7	211	28.4
	Young Adult	17	11.3	13	6.3
	Middle Adult	9	8.0	28	14.9
	Older Adult	17	11.3	13	6.3

For every age category of RFP, belt use was higher after the effective date of the state's MUL. There was a slight increase in infant use (58.8% vs. 67.0%) and very large rate increases by pre-adults (36.9% vs. 59.6%),

young adults (26.0% vs. 52.0%), middle adults (27.2% vs. 54.8%), and older adults (30.2% vs. 60.9%). In addition, the belt use rates in 1988 were more uniform across all age groups than in previous years. When RP belt use was categorized by age of occupant, the data were variable. There were increases in usage by infants (40.3% vs. 54.9%) and by middle adults (8.0% vs. 14.9%), decreases by both young and older adults (11.3% vs. 6.3%), and no real change by pre-adults (27.7% vs. 28.4%). In both 1987 and 1988, RP belt usage was lower than that for drivers and RFPs in every age classification. As has previously been discussed, the Virginia MUL applies only to front seat occupants and these data are representative of this situation. The data provide an identification of one group of target audiences for special methods or programs to increase belt usage: programs should be aimed first at RPs as a group and next at specific age strata, e.g., middle or young adults.

The figures on the use of safety belts in the three daily time periods in which data were collected are contained in Table 17. As with the other categorizations of data, driver use of belts was the highest, followed by that of the RFPs, and then by the RPs. Within each category of vehicle occupant, there was little difference in use rates throughout the day. For drivers, just over a third of the occupants used a safety belt in 1987, and the upper and lower daily rates varied by only two percentage points. Driver use rates were 34.0% in the morning, 33.4% at mid-day, and 35.4% in the afternoon. In 1988, nearly two-thirds of the drivers used safety belts, and the rates varied by less than four percentage points. The rates were 67.3% (a.m.), 63.6% (mid-day), and 65.8% (p.m.).

While RFP rates were lower than those for drivers, there was less variability in usage throughout the day: the rates varied by only one

TABLE 17

Belt Use by Time Period
Statewide

Occupant Seat Position	Time Period	1987		1988	
		Number	Percent	Number	Percent
Driver	A.M.	960	34.0	2,030	67.3
	Mid.	935	33.4	1,960	63.6
	P.M.	1,062	35.4	2,320	65.8
Right Front Passenger	A.M.	224	30.8	369	57.5
	Mid.	291	30.3	573	56.0
	P.M.	323	29.8	681	56.0
Remaining Passengers	A.M.	99	25.4	88	30.8
	Mid.	157	28.3	190	30.9
	P.M.	150	25.3	206	28.7

percentage point from the lowest to the highest in 1987 and by only 1.5 points in 1988. Less than one-third of all of the RFPs used a safety belt in June 1987: 30.8% during the morning, 30.3% during mid-day, and 29.8% during the afternoon. Over half of the RFPs used safety belts in 1988: 56.0% during both the mid-day and afternoon survey periods and 57.5% during the morning. Use rates by RPs were lower than those for drivers and RFPs. There was a three percentage point range from the lowest to the highest rate in 1987, and a two point range in 1988. A greater percentage of RPs used safety belts in 1988 than in 1987 during each survey time period. In the morning the rate increased from 25.4% to 30.8%; at mid-day, from 28.3% to 30.9%; and in the afternoon, from 25.3% to 28.7%. The greatest change was just over five percentage points in the morning, a rate of change much less than that for the other occupant groups by time period. It is interesting to note that the 1988 RP use rate is nearly the same as the 1987 RFP use, indicating that RP use would increase under the same conditions, i.e., with a MUL applying to them. The consistency of use throughout the day for each of the occupant seat positions is a positive sign for the conduct of observational surveys of safety belt usage. Because the range of rates is small, the collection of data can be set up to satisfy other survey requirements first and then scheduled for the most convenient hour of the day without biasing the results.

Statewide Summary

The urban area and town safety belt use results have been combined into a set of statewide findings. These are summarized as follows:

1. After passage of the MUL, nearly two-thirds (65.6%) of the drivers were using safety belts in June 1988.
2. Over half (56.3%) of the RFPs and less than a third (29.9%) of the RPs were using safety belts six months after the effective date of the MUL.
3. Of the infants surveyed, 37.5% (1987) and 21.4% (1988) were categorized as being incorrectly restrained in a child safety seat.
4. There was a positive association between driver and passenger uses of safety belts.
5. Each year, female drivers had a higher rate of belt use than did males, 37.6% vs. 30.7% in 1987 and 70.9% vs. 59.9% in 1988.
6. In 1988, there was a 13-point difference in favor of the female RFP belt use rate (60.7% vs. 47.3%). There was no real difference in usage in 1987 (30.4% vs. 29.9%).
7. There was little difference within or between years in male and female RP uses of safety belts (26.3% and 28.9% vs. 26.5% and 30.8%).

8. The highest rate of driver belt use in 1987 was by young adults (37.0%). In 1988, the highest rate was by older adult drivers (70.3%).

9. During both 1987 and 1988, the highest passenger use rates were by infants and pre-adults.

10. There was little difference in driver or passenger use rates throughout the day.

ACKNOWLEDGMENTS

Appreciation is expressed to Preston Hicks and Eric Clay, who collected the 1988 observation data used in this report update. They also entered the data on the computer disks so that tables for analysis could be produced. Thanks are expressed to Jennifer Ward, who developed and ran the computer programs that produced the data tables used in the report.

The author appreciates the efforts of Sharon Clark, who typed the drafts and prepared the final manuscript of this report; of members of the Safety Team for their review, comment, and general assistance; and of Roger Howe for his editorial efforts in readying the report for publication.

APPENDIX A

TABLE 1
SUMMARY OF URBAN RESULTS

	Urban 1983	Urban 1984	Urban 1985	Urban 1986	Urban 1987	Urban 1988
Total Cars	6,495	5,858	5,436	6,155	6,020	7,137
Total Persons	9,732	8,981	8,135	9,235	9,022	10,331
Total Belt Use	17.3%	20.1%	27.5%	34.7%	37.9%	63.3%
Driver Belt Use	16.4%	20.5%	28.4%	35.5%	40.4%	68.9%
Passenger Belt Use	19.0%	19.4%	25.7%	33.1%	32.9%	50.8%
Male Use	17.2%	19.6%	26.9%	32.6%	34.7%	58.4%
Female Use	19.3%	20.7%	28.0%	36.6%	40.6%	67.4%
Morning	18.4%	22.0%	30.7%	36.4%	38.0%	66.4%
Mid-Day	15.4%	17.9%	27.0%	34.0%	38.6%	61.7%
Afternoon	18.3%	21.1%	25.6%	34.2%	37.2%	62.3%
Infant Use	68.2%	68.7%	66.8%	69.3%	43.9%	66.2%
Pre-Adult Use	17.9%	20.5%	25.1%	34.7%	37.4%	45.9%
Young Adult Use	12.7%	19.7%	24.6%	31.7%	38.6%	60.6%
Middle Adult Use	16.4%	18.6%	28.4%	36.2%	38.6%	66.4%
Older Adult Use	14.7%	14.5%	19.1%	30.4%	33.6%	68.6%
Western Urban	13.2%	15.9%	23.2%	27.0%	28.5%	61.0%
Northern Urban	22.2%	25.5%	33.0%	45.2%	46.8%	63.7%
Central Urban	15.3%	16.5%	24.4%	28.6%	35.9%	68.6%
Eastern Urban	16.2%	20.1%	27.1%	33.3%	35.7%	60.3%

TABLE 2

SUMMARY OF TOWN AND STATEWIDE RESULTS

	Town 1987	Town 1988	State 1987	State 1988
Total Cars	2,605	2,491	8,625	9,628
Total Persons	3,913	3,797	12,935	14,128
Total Belt Use	19.9%	49.4%	32.5%	59.6%
Driver Belt Use	20.2%	55.8%	34.3%	65.5%
Passenger Belt Use	19.5%	37.1%	28.9%	46.8%
Male Use	18.8%	42.6%	30.1%	54.3%
Female Use	20.8%	54.7%	34.5%	64.0%
Morning	16.0%	51.6%	32.5%	63.0%
Mid-Day	19.0%	48.5%	32.1%	57.7%
Afternoon	23.4%	48.8%	32.8%	58.7%
Infant Use	45.1%	33.6%	44.2%	57.1%
Pre-Adult Use	19.6%	31.8%	31.7%	40.9%
Young Adult Use	21.6%	47.9%	33.8%	57.5%
Middle Adult Use	7.7%	52.9%	32.2%	63.0%
Older Adult Use	18.6%	58.4%	28.6%	65.2%
Western Town	19.2%	53.3%	-----	-----
Valley Town	25.7%	52.2%	-----	-----
Southside Town	16.0%	43.2%	-----	-----

TABLE 3
SAFETY BELT USE RATES BY COMMUNITY SURVEYED

Community	1987			1988		
	Total	Drivers	Passengers	Total	Drivers	Passengers
Marion	19.0	20.8	13.8	50.9	55.1	38.1
Wytheville	18.3	18.2	18.5	50.5	57.8	38.7
Galax	21.4	23.2	17.8	59.0	66.4	46.5
Covington	18.9	18.9	19.0	55.1	60.1	40.3
Lexington	23.2	22.2	25.7	50.4	52.1	46.8
Harrisonburg	31.8	31.6	32.3	51.9	60.8	36.1
Emporia	10.4	11.6	6.8	48.9	52.3	37.1
South Boston	16.2	16.8	15.2	44.5	53.6	30.3
Farmville	18.6	18.0	19.4	39.6	46.8	29.3
Vinton	23.7	23.7	23.7	53.0	56.1	47.0
Salem	26.9	29.6	21.8	56.8	62.4	45.4
Roanoke	31.5	30.5	33.9	68.0	71.0	58.3
Alexandria	42.9	47.0	35.2	64.5	70.3	51.6
Arlington Co.	44.0	49.7	35.5	57.3	65.0	45.2
Fairfax Co.	50.0	52.6	41.8	64.5	66.4	55.4
Springfield	58.6	59.6	56.9	70.4	71.4	68.2
Woodbridge	49.3	52.9	39.5	67.2	71.0	55.9
Annandale	50.6	53.1	43.9	61.6	63.1	56.9
Richmond	21.9	24.9	14.9	61.0	67.1	45.6
Henrico Co.	36.8	39.8	29.3	67.1	74.0	47.8
Chesterfield Co.	45.3	46.1	43.1	76.0	79.3	65.5
Norfolk	34.4	38.3	26.3	57.6	66.5	39.5
Hampton	33.2	34.5	30.9	64.4	68.6	57.4
Newport News	43.8	46.3	41.1	62.1	72.1	51.5
Combined						
Urban	37.9	40.4	32.9	63.3	68.9	50.8
Towns	19.9	20.2	19.5	49.4	55.8	37.1
State	32.5	34.3	28.9	59.6	65.5	46.8

TABLE 4
NUMBER OF BELT USERS BY COMMUNITY SURVEYED

Community	Total	1987		Total	1988	
		Drivers	Passengers		Drivers	Passengers
Marion	66	54	12	172	140	32
Wytheville	116	76	40	282	200	82
Galax	63	45	18	246	174	72
Covington	55	40	15	157	128	29
Lexington	88	61	27	198	139	59
Harrisonburg	154	101	53	229	172	57
Emporia	35	29	6	137	114	23
South Boston	69	45	24	214	157	57
Farmville	134	74	60	239	166	73
Vinton	96	56	40	206	143	63
Salem	183	131	52	469	345	124
Roanoke	317	218	99	646	516	130
Alexandria	493	353	140	706	531	175
Arlington Co.	344	234	110	438	303	135
Fairfax Co.	165	132	33	213	182	31
Springfield	187	121	66	300	212	88
Woodbridge	150	118	32	295	233	62
Annandale	123	94	29	183	142	41
Richmond	115	92	23	414	326	88
Henrico Co.	232	178	54	463	376	87
Chesterfield Co.	329	239	90	635	502	133
Norfolk	327	246	81	784	607	177
Hampton	204	133	72	441	293	148
Newport News	156	87	69	350	209	141
Combined						
Urban	3,421	2,432	989	6,543	4,920	1,623
Towns	780	525	255	1,874	1,390	484
State	4,201	2,957	1,244	8,417	6,310	2,107