

CHILD SAFETY SEAT AND SAFETY BELT USE AMONG URBAN TRAVELERS

Results of the 1985 Survey

by

Charles B. Stoke  
Research Scientist

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ABSTRACT

During nine days in June 1983, 1984, and 1985, four major metropolitan areas of Virginia were surveyed to determine the extent to which safety restraints were being used by urban travelers. Observers stationed at selected signalized intersections displayed to stopped motorists a clipboard bearing the question, Are you wearing safety belts? The observers then approached the vehicles to visually verify any response given, and recorded whether safety belts or child safety seats were being used. They also recorded the license numbers of the vehicles and the sex and approximate age of each occupant.

Results published in previous reports have shown that passage of the state's Child Safety Seat Law resulted in a significant positive change in the usage rates by passengers less than four years of age. The rates of usage for infants in 1983, 1984, and 1985 were nearly identical. Nearly three-fourths of the infants traveling as right front passengers (RFP's) and two-thirds of the infants classed as remaining passengers (RP's) were observed to be in safety restraints (Table 6).

The 1985 data replicate earlier findings that when there was an infant in the car, and the infant was in a child safety seat, belt use by drivers and passengers was significantly higher than use rates by drivers and passengers when the infant was not in a child seat (Table 3). In 1984 and 1985, over 30% of the drivers, 40% of the RFP's, and 75% of the RP's used belt systems when a child was in a child seat, but fewer than 10% of these occupants were using safety restraints when the child was not in a child seat. The study also identified an association between the driver's use of safety belts and the use by other passengers. When drivers do not use belts, few passengers use belts. When drivers use lap belts, an increasing proportion of passengers use safety belts. Belt use rates by passengers are highest when drivers use the lap/shoulder belt combination (Table 2).

This longitudinal study of observed belt use patterns shows an increase in the use of safety restraint systems by drivers and passengers. In June 1985, 28.4% of the drivers and 25.7% of all passengers were using belt systems (Table 1). The rates in 1984 were 20.4% and 19.4% and those in 1983 were 16.4% and 19.0%

An analysis of the data also produced additional findings that could relate to various educational or public information campaigns. These findings include the following: 1. the percentage of belt use by female drivers and RFP's is higher than that for their male counterparts (Table 4); 2. belt use by drivers was highest in in the afternoon, but use by passengers was highest in the morning (Table 5); 3. other than that for infants, belt use was highest for middle adult drivers and pre-adult passengers (Table 6); 4. belt use by drivers and passengers

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was greater in newer cars (Table 7); and 5. belt use was highest in the northern area and lowest in the western area of the state (Table 9).

These findings lead to the conclusion that the Child Safety Seat Law has been responsible for a significant increase in restraint usage by infants. There also appears to have been a spillover effect that has increased safety restraint usage by other categories of vehicle occupants.

## SUMMARY OF FINDINGS

1. The percentage of drivers using safety belts increased from 1983 to 1984 to 1985 (16.4%, 20.5%, and 28.4%).
2. Use of the lap/shoulder combination accounted for nearly all of the driver belt usage for the three years (14.4%, 17.7%, and 26.0%).
3. Safety belt usage by RFP's was much higher in 1985 (24.7%) than in 1983 (16.2%) or 1984 (16.7%).
4. The use of the lap/shoulder combination accounted for 12.1%, 12.5%, and 18.8% of the RFP belt use from 1983 to 1985.
5. Safety belt usage by RP's increased each year (23.6%, 24.1%, and 27.4%).
6. The use of child safety seats (15.7%, 11.4%, and 14.4%) and lap belts (6.8%, 12.1%, and 11.0%) accounted for most of the belt usage by RP's.
7. There was a positive association between driver and RFP use of safety belts. If one used safety belts, there was an increased tendency for the other to also use them (see Table 2).
8. When there was an infant in the car using a child safety seat, there was an increased percentage of other occupants using safety restraints (see Table 3).
9. A slightly greater percentage of female drivers and RFP's used safety belts than did their male counterparts (see Table 4).
10. The usage rates for male RP's was higher than that for female RP's (see Table 4), and the difference increased each year.
11. In 1985, belt use by drivers and passengers was greatest in the morning survey period; in both 1983 and 1984 passenger use rates were higher in the morning and driver rates were higher in the afternoon (see Table 5).
12. In each driver age category, safety belt use was higher in each successive year of the survey (see Table 6).
13. Over three-fourths of the infant RFP's and two-thirds of the infant RP's were in safety restraints (see Table 6).
14. For occupants other than infants, belt use was highest for middle adult drivers and pre-adult passengers (see Table 6).

15. Belt use tended to be higher in newer vehicles (see Tables 7 and 8).
16. Belt use was highest in the northern area and lowest in the western area of the state (see Table 9).
17. The same proportions of survey data were collected each year relative to time of day, area of the state, and sex of the occupant. Because of this, these factors should not bias the data on safety belt usage rates (see Appendices A-1, A-3, and A-4).
18. The increasing percentage of new cars surveyed and changes in the age distributions of occupants surveyed could cause a modest increase in belt usage (see Appendices A-2 and A-5).

## CONCLUSION

Based on the analysis of the data collected during each of the surveys reported here, it was concluded that passage of the Child Safety Seat Law by the Virginia General Assembly has had a major positive influence on the use of safety restraints by infants and a lesser, but still positive, influence on belt usage by other vehicle occupants.



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### INTRODUCTION

There is a great body of literature detailing the advantages of safety belt use by motor vehicle occupants. This literature cites the probability of reducing injuries, including fatal injuries, and projects the value of this reduction to the individual and to society in general. This evidence of injury avoidance and economic savings is so strong that for over 20 years both federal and state governments have required the installation of safety belts in all new automobiles offered for sale. It is equally well known that making safety belts available does not assure their use.

Numerous efforts have been initiated by government agencies and private groups to persuade motorists to use restraining devices. There have been many public information and education campaigns using both the print and electronic media and star personalities, as well as offers of various awards (in one instance new cars), to increase safety belt usage. The public is also familiar with various engineering approaches, such as the installation of warning buzzers and lights, interlock systems, the three-point belts, and inertial reels, to promoting the use of restraints. All 50 states require the use of child safety seats, although there are variations in the statutes, and 25 states, as of July 1986, had various mandatory use laws applicable to other vehicle occupants.

Legislation that would require the use of safety belts by drivers and front seat occupants was introduced during the 1984, 1985, and 1986 sessions of the Virginia General Assembly. A bill has been closer to passage during each successive year. In 1984, a bill failed in the house. In 1985, it passed in the house, but not in the senate. In 1986, both of the legislative bodies initially passed a mandatory use law, but there were variations in the house and senate versions. As with all legislation, these differences were worked out by a conference committee and the compromise bill went to a vote in both houses during the final days of the session. It passed in the house and initially passed in the senate, but upon a call for reconsideration there, it failed on a tie vote. This chronology is recapped to show just how close a mandatory usage law was to being enacted in Virginia in 1986.

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The bill's sponsor has indicated that he will reintroduce a mandatory safety belt use statute in the 1987 session, and hopes that he will be successful in having it enacted.

Through the years, there have been a number of investigations to determine the extent to which motor vehicle occupants use safety belts. In the early studies, the investigators used questionnaire and interview formats, while in later ones they have used a variety of observational techniques. It has been found that motorists responding to questions on their use of safety belts generally give the socially acceptable affirmative reply. Observations have shown, however, that their actual belt use is less than that stated.

Over the years, there have been a number of events that could influence the rate of safety belt usage in Virginia. The 1982 General Assembly passed a statute requiring children younger than 4 years of age to be restrained in child safety seats. This law became effective January 1, 1983. Also, there have been major changes in the size, weight, and design of vehicles, both domestic and imported, that should affect safety belt use. In addition, there is the possibility that efforts to promote safety consciousness over the intervening years have produced an increase in the use of safety belts. Finally, publicity on the efforts to enact a mandatory safety belt statute in Virginia may have led some citizens to alter their belt use patterns.

#### PURPOSE

The observational surveys of belt use discussed here are used to determine the extent to which the law mandating the use of child safety seats has changed the percentage of infants using these safety devices and whether the rates have changed over the years. A second objective of the study is to determine the extent of safety belt usage by all vehicle occupants and whether the rates of use have changed.

#### SURVEY METHODOLOGY

In June of 1983, 1984, and 1985, observers surveyed four metropolitan areas of the state; namely, Western Virginia (Roanoke-Salem-Vinton), Northern Virginia (Alexandria-Arlington-Fairfax County-Belvoir), Central Virginia (Richmond-Henrico-Chesterfield), and Eastern Virginia (Norfolk-Virginia Beach-Hampton). Each day of the week, Sunday through Saturday, was sampled for at least 1 full day, and Thursday and Friday were sampled for 2 days.

Three sites located in different sections of the survey areas were used each day. They were chosen because the thoroughfares carried relatively high traffic volumes and provided adequate and safe vantage points for observations. Each day 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. Three time periods were used: 1. 8:00 a.m. to 10:30 a.m.; 2. 11:30 a.m. to 2:00 p.m.; and 3. 3:30 p.m. to 6:00 p.m.

The observations were made at signalized intersections, and 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 from the front at a 45° angle. Approaching at the right front fender, the observer walked along the side and past the vehicle while noting and recording the use of safety restraints. Upon seeing the question, most occupants would reply. This reply was acknowledged, 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 passengers were using only a lap belt, both the lap and shoulder belts, or no form of restraint. In addition, they recorded whether any of the infants were in approved child seats. An "approved child seat" was defined as any of those models on the list distributed by the Virginia State Police as meeting their specification. Infants in car seats that clearly were not adequately anchored to the vehicle were recorded as nonuse. The survey personnel also recorded the sex and approximate age of each occupant, their seat position in the vehicle, and the license number of the vehicle (see Figure 1).

Occupant age was divided into five categories: 1. infants (up to 4 years old), 2. pre-adults (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). Vehicle age was divided into four categories: 1. the three most current full model years and the newest partial model year during each survey period, 2. the next three oldest model year vehicles, 3. the next three oldest model year vehicles, and 4. all remaining model year vehicles. To determine the vehicle age category, the recorded license plate numbers were submitted to personnel of the Vehicle Services Administration (VSA) at the Department of Motor Vehicles (DMV), who accessed the vehicle file and provided the model years. Model year data were then entered onto the computer tape and this information was processed at the same time as all the other data recorded on the survey

FIGURE 1

SAFETY BELT USAGE SURVEY FORM

Date \_\_\_\_\_  
 Sheet No. \_\_\_\_\_

Start Time \_\_\_\_\_  
 Stop Time \_\_\_\_\_

Location \_\_\_\_\_  
 At \_\_\_\_\_

License Number	Driver		Mid Front		R Front		L Rear		Mid Rear		R Rear	
	Belts	Sex	Age	Belts	Sex	Age	Belts	Sex	Age	Belts	Sex	Age
	L S	M	P Y	L S	M	I P Y	L S	M	I P Y	L S	M	I P Y
	N F	M O	M O	N A	F	M O	N A	F	M O	N A	F	M O
	L S	M	P Y	L S	M	I P Y	L S	M	I P Y	L S	M	I P Y
	N F	M O	M O	N A	F	M O	N A	F	M O	N A	F	M O
	L S	M	P Y	L S	M	I P Y	L S	M	I P Y	L S	M	I P Y
	N F	M O	M O	N A	F	M O	N A	F	M O	N A	F	M O
	L S	M	P Y	L S	M	I P Y	L S	M	I P Y	L S	M	I P Y
	N F	M O	M O	N A	F	M O	N A	F	M O	N A	F	M O
	L S	M	P Y	L S	M	I P Y	L S	M	I P Y	L S	M	I P Y
	N F	M O	M O	N A	F	M O	N A	F	M O	N A	F	M O
	L S	M	P Y	L S	M	I P Y	L S	M	I P Y	L S	M	I P Y
	N F	M O	M O	N A	F	M O	N A	F	M O	N A	F	M O
	L S	M	P Y	L S	M	I P Y	L S	M	I P Y	L S	M	I P Y
	N F	M O	M O	N A	F	M O	N A	F	M O	N A	F	M O
	L S	M	P Y	L S	M	I P Y	L S	M	I P Y	L S	M	I P Y
	N F	M O	M O	N A	F	M O	N A	F	M O	N A	F	M O

Restraint Use

Occupant Age

- L = Lap
- S = Shoulder
- N = None
- A = Approved Child Seat
- 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 and Up)

forms. In the data collected during the 1984 survey, for an undetermined reason there were a small number of vehicles (1.1%) for which model year designations could not be established. Thus, in several of the tables in this report, it is noted that some vehicles are undefined by model year.

The 1985 survey was the seventh one to be conducted and the fourth during summer months, the first three having been conducted during February. The observational 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, conducted during June 1977, was the first to include observations on the use of child restraints. This information on child restraint usage was added at the request of the director of the Highway Safety Division. Subsequent to the 1977 survey, it was determined that yearly 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 the passage of Senate Bill 413 during the 1982 session of the Virginia General Assembly. This statute is referred to as the Child Safety Seat Law and, as has been noted, went into effect January 1, 1983. Therefore, during June 1983, about 6 months after the effective date of the statute, 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. A year later, data were being collected during the summer of 1984 in an effort to determine whether there was a change in belt use patterns by vehicle occupants. Because of the publicity associated with the bill to require front seat occupants to use safety belts, and the knowledge that the bill would be reintroduced during the 1986 session, it was decided to conduct the survey during the summer of 1985 to maintain the data baseline.

## ANALYSIS

The survey data in this report are discussed in a two-step process. In the first step, the location, vehicle, and occupant characteristics of the survey sample are analyzed to determine whether they could (and did) contribute to changes in belt use patterns over the 3 year period (1983-1985). In the second step, data on the observed belt usage in each year are analyzed and changes in the use patterns are discussed.

### The Survey Sample

During the 9 day survey period in June 1983, data were collected on 9,737 occupants of 6,498 vehicles. The 1984 figures encompassed 8,981 occupants in 5,581 vehicles, and those for 1985 covered 8,135 occupants

in 5,436 vehicles. Data on the number and percentages of individuals surveyed by time period, age of the automobile, area of the state, sex of the occupant, and age of the occupant are presented in Appendix Tables A-1 through A-5.

The number and percentage of vehicles surveyed during each of the daily time periods are contained in Appendix Table A-1. For each year of data presented in this report, the greatest percentage of vehicles was observed during the afternoon (3:30 to 6:00 p.m.) time period and the smallest percentage was during the morning (8:00 to 10:30 a.m.) period. The percentages for 1983 and 1984 were nearly identical (26.8% vs. 27.2% in the morning, 34.3% vs. 34.0% at midday, and 38.9% vs. 38.8% in the afternoon), while those for 1985 (30.6%, 32.5%, and 36.9%) vary from those of the 2 previous years. Although there were differences in the distributions of vehicles surveyed by time of day over the 1983 to 1985 period, the differences were such that they should not affect overall year-to-year belt use patterns by drivers or passengers.

Vehicle age data are contained in Appendix Table A-2. The data are categorized in age groups based on vehicle model year. It has been postulated that belt usage rates are higher in new cars than in older models. The age groups were, therefore, set up to include three full model years (a typical ownership period) in each set of data. Since 1983 there has been an increase in the proportion that the newest three model years comprise of the total number of vehicles; from 24.4% in 1983 to 28.9% in 1984 to 31.5% in 1985. Over this same 3 year survey period, there has been a decline in the proportion of vehicles 3 to 6 years old (29.3% in 1983 to 23.7% in 1985), a modest increase in the proportion of 6-to-9-year-old vehicles (19.3% to 21.7%), and a 4 percentage point drop (27.1% to 23.1%) in the proportion of vehicles 10 or more years old. In both 1984 and 1985, category 4 vehicles (the newest model years) made up the largest single portion of the total. In 1985, nearly a third of all vehicles surveyed fell into this vehicle category. If the theory of greater belt use by occupants of newer vehicles holds true, then state-wide belt use should be higher in each successive year.

Appendix Table A-3 contains data on the number and percentage of vehicles surveyed in each of the four areas of the state. The observers worked 3 days, one being a Sunday with its lower traffic volumes, in the northern area, and 2 days in each of the other three geographic areas. In light of the number of days worked, it appears that there was an overrepresentation in the percentages of vehicles surveyed in the central area all 3 years, in the eastern area in 1983, and in the western area in 1984. Each year, approximately 32% of the vehicles surveyed were in the northern area, nearly 25% in the central area, and about 21% each in the western and eastern areas. Only one data set, the 1984 western area percentages, varied by more than 2 percentage points in the year-to-year figures. Because of the general consistency in the percentages of vehicles surveyed in the four geographic areas of the

state over the last 3 years of the project, there is no bias factor that should influence belt use patterns as a function of the number of vehicles observed in each area of the state.

The data on the sex of the occupant are presented in Appendix Table A-4. The ratios of male to female drivers and right front passengers (RFP's) were nearly the same for 1983 and 1985. The figures for 1984 varied by just over 2 percentage points in each instance. For the 3 years of data presented in this report, over half of the drivers were males and over two-thirds of the RFP's were females. The data for the remaining passengers (RP's) indicate a declining proportion of females, from 58.6% in 1983 to 54.4% in 1985. Differences in the year-to-year percentages are so slight that they should not influence statewide driver and passenger belt use patterns.

Appendix Table A-5 contains data on the ages of the occupants surveyed. There was a difference in the age distributions for drivers over the three survey periods. Each year the greatest proportion of drivers were middle adults. Although this age group accounted for most of the observed drivers, the percentages varied from 69.0% in 1983 to 55.5% in 1984 to 60.9% in 1985. The proportion of young adult drivers varied in an indirect relationship to those for middle adults; 27.5% in 1983, 34.8% in 1984, and 28.6% in 1985. In addition, there was a steady increase in the proportion of older adult drivers; 3.5% in 1983, 9.5% in 1984, and 10.4% in 1985. With the year-to-year variations in the driver age group distributions (more young and older adults and fewer middle adults in the 1984 survey), statewide belt usage would be expected to decline between 1983 and 1984. The modest increase in the proportion of middle adults in 1985, accompanied by other changes as enumerated above, should result in a slight increase in driver belt usage in the 1985 survey results.

The distributions of RFP's surveyed over the 3 years fluctuated in nearly the same manner as those for drivers. The middle adult age group had the greatest proportion of RFP's, but the rates were not as great as those for drivers. Young adults made up the second largest RFP group each year, followed by pre-adults, older adults, and infants. The proportion of infants changed relatively little from year to year (2.5%, 2.1%, and 3.2%), but there was a steady increase for pre-adults (14.5%, 16.2%, and 17.9%) and older adults (7.9%, 12.5%, and 14.0%). The young adult RFP percentages were 26.9%, 29.5%, and 24.4%, and those for middle adults were 48.3%, 39.7% and 40.5% during the 1983 to 1985 period, respectively. The overall effect of these changes in the ages of the survey samples is such that there should be a slight drop in RFP use rates in 1984 and an increase in 1985 to a level similar to that in 1983.

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As with drivers and RFP's, there were variations in the age distributions of the remaining passengers over the three surveys. At least two-thirds of the RP's surveyed each year were infants or pre-adults, groups that have tended to have the highest usage rates. Of the remaining RP's, there was a 3-year decline in the proportion of young adults (15.7%, 13.9%, and 11.2%), a relative stability in the middle adult group (14.3%, 13.2%, and 13.7%), and a small change in the older adult group (3.3%, 5.8%, and 4.5%). The theoretical results of these variations would be a slight increase each year in belt usage by the RP's.

The results of the analysis of the survey sample indicate that variations in the percentages of vehicles surveyed in the three daily time periods and the four geographic areas of the state, and in the ratio of male and female drivers and passengers should have no effect on statewide belt use patterns. Year-to-year variations in the vehicle age classifications (more new cars) and in the age distributions of the vehicle occupants should lead to a very modest increase in belt usage.

As regards the five characteristics of the survey sample discussed in this section of the report, there is no single factor or combination of factors that should produce a bias effect large enough to cause changes in the year-to-year belt use patterns by either drivers, RFP's, or RP's. If changes in use patterns are discovered in the analysis carried out in section two of this report, these differences would be the result of other influencing effects, such as changes in state law, public information programs, news media reports of legislative action, or other undiscovered causes.

#### Observed Belt Use

At the outset of the analysis of the data on belt use, it should be pointed out that large percentage increases in the year-to-year and longitudinal use rates are usually the result of very low use rates in the baseline period, and, therefore, that small numerical changes can result in large percentage changes. The reader is cautioned to view these rates of change in use patterns in light of the overall percent of use for the category under discussion.

The data in Table 1 show the overall use of safety belts by drivers and passengers. Rates of use for the occupants of each seat position are based on the number of occupants using the various restraint devices as a function of all occupants in the 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 discuss age group usage rates.

Table 1

## Use of Safety Belts

Occupant Seat Position	Restraint Use	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	Child Seat	33	1.6	24	1.2	37	2.2
	Lap Only	51	2.5	59	3.0	64	3.7
	Lap/Shoulder	246	12.1	247	12.5	322	18.8
	None	1,700	83.7	1,653	83.4	1,292	75.3
Remaining Passengers	Child Seat	190	15.7	131	11.4	142	14.4
	Lap Only	82	6.8	139	12.1	108	11.0
	Lap/Shoulder	13	1.1	7	0.6	20	2.0
	None	922	76.4	870	75.9	714	72.6

Over the 3 year survey period, belt use rates increased for both drivers and passengers. The change for drivers was at a level greater than that for RFP's or RP's. In 1983, 16.4% of the drivers were observed to be using some type of belt system. The rate increased to 20.5% in 1984 and to 28.4% in 1985. This increase of 12 percentage points in use rates between 1983 and 1985, a 73% increase from the 1983 base rate, is a highly significant rate of change. Each year, most of the usage was accounted for by the use of lap and shoulder (L/S) belts (14.4%, 17.7%, and 26.0%). Belt use by RFP's increased from 16.3% to 16.6% to 24.7%, with the major portion of these rates of use being accounted for by the use of L/S belts. The 1985 RFP usage rate is 52% greater than that observed in 1983. The use of only lap belts in the driver and RFP seat positions was very low because few cars surveyed were equipped with this belt system at these seating positions. Belt use by RP's increased from 23.6% to 24.1% to 27.4% over the 3 years. Nearly all of the increase was accounted for by the use of child safety seats and lap belts. L/S belt use in these seating positions was low because few cars were equipped with the L/S restraint system in the RP seating positions. During each of the surveys, belt use was lower for RFP's than for drivers or RP's, but by 1985 the differences had narrowed.

Data on the association between driver and passenger uses of safety belts are contained in Table 2. The survey results for all 3 years indicate that when the drivers were not using safety belts nearly all of the RFP's also were not using belt systems. While there were slight improvements in belt usage between 1983 (5.4%) and 1985 (7.3%), with all of this improvement due to the use of L/S belt systems, the fact remains that over 92% of the RFP's were not using the safety restraints provided in the vehicles in which they were occupants when riding with non-restrained drivers. The overall belt use by RP's riding in cars with drivers not using belts was more favorable than that for RFP's. When the rates for these seat positions were compared, the RP use rates were nearly 12 points higher in 1983, 9.5 points higher in 1984, and 6.0 points higher in 1985. These figures also show that RP's had declining use rates over the 3 years (17.2%, 15.4%, and 13.4%). By 1985, nearly 87% of the RP's were not using available safety restraints. These nonuse figures are especially depressing because the RP seat positions are those in which few adults but most children ride.

Child seat usage declined from 13.9% in 1983 to 9.7% in 1985 in vehicles driven by unbelted drivers. This change could be the result of either a small number of children riding in these seats or of an actual decrease in use. Child seat usage will be discussed more fully in a following section of this report.

The data were also categorized according to RFP and RP belt use patterns when the driver was using only a lap belt. If the driver had

Table 2

## Association Between Driver and Passenger Uses of Safety Belts

Occupant Seat Position	Occupant Use of Belt	1983		1984		1985	
		Number	Percent	Number	Percent	Number	Percent
Right Front Passenger Using	Child Seat	25	1.5	18	1.1	18	1.4
	Lap Only	17	1.0	24	1.5	14	1.1
	Lap/Shoulder	50	3.0	55	3.4	60	4.7
	None	1,598	94.6	1,528	94.0	1,176	92.7
Remaining Passenger Using	Child Seat	139	13.9	89	9.9	67	9.7
	Lap Only	31	3.1	48	5.4	20	2.9
	Lap/Shoulder	3	0.3	1	0.1	6	0.9
	None	830	82.8	760	84.6	600	86.6
Occupant Seat Position	Occupant Use of Belt	1983		1984		1985	
		Number	Percent	Number	Percent	Number	Percent
Right Front Passenger Using	Child Seat	0	----	3	7.9	2	6.1
	Lap Only	25	67.6	21	55.3	14	42.4
	Lap/Shoulder	2	5.4	4	10.5	6	18.2
	None	10	27.0	10	26.3	11	33.3
Remaining Passenger Using	Child Seat	4	16.0	0	----	5	20.8
	Lap Only	8	32.0	14	53.8	14	50.0
	Lap/Shoulder	0	----	0	----	0	----
	None	13	52.0	12	46.2	9	32.1

Table 2 (continued)

Association Between Driver and Passenger Uses of Safety Belts

Occupant Seat Position	Occupant Use of Belt	1983		1984		1985	
		Number	Percent	Number	Percent	Number	Percent
Right Front Passenger Using	Child Seat	8	2.7	3	0.9	17	4.1
	Lap Only	9	3.0	14	4.4	36	8.7
	Lap/Shoulder	194	64.5	188	58.7	256	61.8
	None	90	29.9	115	35.9	105	25.4
Remaining Passenger Using	Child Seat	46	25.8	42	18.8	70	26.6
	Lap Only	43	24.2	77	34.5	74	28.1
	Lap/Shoulder	10	5.6	6	2.7	14	5.3
	None	79	44.4	98	44.0	105	39.9

ducked under the available shoulder strap portion of an L/S belt system, the use was recorded as that for only a lap belt. For the most part, cars equipped with only a lap belt for the driver had only a lap belt for the passengers. In addition, these vehicles make up a decreasingly small portion of the total vehicle fleet, especially since they are represented by vehicles older than the 1973 model year. In general, RFP uses of restraint systems were nearly the same in 1983 and 1984 (73.0% and 73.7%), but declined to 67.7% in 1985. For these same lap-belted drivers, RP use increased from 48.0% to 53.8% to 70.9% over the 3 years. While these are relatively high use rates, and the 23-point increase (a 48% improvement) appears to be a major accomplishment for belt use advocates, the rates in fact represent very few total occupants and have little effect in modifying overall use patterns.

Restraint system usage by RFP's and RP's was greatest, during each of the three surveys and for both seating positions, when the driver was using the L/S combination. From 1983 to 1985, total RFP use rates varied from 70.1% (1983) to 64.1% (1984) to 74.6% (1985), with nearly all of this use accounted for by the use of the L/S combination (64.5%, 58.7%, and 61.8%). During the 1985 survey, a greater percentage of all RFP's riding in cars with L/S-belted drivers were observed using either the child seat (4.1%) or the lap belt (8.7%), traditional methods for protecting children, than were observed using these restraint systems during the two previous surveys. RP use of belt systems gradually increased over the 3 years, from 55.6% to 56.0% to 60.1%. Nearly all of the use was accounted for by the use of child seats and lap belts. As with RFP's, restraint system usage for RP's was greater in 1985 than during the previous 2 years. As has been noted, because the belt use percentages in Table 2 are based on the number of persons using a particular restraint system as a function of all passengers in the seat position, and not a function of the age distributions of these passengers, the data appear to show that infant use of child safety seats was at a low level.

The focus of the data in Table 3 is on the extent to which drivers and passengers were found to use restraint systems when infants were in the vehicle. If the infant occupant was not in a child safety seat, most of the drivers and passengers also were not using their available safety restraints. The nonuse figures for drivers were 95.4%, 88.4%, and 84.3% for the 1983-1985 period. While the 15.7% usage in 1985 represents a major change in usage patterns from the 4.6% of 1983, this rate is well below the previous averages for use by all drivers. The nonuse rates for RFP's were 90.2%, 84.0%, and 88.4%, and those for RP's were 91.3%, 84.2%, and 95.6%. As with drivers, these rates were worse than the figures for all passengers in these same seat positions in previous surveys. While belt use by these drivers increased over the 3 years, use by RFP's dropped from 1984 to 1985 to a level slightly above the 1983 level. Belt use by RP's was lower in 1985 than in either 1983 or 1984, and was lower than usage rates for any other seat position in

Table 3  
Belt Use of Other Occupants in Vehicles with Infant Passengers

Use By Other Occupants	Belt Use	When Infants Were in Child Seats					
		1983		1984		1985	
		Number	Percent	Number	Percent	Number	Percent
Driver	Belted	51	25.1	44	30.8	86	52.4
	Not Belted	152	74.9	99	69.2	78	47.6
Right Front Passenger	Belted	16	17.2	41	42.3	76	65.0
	Not Belted	77	82.8	56	57.7	41	35.0
Remaining Passengers	Belted	18	23.1	146	81.1	170	77.3
	Not Belted	60	76.9	34	18.9	50	22.7

  

Use By Other Occupants	Belt Use	When Infants Were Not in Child Seats					
		1983		1984		1985	
		Number	Percent	Number	Percent	Number	Percent
Driver	Belted	5	4.6	10	11.6	13	15.7
	Not Belted	104	95.4	76	88.4	70	84.3
Right Front Passenger	Belted	9	9.8	12	16.0	8	11.6
	Not Belted	83	90.2	63	84.0	61	88.4
Remaining Passengers	Belted	16	8.7	20	15.8	6	4.4
	Not Belted	167	91.3	107	84.2	130	95.6

any year. It is apparent from these data that when the adults in the car do not see that the infant occupants are properly safeguarded through the use of safety belts, they also have little or no inclination to protect themselves.

When the infant occupant was protected through the use of a safety restraint system, there was an increased probability that other vehicle occupants were also using safety belt systems. Over the three survey periods, use rates for drivers were 25.1%, 30.8%, and 52.4%. Over this same period, belt usage rates for RFP's were 17.2%, 42.3%, and 65.0%, and those for RP's were 23.1%, 81.1%, and 77.3%. It is at once apparent from these data that belt use by other vehicle occupants was significantly higher when the infant was protected by a safety seat than when the infant was not so protected. The other noticeable factor is the major increase in driver (+109%) and passenger (+278% and +235%) use rates when 1985 data were compared to the 1983 data. These increases can probably be ascribed to the spillover effect related to the passage of the Child Safety Seat Law and attempts at passage of an adult belt use law.

The data in Table 4 depict safety belt use according to the sex of the occupant. For male and female drivers, female RFP's, and male RP's there were increases in belt use for succeeding surveys. Belt use by male drivers was 35% higher in 1985 than in 1984 (26.4% vs. 19.5%) and 26% higher in 1984 than in 1983 (15.5%). The 1985 rate for male drivers was 70% higher than the 1983 rate. For female drivers, belt use was 40% higher in 1985 than in 1984 (30.6% vs. 21.9%) and 25% higher in 1984 than in 1983 (17.5%). There was a 75% change in usage rate from 1983 to 1985 for female drivers. Each year, female drivers used safety belts at a higher rate than did males, and their yearly rate of increase and total increase over the study period reported here were also greater.

Belt use by male and female RFP's was lower each year than that for drivers. Except for males in 1984, there was an increase in use rates over the 3 year reporting period. Male RFP use was 15.0% in 1983, 14.2% in 1984 (-5%), and 25.4% in 1985 (+79%). Female RFP use was 16.9% in 1983, 17.9% in 1984 (+6%), and 24.3% in 1985 (+36%). The 1983 to 1985 increase in usage was 69% for males and 44% for females.

Except for females in 1984, belt use rates by RP's were successively greater. Male RP use increased from 24.0% in 1983 to 27.8% in 1984 (+16%) to 31.8% in 1985 (+14%). Female RP use was 23.4% in 1983, 21.3% in 1984 (-9%), and 23.7% in 1985 (+11%). For these 3 years, males had a 33% higher rate in 1985 than in 1983 and females had only a 1% higher rate in 1985.

The year-to-year percentage increase was relatively large for drivers and passengers. While this is an encouraging sign and gives rise to hope for further increases in safety belt usage, with the

Table 4  
Belt Use by Sex of Occupant

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 Passengers	Male	120	24.0	139	27.8	143	31.8
	Female	165	23.4	138	21.3	127	23.7

possibility of reaching half of the motorists on a voluntary basis, the fact remains that even in the best of years (1985) and for the highest use rates, less than a third of all drivers and passengers were using safety belt systems.

Data on safety belt use by survey time period are contained in Table 5. As with the other classifications of data, driver use rates were higher in 1985 than in 1984, and higher in 1984 than in 1983. Driver use rates varied by fewer than 4 percentage points among the three time periods during any single year of the survey. When the data were considered on a longitudinal basis, there were significant year-to-year changes. During the 8:00 to 10:30 a.m. period, driver use rates were 16.5% in 1983, 20.7% in 1984 (+25%), and 30.4% in 1985 (+47%). In the 11:30 a.m. to 2:00 p.m. midday survey period, use rates were 14.5%, 18.5% (+28%), and 27.9% (+51%), respectively for the 3 years. In the 3:30 to 6:00 p.m. period, use rates were 18.1% in 1983, 22.1% in 1984 (+22%), and 27.1% in 1985 (+23%). Over the 3 years, the increases in use rates for drivers were 84% in the morning, 92% at midday, and 50% in the afternoon. The data also show that use rates were highest in the afternoon period and lowest in the midday period for the 1983 and 1984 surveys, but highest in the morning and lowest in the afternoon for the 1985 survey. As discussed in other sections of this report in conjunction with other classifications of data, there also were major increases in the year-to-year driver use rates when the data were categorized by survey time period. Even though these are important increases, fewer than 30% of the drivers surveyed in the year with the best results (1985) were observed to be using safety belts in any time period.

When categorized according to the survey time period, RFP belt use increased each year with the exception of the afternoon period in 1984. During the morning period, the use rates were 16.3% in 1983, 19.6% in 1984 (+20%), and 27.7% in 1985 (+41%); for the midday period, they were 15.0% in 1983, 15.4% in 1984 (+3%), and 25.5% in 1985 (+66%); and for the afternoon period, they were 17.3% in 1983, 16.3% in 1984 (-6%), and 22.4% in 1985 (+37%). For the morning period, the belt use rate in 1985 was 70% higher than that in 1983, for midday, it was also 70% higher, and for the afternoon 29% higher. Again, these data show a favorable trend in belt use, but they also indicate that only a fourth of the passengers were using available safety restraints in 1985, the year with the highest observed usage. It is interesting to note that for each time period and during each year of the survey, with one exception in 1983, driver belt use rates were greater than those for RFP's.

For RP's, there was little practical difference in belt use rates in the morning (35.1% vs. 34.9%) and midday (20.1% vs. 19.1%) periods in 1983 and 1984, or in the afternoon period in 1984 and 1985 (24.0% each year). The use rate in 1985 was 12% higher than the 1983 rate in the

Table 5

Belt Use by Time Periods

Occupant Seat Position	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 Passengers	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

morning, 25% higher at midday, and 13% higher in the afternoon. These figures show that there was less year-to-year variability in belt use rates by RP's than those for drivers and RFP's. The highest rate of use each year was in the morning period, a time when there was the greatest probability of an infant being in the car. In past years, use rates by infants were much greater than those for other age groups, and, therefore, a greater percentage of passengers in this age group would tend to push up usage rates. The data also indicate that in 1985 there was a narrowing of the use rates when categorized by occupant seat position and survey time period. This was primarily due to the increased usage by drivers and RFP's, and the relative stable use by RP's.

Table 6 contains safety belt use data according to the age of the occupant. During the 1985 survey, a greater percentage of young, middle, and older adult drivers were observed using safety belts than were observed in either 1983 or 1984. When belt use data were considered on a year-to-year basis, young adult drivers (17 to 30 years old) had rates of 14.3% in 1983, 22.4% in 1984 (+57%), and 27.6% in 1985 (+23%). The rates for middle adult drivers (31 to 60 years) were 17.3%, 25.1% (+45%), and 29.9% (+19%); and those for older adults (over 60 years) were 16.3%, 16.6% (+2%), and 21.9% (+32%). Each year middle adults had higher use rates than drivers in the other age groups, but there were significant increases in use rates by young adults, the group which contained the greatest number of high risk/high crash and conviction rate drivers, and by older adults. There also was a steady increase in belt use rates by all drivers over this period. The 1985 use rate for young adults, middle adults, and older adults were 93%, 73%, and 34% higher than the 1983 use rates.

When belt use by RFP's was categorized by the age of the occupant, the data provided interesting similarities and contrasts over the 3 years. For infants, occupants less than 4 years of age, there was little practical change in use rates -- 76.0% in 1983, 78.6% in 1984, and 76.4% in 1985. Because there was so little variability in the use rates, and because the state has a child restraint statute, these percentages probably represent the upper range of belt use obtainable for these passengers. RFP use rates by pre-adults (4 to 16 years) were 21.8%, 20.1% (-8%), and 30.0% (+49%); those for young adults were 11.0%, 14.9% (+35%), and 19.1% (+28%); those for middle adults were 14.7%, 14.7%, and 25.1% (+71%); and those for older adults were 15.0%, 12.1% (-19%), and 14.6% (+21%). These data show that there was no practical or effective difference in use rates between those in 1983 and 1985 for infants and older adults. There were, however, important increases in use rates in the other three age categories -- 38% by pre-adults, 74% by young adults, and 71% by middle adults. These data also show just how few RFP's in any age group other than infants were found to be using safety restraints, and suggest target audiences for programs to increase belt use.

Table 6  
Belt Use by Age of Occupant

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

Use rates by infant RP's were marginally lower each year of the survey. During 1983, 66.8% of these passengers were properly restrained, the rate in 1984 was 66.7%, and that in 1985 was 64.4%. This 2.4 percentage point drop between 1983 and 1985 is of little real significance. Use rates by other age groups of RP's increased each year, but so few young, middle, and older adult RP's were observed to be using belt systems that rates of use and percentages of change for these categories are of no practical value. The data for these three age groups do, however, provide an indication of just how few passengers were actually in these seating positions on a day-to-day basis. And finally, pre-adult RP use rates increased from 15.7% to 20.8% (+32%) to 21.7% (+4%), perhaps as a carryover effect of use rates by infants and the accompanying publicity associated with the Child Safety Seat Law and the proposed state statute applying to adults.

From the analysis of belt use data as a function of occupant age, four findings appear to have significant implications and potential application to the state. These are 1. the increase in belt use over time for all age groups of drivers, 2. the relative stability of use rates by infant RFP's and RP's, 3. the increasing use rates by young adult drivers and RFP's, and 4. the generally very low rates of use by all occupants in all seating positions, with the exception of infants.

Data on safety belt use by vehicle age are presented in Table 7. In previous reports, the vehicle age classification was based upon the type of safety belt system installed in the vehicle. Over the last 3 years, 68.5%, 74.3%, and 76.9% of all vehicles surveyed were in the category classified as three-point belts with a 4 to 8 second buzzer. This category represents all vehicles manufactured since the 1976 model year. In light of the size of this group of vehicles, it was not deemed appropriate to use the previous data categories based on installed belt systems as the basis for an analysis.

Some researchers have postulated that the rate of safety belt use is associated with the age of the vehicle, with rates being higher for newer cars. For this report, the data for vehicle age have been grouped into three 3-year categories and remainder. Because these categories are not static, and there is thus a shifting of vehicles between the categories over the various surveys, the data are not analyzed on a longitudinal basis as were the other data for this report.

For drivers, the theory of greatest belt use occurring in the newer cars was upheld. Except for the category one (oldest) vehicles in 1983, the use rate increased with decreasing vehicle age. Use rates in 1983 were 28.8% (category one), 15.9%, 33.0%, and 33.1% (category four); the rates in 1984 were 16.6%, 17.5%, 27.7%, and 37.2%; and the rates in 1985 were 17.8%, 23.0%, 30.7%, and 38.1%. In excess of a third of the drivers of category four cars were observed to be using safety belts

Table 7

## Belt Use by Vehicle Age

Occupant Seat Position	Vehicle Age*	1983		1984		1985	
		Number	Percent	Number	Percent	Number	Percent
Driver	Category 1	193	28.8	200	16.6	223	17.8
	Category 2	170	15.9	210	17.5	271	23.0
	Category 3	352	33.0	333	27.7	396	30.7
	Category 4	353	33.1	448	37.2	653	38.1
	Undefined	---	----	12	1.0	---	----
Right Front Passenger	Category 1	63	19.1	42	12.7	63	15.0
	Category 2	59	17.9	57	17.3	85	21.9
	Category 3	104	31.5	93	28.2	109	38.9
	Category 4	104	31.5	136	41.2	166	32.2
	Undefined	---	----	2	0.6	---	----
Remaining Passengers	Category 1	60	21.1	43	15.5	46	18.0
	Category 2	49	17.2	66	23.8	50	21.5
	Category 3	79	27.7	55	19.9	63	29.4
	Category 4	97	34.0	110	39.7	111	39.5
	Undefined	---	----	3	1.1	---	----

Category 4 = The 3 most current model years and newest partial model year (1983 data = 1981 to 1984, 1984 data = 1982 to 1985, and 1985 data = 1983 to 1986.)

Category 3 = The next 3 oldest model years (1983 data = 1978 to 1980, 1984 = 1979 to 1981, and 1985 data = 1980 to 1982).

Category 2 = The next 3 oldest model years (1983 data = 1975 to 1977, 1984 data = 1976 to 1978, and 1985 data = 1977 to 1979).

Category 1 = All remaining model years.

during each year of the survey, while less than a fifth of the drivers of category one cars were so observed.

The theory about higher belt use in newer vehicles also held true for RFP's, but the data were not as clear-cut as those for drivers. The 1984 data followed the trend for each vehicle age group, but there were variations in the data trends in 1983 and 1985. The 1983 belt use rates, from the oldest to the newest group, were 19.1%, 17.9%, 31.5%, and 31.5%. Comparable use rates in 1984 were 12.7%, 17.3%, 28.2%, and 41.2%; and those for 1985 were 15.0%, 21.9%, 38.9%, and 32.2%. Nearly a third of all RFP's in cars less than four model years old were using safety belts each year the survey was conducted. Less than a fifth of the RFP's in cars more than ten model years old were observed using safety belt systems.

Belt use patterns by RP's also followed the vehicle age/use rate theory, although the relative use patterns were more closely aligned with those for RFP's than with those for drivers. In 1983, RP use rates were 21.1%, 17.2%, 27.7%, and 34.0%. The 1984 use rates were 15.5%, 23.8%, 19.9%, and 39.7%; and those for 1985 were 18.0%, 21.5%, 29.4%, and 39.5%. As with drivers and RFP's, over a third of all RP's riding in the newest cars were observed using safety belts, as compared with less than a fifth of those in the oldest cars.

The data in Table 8 show the percentage of belt use in each occupant seat position as a ratio of the total observed belt use, and the data are arrayed so that use rates can be compared with the percentage of vehicles surveyed in each vehicle age group. By analyzing these two types of data, percentage use vs. percentage vehicles, it can be determined whether any age category/seat position/survey year element is over- or underrepresented as compared with the percentage of vehicles in the vehicle age category. This would be an additional indication of whether the belt use/vehicle age theory is viable.

When occupants were in vehicles greater than seven model years old, belt use by drivers, RFP's, and RP's was at a rate less than the percentage of these vehicles in the survey sample during all 3 years of data reported here. Belt use by these same occupants in the newest seven model year cars, with the exception of RP's in cars four to seven years old, was at a rate greater than the percentage of these vehicles to the total surveyed. The overrepresentation of belt use in newer cars and the underrepresentation of belt use in older cars, with the shift in usage rates occurring at the seventh model year, further confirms the theory of new vs. old car safety belt use. In addition, belt use by drivers and passengers was highest in group four vehicles and lowest in group one vehicles in both 1984 and 1985, with the group four use rates approaching 40% and those for group one being approximately 15% each year.

Table 8  
Ratio of Belt Use by Ratio of Age of Vehicles Surveyed

<u>Survey Year</u>	<u>Vehicle Age</u>	<u>% Belt Use by Drivers</u>	<u>% Belt Use by RFP's</u>	<u>% Belt Use by RP's</u>	<u>% Vehicles Surveyed</u>
1983	Category 1	18.1	19.1	21.1	27.1
	Category 2	15.9	17.9	17.2	19.3
	Category 3	33.0	31.5	27.7	29.3
	Category 4	33.1	31.5	34.0	24.4
1984	Category 1	16.6	12.7	15.5	24.5
	Category 2	17.4	17.3	23.8	21.0
	Category 3	27.7	28.2	19.9	24.4
	Category 4	37.2	41.2	39.7	28.9
	Undefined	1.0	0.6	1.1	1.1
1985	Category 1	14.5	14.9	17.0	23.1
	Category 2	17.6	20.1	18.5	21.7
	Category 3	25.7	25.8	23.3	23.7
	Category 4	42.3	39.2	41.1	31.5

Table 9 presents data on safety belt use according to the area of the state surveyed. Each year, driver use rates were highest in the northern area and lowest in the western area. In addition, there were significant changes in use rates in each area between the 1983 and 1985 surveys. In the northern area, safety belt use by drivers increased from 22.7% in 1983 to 27.3% in 1984 (+20%) to 33.8% in 1985 (+24%). Belt use rates in the eastern area were 15.1%, 20.5% (+36%), and 28.5% (+39%); those in the central area were 13.9%, 16.6% (+19%), and 24.7% (+49%); and those in the western area were 11.3%, 15.6% (+38%), and 24.3% (+56%) for the 3 years, respectively. While the greatest rate of use each year was in the northern area, the greatest rate of increase over the 3 years was in the western area, and the use rates between the various geographic locations narrowed over time.

Observed belt use by RFP's was greater in 1985 than in the previous two surveys, although there was not the steady and consistent year-to-year increase seen in the driver use data. As with drivers, RFP use rates were highest in the northern area and lowest in the western area. Over the 3 years, use rates were 20.9%, 20.9%, and 31.2% (+49%) in the northern area; 14.2%, 16.8% (+18%), and 24.0% (+43%) in the eastern area; 14.5%, 13.6% (-6%), and 21.9% (+61%) in the central area; and 13.5%, 13.1% (-3%), and 19.0% (+45%) in the western area. RFP use was not as high as that for drivers in any of the four survey areas during 1984 and 1985; the results in 1983 were mixed with RFP use higher in the central and western areas. During 1983 and 1984, use rates exceeded 20% only in the northern area, but in 1985, RFP use rates failed to exceed 20% only in the western area.

For RP's, there was a steady increase in belt use in the northern area. These rates were 21.7% in 1983, 24.6% in 1984 (+13%), and 31.3% in 1985 (+27%). The use rates in the other three survey areas varied over the years. In the eastern area, RP use rates were 24.0%, 27.3% (+14%), and 26.5% (-3%), for a net increase over the 3 years. In the central area, the use rates were 25.8%, 21.1% (-18%), and 26.5% (+26%), indicating little change over the years. And in the western area, the use rates were 23.8%, 22.1% (-7%), and 24.3% (+10%), for no effective change. For the most part, use rates by RP's were higher than those for RFP's during all 3 years and higher than those for drivers during 1983 and 1984.

#### SUMMARY

Observational surveys of safety belt use in Virginia have been conducted in two series. The first series covered 1974 through 1977 and the second 1983 through 1985. Data were collected in February of 1974, 1975, and 1976, and in June in each of the four other years. This

Table 9

Belt Use by Area Surveyed

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	81	26.5

document reports the data from only the second series of observations. A number of the general findings from this latter series are similar to those from the first, and are similar to those that other researchers and organizations have reported over this same time period. The findings are categorized into those considered as major accomplishments or results, and those considered as informational or interesting results.

There are four results in the major accomplishments category. The first is the significant percentage of infants that were found to be protected in some form of safety restraint system. In each of the three surveys made subsequent to passage of the Child Safety Seat Law over two-thirds of the passengers less than 4 years old were observed to be in safety restraints. The usage rate prior to the passage of the law was in the range of 10%. The second major finding was that increasing proportions of passengers used safety belts when the driver used a lap or lap/shoulder belt. As the drivers availed themselves of increased protection, the percentage of passengers using restraints increased. Third, a small percentage of other occupants, generally less than 10%, were found to be using belt systems when infants were not in child safety seats. In the 1984 and 1985 surveys, over 30% of the drivers, 40% of the RFP's, and 75% of the RP's were using belt systems when the child was in a child seat. As the adults in the vehicles make efforts to safeguard their infant passengers, they also tend to increase their own protection through use of available belt systems. Fourth, there was a very important rise in the use of belt systems by drivers and passengers from 1983 to 1985. Belt use in June 1985 was 28.4% by drivers and 25.7% by all passengers. The lowest use rate was in June 1977, when only 16.3% of the drivers and 7.2% of the passengers used safety belt systems.

Findings categorized as interesting or informational, areas which could impact educational or public relations campaigns, include the following: 1. a greater percentage of female than male drivers and RFP's used safety belts; 2. belt use by drivers was highest in the afternoon survey period, but that by passengers was highest in the morning (although in the case of drivers, the rates varied by only a few percentage points); 3. for occupants other than infants, belt use was highest for middle adult drivers and pre-adult passengers; 4. the newer the car, the higher the belt use; and 5. belt use was highest in the northern area and lowest in the western area of the state. There also was a greater percentage of new cars in the northern area than in the other survey areas.

In an effort to determine the significance of the findings related to belt use, the location, vehicle, and occupant characteristics of the survey sample were analyzed to determine whether they could, and did, contribute to changes in belt use patterns over the 3 years. The results of this analysis indicated that year-to-year variations in the

proportions of vehicles surveyed in the 3 daily time periods and the 4 geographic areas of the state, and in the ratio of male and female drivers and passengers, should have no effect on statewide belt use percentages. Year-to-year variations in the ages of the vehicles and the ages of the occupants should lead to modest increases in statewide belt usage. The analysis of the data indicate that the actual increases observed were much greater than what would have been expected from these changes.

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APPENDIX A

Summary of Survey Data

Appendix Table A-1

Time Period Data

Time Period	1983		1984		1985	
	Number	% of Total	Number	% of Total	Number	% of Total
Morning	1,739	26.8	1,596	27.2	1,665	30.6
Midday	2,229	34.3	1,991	34.0	1,766	32.5
Afternoon	2,530	38.9	2,272	38.8	2,005	36.9

Appendix Table A-2

Vehicle Age Data

Vehicle Age*	1983		1984		1985	
	Number	% of Total	Number	% of Total	Number	% of Total
Category 1	1,758	27.1	1,437	24.5	1,253	23.1
Category 2	1,251	19.3	1,233	21.0	1,179	21.7
Category 3	1,904	29.3	1,430	24.4	1,291	23.7
Category 4	1,585	24.4	1,692	28.9	1,713	31.5
Undefined	-----	-----	67	1.1	-----	-----

\* See Table 7 for descriptions - Category 1 contains the oldest vehicles and Category 4 the newest.

Appendix Table A-3

Location Data

<u>Location</u>	<u>1983</u>		<u>1984</u>		<u>1985</u>	
	<u>Number</u>	<u>% of Total</u>	<u>Number</u>	<u>% of Total</u>	<u>Number</u>	<u>% of Total</u>
Western	1,307	20.1	1,414	24.1	1,177	21.7
Northern	2,067	31.8	1,850	31.6	1,765	32.5
Central	1,670	25.7	1,399	23.9	1,350	24.8
Eastern	1,454	22.4	1,196	20.4	1,144	21.0

Appendix Table A-4

Sex of Occupant Data

<u>Occupant Seat Position</u>	<u>Sex of Occupant</u>	<u>1983</u>		<u>1984</u>		<u>1985</u>	
		<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Driver	Female	3,034	46.7	2,577	44.0	2,585	47.6
	Male	3,464	53.3	3,282	56.0	2,851	52.4
Right Front Passenger	Female	1,377	67.8	1,302	65.6	1,151	67.1
	Male	655	32.2	684	34.4	564	32.9
Remaining Passengers	Female	707	58.6	647	56.4	535	54.4
	Male	500	41.4	500	43.6	449	45.6

Appendix Table A-5

Age of Occupant Data

Occupant Seat Position	Age of Occupant	1983		1984		1985	
		Number	Percent	Number	Percent	Number	Percent
Driver	Pre-Adult	0	-----	6	0.1	4	0.1
	Young Adult	1,785	27.5	2,041	34.8	1,553	28.6
	Middle Adult	4,486	69.0	3,253	55.5	3,313	60.9
	Older Adult	227	3.5	559	9.5	566	10.4
Right Front Passenger	Infant	50	2.5	42	2.1	55	3.2
	Pre-Adult	294	14.5	321	16.2	307	17.9
	Young Adult	547	26.9	585	29.5	419	24.4
	Middle Adult	981	48.3	789	39.7	694	40.5
Older Adult	160	7.9	248	12.5	240	14.0	
Remaining Passengers	Infant	286	23.7	210	18.3	225	22.9
	Pre-Adult	518	42.9	560	48.8	470	47.8
	Young Adult	190	15.7	160	13.9	110	11.2
	Middle Adult	173	14.3	151	13.2	135	13.7
Older Adult	40	3.3	67	5.8	44	4.5	