Research Report
KTC-92-15

1992 SAFETY BELT USAGE SURVEY AND EVALUATION OF EFFECTIVENESS IN KENTUCKY

by

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in cooperation with
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16. Abstract

The objective of the survey was to establish 1992 safety belt and child safety seat usage rates in Kentucky. Data were collected at 100 sites and combined based on vehicle miles travelled for a given type of highway, rural or urban location, and county population category. Also included in this report is an analysis of accident records evaluating the effectiveness of safety belts.

Statewide usage rates were 41 percent for drivers and front-seat passengers (over 19 years of age) and 62 percent for children under four years of age (front and rear seats). Driver usage rates increased in 1992 compared to 1991, however, the amount of the increase was less than in previous years. Rates were highest on interstate highways and lowest on rural, non-interstate highways.

Benefits in the reduction of injures for occupants involved in police-reported accidents wearing a safety belt or in a safety seat were shown through the analysis of accident records. For example, a 52 percent reduction in fatal or incapacitating injuries was determined for drivers wearing a safety belt compared to those who were not restrained.

The increased usage that resulted in Fayette County and Jefferson County after enactment of local mandatory usage laws was shown. Increased usage rates in Covington and Bowling Green would also be related to passage of local laws. The recommendation is that a statewide mandatory safety belt law should be passed or, in lieu of a statewide law, additional local governments should pass such a law.

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Table of Contents

INTRODUCTION

The use of safety belts and child safety seats is an effective means of reducing injuries to motor-vehicle occupants involved in a traffic accident. There have been efforts to increase safety belt and safety seat usage. In Kentucky, these efforts have usually involved public information campaigns. While most states have passed a statewide mandatory safety belt usage law, such a law has not been passed in Kentucky. In an attempt to increase usage of child safety seats, a law was enacted by the 1982 Kentucky General Assembly requiring use of a "child restraint system" for children 40 inches or less in height. The 1988 Kentucky General Assembly strengthened the child restraint law to include a $50 fine for violation of the law. Also, local mandatory safety belt usage laws have been enacted in several local jurisdictions in Kentucky. The first such local law was enacted by the Lexington-Fayette Urban County Government with an effective date of July 1, 1990. The second local law was enacted by the city of Louisville with an effective date of July 1, 1991. Jefferson County later adopted such a law. Within the past year, local safety belt ordinances have been adopted by Murray, Bowling Green, Kenton County, Corbin, and Bardstown. The combined population of the counties and cities having a local ordinance represents approximately one-third of the statewide population.

Statewide observational surveys have been conducted in 19 cities across Kentucky annually beginning in 1982 (with the exception of 1987) to document safety belt and safety seat usage in Kentucky (1, 2, 3, 4, 5, 6, 7, 8, 9). The number of sites was increased starting in 1990 in an attempt to obtain a more representative statewide sample (8). Statewide usage of child safety seats or safety belts for children under 4 years of age increased from about 15 percent in 1982 before enactment of the mandatory child restraint law to about 30 percent in 1984 and stayed at this level in 1985 and 1986. This percentage increased to almost 50 percent in 1988 and 1989 and to 57 percent in 1990 and 1991 after a penalty was added to the law. Safety belt usage for the driver has increased each year of the survey. The statewide driver safety belt usage rate was only 4.2 percent in 1982 compared to 39 percent in 1991.

The objective of the survey summarized in this report is to establish statewide 1992 safety belt and child safety seat usage rates in Kentucky. These rates may be compared to those determined from previous surveys. Another objective of this study was to analyze accident data to evaluate the effectiveness of safety belts in reducing injuries to occupants of motor vehicles involved in traffic accidents.

PROCEDURE

DATA COLLECTION PROCEDURE

The data collection procedure used in the surveys was modified starting with the 1990 survey. The procedure used in the 1990 and 1991 surveys was again used in the 1992 survey. The procedure used for the first several surveys was changed in order to obtain a more representative statewide sample as well as to use a procedure that would be comparable to surveys taken in other states. The data collection form was changed as well as the site selection procedure.

The data collection form used in the survey is shown in Figure 1. Usage was recorded for drivers and front-seat passengers sitting in the outboard position. The exception was for children under four years of age for which data were collected for all positions in the front and the rear seats. Drivers were classified into three age categories and were classified by sex. Passengers were classified into several age categories. For drivers and front-seat passengers (over three years of age), usage was classified as either using a harness or belt or no restraint. For children one to three years of age, the categories included safety seat, booster seat, harness or belt, or no restraint. For children under one year of age, the categories were either safety seat or no restraint. When a safety seat was used, an attempt was made to determine if there was an obvious misuse.

The following list of guidelines for data collection was given to each observer, and each data collector went through a training period.

1. Always include the driver so the number of vehicles included in the sample will be known.

2. Include all vehicles at low-volume locations. When taking data on a multi-lane road, generally include only vehicles in the curb or near lane unless the traffic volume and roadway geometrics allow data to be collected in the next lane.

3. Collect data on only one approach at the intersection.

4. If traffic volume is too heavy to collect data for all vehicles, record data for the next vehicle in view after recording data for the prior vehicle.

5. Obtain a random sample of vehicles independent of whether the occupants are wearing a safety belt. (Do not attempt to include all vehicles having an occupant wearing a safety belt at a location where all vehicles cannot be obtained.)

6. Attempt to include data for children under four years of age for any vehicle in the sample in which such a child is a passenger.

7. Only include vehicles either stopped or moving so slowly that occupants can be readily observed.

8. Excluding children under four years of age, collect data only for drivers and passengers in the right-front seat (exclude the center front and rear seating positions).

9. Do not include old passenger cars not equipped with a safety belt (those without a head rest).

10. Collect data during daylight hours on weekdays and weekends.

11. Collect data for four hours at each site.

12. Begin and end data collection at a specified time not considering whether the occupants are using a safety belt.

13. Collect data for cars, vans, and light trucks.

14. Do not include a vehicle in the count when use by the driver cannot be determined.

As noted, data were collected for four hours at each location. The decision was made to collect data for an equal time period for each location rather than attempt to collect a given sample size.

DATA COLLECTION LOCATIONS

Data for the surveys collected from 1982 through 1989 were conducted at 23 sites in 19 cities. The cities were selected so that they would be distributed across the state. These cities were also selected to represent a range of population categories to account for social and economic factors. In order to be able to relate the survey results to data taken in other states and to include all types of roadways, it was necessary to expand the number of sites to include data in rural locations and for interstates. The distribution of the sites was based on vehicle miles travelled statewide for various categories of roads in counties of varying populations. The variables considered were the rural or urban designation of the road, the functional classification of the road, and the county population. This was done so that roads would be stratified to assure a proper representation of urban and rural areas and different road types. The percentages of vehicle miles travelled on various types of highways in counties within given population ranges

are given in Table 1. These percentages represent the proportion of vehicle miles driven on roadways having the given characteristics of the total vehicle miles driven statewide. The data apply to roads for which a traffic volume was available (which is the state-maintained highway system of slightly over 27,000 miles). Local county and city roadways would not be included. The data shown in Figure 1 were obtained using 1990 data. There would be little change in the distribution from year to year so the same percentages were used in 1991 and 1992. This would allow the same locations to be used each year.

The decision was made to take survey data at 100 sites. The number of sites for any type of highway and county population category was equal to the percentage of vehicle miles travelled for the given type of highway and county population. For example, eight percent of all vehicle miles travelled was on rural arterial highways in counties having a population between 10,000 and 25,000 so eight sites were selected on highways meeting this criterion. A computer file was used to prepare a randomly selected list of sections of roadway for each of the categories given in Table 1. This list was used as a source for selecting sites. Data had been collected at 23 sites since 1982, and it was felt that it would be beneficial to maintain an historical record at these sites. Therefore, these sites were maintained. A list of the observation sites is presented in Table 2, and the 23 original sites are identified with an asterisk. Many of the other sites were obtained from the randomly selected list of highway sections.

The sites had to be selected at a location where traffic would stop. A list of all locations having a traffic signal was obtained and used in the selection of sites. Except for some interstate locations, all the sites are at an intersection. Most of the intersections are controlled by a traffic signal. The sites selected to obtain data for interstates were either at an exit ramp or at a rest area. This would be the only exception to the sites being at a typical intersection. Data at an exit ramp were taken for traffic exiting the interstate at the intersection with the ramp and intersecting roadway. Another variable which was considered was the geographical location of the sites. Sites were selected to assure that they were distributed across the state. Sites were selected in 62 of the 120 counties. The largest number in any one county was eight in Jefferson County. For each category, the county, location (road and intersecting road), and city (nearest city for rural locations) are given in Table 2.

SURVEY DATA ANALYSIS

Safety belt usage rates were obtained for the driver and for all front-seat occupants. Rates were also obtained by driver age and sex and by age of the front-seat occupant. Statewide rates were obtained by weighting the usage determined for a given type of highway and county population by the percentage

of vehicle miles given in Table 1 and combining the percentages from the various categories. Confidence intervals for the statewide usage rates were calculated.

For children under four years of age, rates were obtained for both front and rear seating positions as well for combined seating positions. Rates were separated into safety seat, booster seat, and harness or belt.

The 1992 usage rates for the 19 cities previously surveyed were compared to results determined in prior years. The rates for the various types of highway and county population categories were compared. Rates were also compared by region of the state.

ACCIDENT ANALYSIS

The computer files containing all reported accidents in Kentucky (for the years 1987 through 1991) were analyzed to determine the effectiveness of wearing safety belts or riding in a safety seat. The percent reductions in injuries were computed, and statistical tests were conducted to determine if the reductions were significant. This type of analysis was performed for drivers, children age three and under, and front-and rear-seat passengers. The effectiveness of safety belts was related to several factors such as seating position, type of vehicle, and speed limit. The potential annual reduction in traffic accident fatalities and serious injuries and the accident savings from an increase in driver safety belt usage were estimated.

RESULTS

SURVEY DATA ANALYSIS

Driver usage rates for the various types of highways and county population categories are summarized in Table 3. The overall statewide rate, using the data collected at 100 sites and the weighting procedure described, was 41 percent. The sample size was 84,855 drivers. The confidence limits for a probability of 0.99 would be plus or minus 0.4 percent (10). For a given type of highway, the usage rate was higher for counties having larger populations. In several instances, there were large fluctuations in usage rates at survey sites within the same location and population category.

While the data collection procedure changed in 1990, the usage rate may still be compared to the statewide rates from past years. The previous studies showed that driver usage rates statewide had steadily increased from 4.2 percent in 1982 to 39 percent in 1991. The 1992 survey shows that this increase has continued. The increase in the driver usage rate in 1992 compared to 1991, given

the large sample size, was determined to be statistically significant (probability of 0.99) (11). However, the magnitude of the increase in 1992 of only two percentage points was the smallest since 1985.

Usage rates for front-seat passengers for the various types of highways and county population categories are summarized in Tables 4 through 7 for the different age categories. Usage for children in the four to five year of age cateory was 40 percent plus or minus about 4 percent. This compares to 36 percent for the 1991 survey but this slight increase was not statistically significant. For children in the 6 to 12 years of age category, the usage rate was 37 percent plus or minus about 3 percent. This compares to 38 percent in 1990 with this slight decrease not being statistically significant. For the 13 to 19 years of age category, the usage rate was 31 percent plus or minus about 2 percent. This was an increase from 29 percent in 1991, but this small increase was not statistically significant. For the category of over 19 years of age, the usage rate was 39 percent plus or minus about 1 percent. This was the same usage rate as in 1991.

Usage rates for children one through three years of age are given in Table 8 while rates for children under one year of age are given in Table 9. These rates are for children in both the front and the rear. The usage rate for children under one year of age (79 percent with a confidence limit of about four percent) was higher than that for children one to three years of age (59 percent with a confidence limit of about two percent). The usage rate for the combination of these categories or children under four years of age was 62 percent with confidence limits for a probability of 0.99 percent of about two percent. The sample size for children under four years of age was 4,557. This age category corresponds to the children for which the mandatory child restraint law would apply. This usage rate of 62 percent compares to 57 percent in 1990 and 1991. This percentage was about 15 percent in 1982 before enactment of the child restraint law and increased to approximately 30 percent after enactment of the law having no penalty and increased again to almost 50 percent in 1988 after the addition of a dollar penalty to the child restraint law.

The usage rate for children under four was higher in the rear seat compared to the front seat. For children one to three years of age, the usage rate was 70 percent for the rear seat compared to 47 percent for the front seat. For children under one year old, the usage rate was 91 percent for the rear seat compared to 66 percent for the front seat. There was a slightly higher percentage of children one to three years of age observed in the rear seat while the number in the front and rear seats was almost identical for children under one year old.

Safety belt usage rates for drivers and front-seat passengers, by type of highway, are presented in Table 10. The highest usage rates were on interstates

(both rural and urban). Urban interstates had the highest rate, and this would be related to data taken in Jefferson County where a safety belt law exists. The lowest usage rates were on rural, non-interstate highways. For each category, the highest rate was for urban interstates with the lowest rate on rural, local highways. There was a substantial variation between highway types. For drivers, the percentage using a safety belt varied from 27 percent on rural, local highways to 64 percent on urban interstates. For front-seat passengers, the percentage for those using a safety belt varied from 25 percent on rural, local highways to 61 percent on urban interstates. For children under four years of age, the percentage using a safety seat or safety belt varied from 46 percent on rural, local highways to 85 percent on urban interstates.

There was a variation in usage by the age and sex of the driver (Table 11). Females had a higher usage rate than males. The middle age category of 31 to 50 years of age had a slightly higher usage than the 16 to 30 and over 50 years of age categories.

The highest usage rate for front-seat passengers was for the under four years of age category (Table 12). This would be expected since the mandatory child restraint law would apply to this age category. The usage rate for children 4 to 12 years of age and the over 19 years of age category were very similar as that for drivers. There was a lower usage rate for teenagers.

The change in usage of safety belts by drivers in the 19 cities in which data have been collected since 1982 is presented in Table 13. The usage rate was higher in 1992 than in 1991 in 11 of the 19 cities with identical rates in three other cities. The largest increase was at the Covington location, and this finding would be related to the passage of a mandatory usage law in Kenton County. The usage rates in Louisville and Lexington were much higher than that in any other city. This shows the potential increase in usage which could be obtained with a mandatory belt law. The lowest rate (19 percent) was in Hazard with the other lowest rates occurring in the smallest cities. In 9 of the 19 cities, the rate has either increased or remained constant from one year to the next. Using the procedure followed in the previous surveys in which data were taken only at sites in these 19 cities results in a statewide usage rate of 40 percent. This rate is almost identical to that determined using the revised procedure in which data are collected at 100 sites.

The change in usage of safety seats or belts by children under 4 years of age in these 19 cities is presented in Table 14. The usage rate was higher in 1992 than in 1991 in 13 of the 19 cities. The highest usage rates were in Louisville and Lexington. The lowest usage was in Somerset. The small sample sizes could result in substantial variations in usage rates. As with usage rates for drivers, the rate was related to city population with usage generally increasing as

population increased. Using the procedure followed in the previous surveys in which data were taken only at sites in these 19 cities results in a statewide usage rate of 66 percent. This rate is higher than that determined using the revised procedure in which data are collected at 100 sites.

A summary of the data collected is given in the Appendix. For each of the 100 data sites, the usage rate and sample size are given for drivers, front-seat passengers (by age category for over four years of age), and children in the one to three years of age and under one year old age categories (both front and rear seat).

Obvious improper usage of safety seats had been estimated in previous surveys. However, improper usage could only be determined when there was a very obvious problem. Since the percentages were very low compared to studies dealing specifically with this subject, improper usage data were not obtained in this survey.

ACCIDENT ANALYSIS

The number and percentage of all drivers involved in police-reported accidents sustaining a given injury as a function of safety belt usage are summarized in Table 15 (based on 1987 through 1991 accident data). By comparing the percentages, the percent reduction associated with safety belt usage could be calculated. The largest reduction was for a fatal injury (81 percent reduction) with the reduction decreasing for less severe injuries. For comparison, the reduction was 12 percent for the "possible injury" category. The reductions in the percentage of each of the types of injuries were determined to be statistically significant (probability of 0.99). In severe accidents, use of a safety belt would lessen, but not eliminate, the injury. This resulted in the smaller reductions in the less severe injury classifications. There was a 52 percent reduction in a driver sustaining a fatal or severe injury in a traffic accident if a safety belt was worn compared to not wearing a safety belt. This agrees with other research studies which report that lap and shoulder safety belts, when used, reduce the risk of fatal or serious occupant injuries by between 40 and 55 percent (12).

The effectiveness of safety belts in reducing driver injuries was related to several variables. In Table 16, the percentage of drivers sustaining either a fatal or severe injury who were wearing or not wearing a safety belt was related to type of vehicle, type of accident, and speed limit. There were reductions in percent fatal or severe injuries for drivers of passenger cars, single-unit trucks, and combination trucks. The reduction was higher for drivers of trucks. The severity of injuries to drivers of passenger cars was higher than for drivers of trucks. Safety belts also reduced the percentage for fatally or severely injured in various types of accidents. The types of accidents were chosen to represent the extremes

of accidents in terms of severity. Reductions were noted for the relatively low severity rear-end accidents as well as the more severe fixed object, head-on, and "overturned" accidents. Safety belts also were determined to be effective in reducing fatal or severe injuries for accidents occurring on either 35-mph local streets or 55-mph high speed roadways.

The number and percentage of children age 3 and under sustaining a given injury as a function of using a safety seat or safety belt are summarized in Table 17. There were substantial reductions, higher for the most severe injury types, associated with both safety seats and safety belts. The reductions were fairly similar for use of either the safety seat or safety belt. The reductions for all injury categories, except fatalities, were statistically significant (probability of 0.99). Of 47 fatalities, 24 involved children not using a safety seat or safety belt. The percent reductions were generally higher than that for drivers (as given in Table 15). There was a 69 percent reduction in the chance of a child less than age 4 sustaining a fatal or severe injury if a safety seat was used compared to not using any restraining device. Also, as shown in Table 18, the reductions in injuries applied to both the rear-and front-seating positions. The data in Table 18 show that accident severity was less in the rear than in the front seat. Of the 47 fatalities, 27 involved a front-seat passenger.

The number and percentage of occupants other than drivers sustaining a given injury as a function of safety belt usage are listed in Table 19. As with drivers, there was a large reduction in the percent injured (all reductions were statistically significant with a probability of 0.99). Overall, these percent reductions were generally slightly higher than that for drivers. The chance of a vehicle occupant, other than the driver, sustaining a fatal or severe injury in a traffic accident was reduced by 54 percent if a safety belt was worn compared to not wearing a safety belt.

The accident severities associated with using a lap belt and/or shoulder harness for occupants other than the driver (by seating position in the front or rear seat) are listed in Table 20. Only a lap belt is available in the rear seat in the majority of vehicles involved in accidents in the time period studied. The use of a shoulder harness and/or lap belt in the front seat or a lap belt in the rear reduced injuries dramatically (all reductions were statistically significant with a probability of 0.99). Accident severity was less in the rear seat and the percent reduction in injuries was generally greater in the rear seat than the front seat. The use of primarily a lap belt in the rear seat has been effective with a reduction in fatal or incapacitating injuries of 65 percent. This finding should not be interpreted to suggest that it would not be preferable to have a combination lap belt/shoulder harness in the rear seat.

The potential annual reductions in traffic accident fatalities and accident savings from an increase in driver safety belt usage are presented in Table 21. The reduction in fatalities and associated accident cost savings were calculated using the reduction factors listed in Table 15, accident data for the years of 1987 through 1991, the 39 percent usage rate determined from the 1991 observational survey, and accident cost estimates recommended by the Federal Highway Administration (13).

SUMMARY

The methodology used to obtain statewide safety belt usage rates in 1992 was the same as that used for the 1990 and 1991 surveys. The data show that, while the usage rate for drivers in 1992 continued the increase that has been documented in previous years, the amount of the increase was less (Table 22). The statewide usage rate of safety belts by drivers was 41 percent. This compares to 39 percent in 1990. The usage rate varied by type of highway and type of area (rural or urban). The rate was generally higher in urban compared to rural areas. Rates were higher on interstate and arterial highways compared to collector or local streets. While Kentucky does not have a statewide mandatory usage law, local ordinances have been enacted in Fayette County (Lexington), Jefferson County (Louisville), Murray, Bowling Green, Kenton County, Corbin, and Bardstown. The effect of these laws was shown with the very high usage determined for the observation sites in Lexington and Louisville (Table 13). The effect of the new law in Covington is also shown in the 1992 data (Table 13). The largest increase in usage in 1992 for any survey site was in Bowling Green which reflects enactment of the law in that city. The survey was taken in Bardstown prior to enactment of the law.

The statewide usage rates for front-seat passengers were also obtained. Considering all passengers, the usage rate was 40 percent. Usage varied with age with the highest usage for the under four years of age category and the lowest usage for the 13 to 19 years of age category.

Kentucky has a law requiring children under 40 inches in height to be placed in a child restraint. The statewide usage rate for children under the age of four (including both the front and rear seat) was determined to be 62 percent. This represents an increase from the 57 percent usage determined in the two previous surveys.

The significant benefits, based upon the reduction of injuries, for occupants involved in a police-reported accident wearing a safety belt or in a safety seat were shown through the analysis of accident records. For example, one finding was that there was a 52-percent reduction in fatal or incapacitating injuries for drivers wearing a safety belt compared to those who were not. The benefit in terms of the

reduction in injuries by wearing a safety belt in either the front or rear seat was documented. The potential savings in fatalities, serious injuries, and accident costs which could be obtained from an increase in the use of safety belts was shown.

RECOMMENDATIONS

While driver safety belt usage has been increasing in the past few years, statewide usage is only about 41 percent with much lower usage rates (as low as under 15 percent) determined for some small cities. While public information has resulted in increases, the method which has been shown to result in a dramatic increase in safety belt usage is enactment of a mandatory safety belt law. This has been demonstrated in Kentucky after enactment of ordinances in Fayette County and Louisville. This resulted in the usage rate almost doubling to a level of about 70 percent. Local ordinances have also been passed in Murray, Bowling Green, Kenton County, Corbin, and Bardstown with increased usage documented in Covington and Bowling Green.

Statewide laws have been enacted in the large majority of states. National surveys have shown usage rates of 30 percent in cities without a belt law compared to 50 percent in cities having a law (12). Belt use as high as 90 percent has been reported in other countries having belt laws and high levels of enforcement (14). A recent survey of licensed drivers revealed that the respondents were in favor (76 percent in favor statewide) of a statewide law requiring use of safety belts (15).

It has been estimated that at the current usage level of about 50 percent in states having belt laws, safety belts would have saved 4,700 lives if all states had belt laws in 1987 (12). An analysis of Kentucky accident records showed the safety benefits associated with safety belt usage and the potential annual reductions in traffic accident fatalities and accident savings from an increase in driver safety belt usage was estimated. For example, an increase in the driver usage rate up to 70 percent usage would result in a potential annual reduction of 172 fatalities and an annual accident savings from the reduction in fatalities and serious injuries of about 302 million dollars.

Therefore, a recommendation is that a statewide mandatory safety belt law should be enacted by the Kentucky General Assembly. In the event a statewide law is not enacted, additional local governments should consider passing mandatory safety belt laws.

Public information and education concerning the reasons to wear safety belts should continue. The survey shows that emphasis areas would be for the 13 to 19 years of age category and for rural areas.

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Figure 1. Data Collection Form.

DATA COLLECTION FORM

Date:_____ Starting Time:_____ Ending Time:_____
Location:_____ Sheet No:_____
Observer:_____ Comment:_____

DRIVER USAGE

Age & Sex	Harness or Belt	None
16-30 M		
31-50 M		
> 50 M		
16-30 F		
31-50 F		
> 50 F		

FRONT-SEAT OCCUPANT USAGE (OVER 3 YEARS OF AGE)

Age	Harness or Belt	None
4-5		
6-12		
13-19		
Over 19		

USAGE FOR CHILDREN 1-3 YEARS OF AGE

	Safety Seat	Safety Seat (Improper)	Booster Seat	Harness or Belt	None
Front					
Rear					

USAGE FOR INFANTS (UNDER 1 YEAR OF AGE)

	Safety Seat	Safety Seat (Improper)	None
Front			
Rear			

TABLE 1. DISTRIBUTION OF VEHICLE MILES TRAVELED BY TYPE OF HIGHWAY AND COUNTY POPULATION

TYPE OF HIGHWAY	COUNTY POPULATION	PERCENTAGE OF ALL VEHICLE MILES
Rural Interstate	Over 100,000	1.04
	50,001-100,000	2.78
	25,001-50,000	4.96
	10,000-25,000	5.19
	Under 10,000	1.32
Rural Arterial	Over 50,000	3.14
	25,001-50,000	7.36
	10,000-25,000	8.12
	Under 10,000	1.93
Rural Collector	Over 100,000	0.65
	50,001-100,000	3.19
	25,001-50,000	7.70
	10,000-25,000	9.72
	Under 10,000	2.28
Rural Local	Over 50,000	0.74
	25,000-50,000	1.74
	Under 25,000	3.74
Urban Interstate	Over 100,000	8.32
	50,000-100,000	1.49
	Under 50,000	1.06
Urban Arterial	Over 100,000	10.23
	25,000-100,000	9.52
	Under 25,000	1.79
Urban Collector or Local	All	1.99

TABLE 2. STATEWIDE SURVEY LOCATIONS		
TYPE LOCATION	COUNTY POPULATION	SURVEY SITE
Rural Interstate	Over 100,000	Fayette, I64 at KY 859, Lexington
	50,001-100,000	Boyd, I64 at US 23, Catlettsburg
		Christian, I24 at US 41A, Hopkinsville
		Hardin, I 65 at rest area, Sonora
	25,001-50,000	Barren, I 65 at KY 70, Cave City
		Boone, I 75 at rest area, Florence
		Clark, I 64 at KY 627, Winchester
		Franklin, I 64 at US 60, Frankfort
		Laurel, I 75 at KY 80, London
	10,000-25,000	Henry, I 71 at KY 153, Sligo
		Rockcastle, I 75 at US 25, Mt. Vernon
		Scott, I 75 at rest area, Georgetown
		Shelby, I 64 at KY 53, Shelbyville
		Woodford, I 64 at KY 341, Midway
	Under 10,000	Trigg, I 24 at US 68, Cadiz
Rural Arterial	Over 50,000	Pike, US 460 at KY 122, Shelbiana
		Daviess, US 60 at KY 144, Owensboro
		Hardin, US 31W at KY 835, West Point
	25,001-50,000	Perry, KY 15X at KY 476, Hazard*
		Knox, US 25E at KY 225, Barbourville
		Harlan, US 119 at KY 179, Cumberland
		Floyd, KY 80 at US 23, Allen
		Bullitt, US 31E at KY 44, Mt. Washington
		Carter, KY 1 at I 64, Grayson
		Laurel, US 25 at KY 80, London
	10,000-25,000	Mason, US 62 at KY 11, Maysville*

TABLE 2. STATEWIDE SURVEY LOCATIONS (continued)

TYPE LOCATION	COUNTY POPULATION	SURVEY SITE
Rural Arterial	10,000-25,000	Clay, US 421 at KY 80, Manchester
		Bourbon, US 68 at 5th St., Millersburg
		Casey, US 127 at KY 70, Liberty
		Meade, US 31W at KY 1638, Muldraugh
		Lincoln, US 127 at KY 78, Hustonville
		Russell, US 127 at KY 80, Russell Springs
		Washington, US 150 at KY 55, Springfield
	Under 10,000	Cumberland, KY 90 at KY 61, Burkesville
		Ballard, US 60 at KY 358, LaCenter
Rural Collector	Over 100,000	Fayette, KY 418 at I 75, Lexington
	50,001-100,000	Christian, US 41 at KY 1682, Hopkinsville
		McCracken, US 62 at US 68, Paducah
		Madison, KY 52 at KY 876, Richmond
	25,001-50,000	Barren, KY 255 at US 31W, Park City
		Nelson, US 62 at KY 48, Bloomfield
		Boone, KY 18 at KY 237, Burlington
		Oldham, KY 146 at KY 393, Buckner
		Knox, KY 11 at US 25E, Barbourville
		Henderson, KY 145 at US 60, Corydon
		Boyle, US 68 at US 150, Perryville
		Greenup, KY 1 at US 23, Greenup
	10,000-25,000	Caldwell, KY 139 at Jefferson, Princeton*
		Grayson, US 62 at KY 259, Leitchfield
		Allen, US 231 at US 31E, Scottsville
		Bath, US 60 at KY 36, Owingsville
		Larue, KY 84 at KY 61, Hodgenville
		Scott, US 62 at I 75, Georgetown
		Anderson, US 127 at US 127B, Lawrenceburg

TABLE 2. STATEWIDE SURVEY LOCATIONS (continued)

TYPE LOCATION	COUNTY POPULATION	SURVEY SITE
Rural Collector	10,000-25,000	Breathitt, KY 30 at KY 15, Jackson
		Webster, US 41 at KY 56, Sebree
		Garrard, KY 39 at US 27, Lancaster
	Under 10,000	Carroll, US 42 at Highland, Carrollton*
		Elliott, KY 32 at KY 7, Sandy Hook
Rural Local	Over 50,000	McCracken, KY 1286 at US 62, Paducah
	25,000-50,000	Harlan, KY 413 at US 119, Loyall
		Greenup, KY 7 at US 23, South Shore
	Under 25,000	Lewis, KY 10 at KY 57, Tollesboro
		Simpson, KY 73 at KY 100, Franklin
		Adair, KY 2290 at KY 55, Columbia
		Taylor, KY 208 at US 68, Campbellsville
Urban Interstate	Over 100,000	Kenton, I 275 at KY 17, Covington
		Kenton, I 75 at KY 371, Cresent Springs
		Fayette, I 75 at US 68, Lexington
		Jefferson, I 64 at KY 1747, Louisville
		Jefferson, I 64 at KY 1631, Louisville
		Jefferson, I 264 at US 31E, Louisville
		Jefferson, I 264 at US 42, Louisville
		Jefferson, I 264 at US 60, Louisville
	50,000-100,000	Warren, I 65 at US 231, Bowling Green
	Under 50,000	Boone, I 71 at KY 14, Verona
Urban Arterial	Over 100,000	Jefferson, US 31W at Gagel, Louisville*
		Jefferson, KY 1447 at Hubbards, Louisville*
		Jefferson, KY 1703 at Trevillian Way, Louisville*

TABLE 2. STATEWIDE SURVEY LOCATIONS (continued)		
TYPE LOCATION	COUNTY POPULATION	SURVEY SITE
Urban Arterial	Over 100,000	Fayette, US 27 at KY 1683, Lexington*
		Fayette, Reynolds at Lansdowne, Lexington*
		Fayette, KY 4 at KY 353, Lexington*
		Kenton, US 25 at KY 236, Covington
		Kenton, KY 8 at KY 17, Covington
		Kenton, KY 16 at KY 177, Covington
		Fayette, US 25 at Fontaine, Lexington
	25,000-100,000	Campbell, US 27 at Carothers, Newport*
		Christian, US 41 at Ninth, Hopkinsville*
		Hopkins, US 41A at KY 70, Madisonville*
		Pulaski, US 27 at KY 80, Somerset*
		Franklin, US 60 at Sunset, Frankfort*
		Henderson, US 41A at First, Henderson*
		Nelson, US 31E at Beall, Bardstown
		Barren, US 68 at Race, Glasgow*
		Clark, US 60 at KY 1958, Winchester*
		Warren, US 31W at US 231, Bowling Green
	Under 25,000	Anderson, US 62 at Broadway, Lawrenceburg*
		Rowan, US 60 at KY 32, Morehead*
Urban Collector or Local	All	Hardin, Poplar at Sycamore, Elizabethtown*
		Kenton, KY 1072 at Highland, Covington*

* Original data collection site.

TABLE 3. DRIVER USAGE RATES

TYPE OF HIGHWAY	COUNTY POPULATION	USAGE RATE (PERCENT)	SAMPLE SIZE
Rural Interstate	Over 100,000	66	286
	50,001-100,000	57	1,419
	25,001-50,000	55	2,096
	10,000-25,000	55	1,764
	Under 10,000	55	536
Rural Arterial	Over 50,000	37	2,575
	25,001-50,000	27	6,492
	10,000-25,000	32	6,821
	Under 10,000	22	1,812
Rural Collector	Over 100,000	60	1,011
	50,001-100,000	41	2,901
	25,001-50,000	33	4,983
	10,000-25,000	25	7,266
	Under 10,000	25	1,699
Rural Local	Over 50,000	43	630
	25,000-50,000	24	920
	Under 25,000	23	1,757
Urban Interstate	Over 100,000	65	8,590
	50,000-100,000	67	741
	Under 50,000	32	317
Urban Arterial	Over 100,000	58	12,427
	25,000-100,000	35	12,846
	Under 25,000	25	2,732
Urban Collector or Local	All	45	2,234
ALL	All	41	84,855

TABLE 4. FRONT-SEAT PASSENGER (AGE 4-5 YEARS) USAGE RATES			
TYPE OF HIGHWAY	COUNTY POPULATION	USAGE RATE (PERCENT)	SAMPLE SIZE
Rural Interstate	Over 100,000	57	7
	50,001-100,000	58	19
	25,001-50,000	55	29
	10,000-25,000	60	20
	Under 10,000	69	13
Rural Arterial	Over 50,000	29	34
	25,001-50,000	26	95
	10,000-25,000	29	98
	Under 10,000	11	18
Rural Collector	Over 100,000	57	7
	50,001-100,000	38	47
	25,001-50,000	41	96
	10,000-25,000	25	100
	Under 10,000	6	17
Rural Local	Over 50,000	44	16
	25,000-50,000	20	10
	Under 25,000	14	35
Urban Interstate	Over 100,000	73	90
	50,000-100,000	50	4
	Under 50,000	25	4
Urban Arterial	Over 100,000	58	139
	25,000-100,000	35	218
	Under 25,000	29	31
Urban Collector or Local	All	47	38
ALL	All	40	1,185

TABLE 5. FRONT-SEAT PASSENGER (AGE 6-12 YEARS) USAGE RATES			
TYPE OF HIGHWAY	COUNTY POPULATION	USAGE RATE (PERCENT)	SAMPLE SIZE
Rural Interstate	Over 100,000	67	3
	50,001-100,000	50	34
	25,001-50,000	62	50
	10,000-25,000	46	41
	Under 10,000	71	17
Rural Arterial	Over 50,000	32	66
	25,001-50,000	29	207
	10,000-25,000	32	165
	Under 10,000	17	81
Rural Collector	Over 100,000	69	13
	50,001-100,000	36	87
	25,001-50,000	33	158
	10,000-25,000	25	240
	Under 10,000	30	61
Rural Local	Over 50,000	38	16
	25,000-50,000	24	42
	Under 25,000	24	51
Urban Interstate	Over 100,000	70	139
	50,000-100,000	58	12
	Under 50,000	67	3
Urban Arterial	Over 100,000	67	288
	25,000-100,000	32	263
	Under 25,000	33	72
Urban Collector or Local	All	40	40
ALL	All	37	2,150

TABLE 6. FRONT-SEAT PASSENGER (AGE 13-19 YEARS) USAGE RATES			
TYPE OF HIGHWAY	COUNTY POPULATION	USAGE RATE (PERCENT)	SAMPLE SIZE
Rural Interstate	Over 100,000	40	10
	50,001-100,000	45	84
	25,001-50,000	47	97
	10,000-25,000	51	80
	Under 10,000	67	12
Rural Arterial	Over 50,000	24	126
	25,001-50,000	20	409
	10,000-25,000	28	421
	Under 10,000	22	131
Rural Collector	Over 100,000	43	37
	50,001-100,000	37	150
	25,001-50,000	31	303
	10,000-25,000	19	481
	Under 10,000	22	121
Rural Local	Over 50,000	11	18
	25,000-50,000	26	104
	Under 25,000	14	138
Urban Interstate	Over 100,000	53	283
	50,000-100,000	61	28
	Under 50,000	0	6
Urban Arterial	Over 100,000	45	446
	25,000-100,000	30	679
	Under 25,000	19	150
Urban Collector or Local	All	32	88
ALL	All	31	4,402

TABLE 7. FRONT-SEAT PASSENGER (OVER 19 YEARS OF AGE) USAGE RATES

TYPE OF HIGHWAY	COUNTY POPULATION	USAGE RATE (PERCENT)	SAMPLE SIZE
Rural Interstate	Over 100,000	67	78
	50,001-100,000	56	568
	25,001-50,000	56	691
	10,000-25,000	56	612
	Under 10,000	56	249
Rural Arterial	Over 50,000	39	596
	25,001-50,000	27	1,753
	10,000-25,000	34	1,781
	Under 10,000	22	414
Rural Collector	Over 100,000	54	263
	50,001-100,000	42	612
	25,001-50,000	30	1,230
	10,000-25,000	26	1,886
	Under 10,000	24	474
Rural Local	Over 50,000	43	113
	25,000-50,000	22	266
	Under 25,000	24	421
Urban Interstate	Over 100,000	61	1,742
	50,000-100,000	57	153
	Under 50,000	32	50
Urban Arterial	Over 100,000	53	2,425
	25,000-100,000	36	2,834
	Under 25,000	20	652
Urban Collector or Local	All	40	429
ALL	All	39	20,292

TABLE 8. USAGE RATES FOR CHILDREN 1-3 YEARS OF AGE (FRONT AND REAR)

TYPE OF HIGHWAY	COUNTY POPULATION	USAGE RATE (PERCENT)	SAMPLE SIZE
Rural Interstate	Over 100,000	86	7
	50,001-100,000	48	67
	25,001-50,000	68	60
	10,000-25,000	64	83
	Under 10,000	63	16
Rural Arterial	Over 50,000	55	75
	25,001-50,000	47	274
	10,000-25,000	47	348
	Under 10,000	36	61
Rural Collector	Over 100,000	89	28
	50,001-100,000	48	95
	25,001-50,000	52	304
	10,000-25,000	47	340
	Under 10,000	47	110
Rural Local	Over 50,000	79	38
	25,000-50,000	34	61
	Under 25,000	37	98
Urban Interstate	Over 100,000	83	277
	50,000-100,000	54	37
	Under 50,000	100	7
Urban Arterial	Over 100,000	83	555
	25,000-100,000	57	721
	Under 25,000	60	181
Urban Collector or Local	All	65	134
ALL	All	59	3,975

TABLE 9. USAGE RATES FOR CHILDREN UNDER 1 YEAR OF AGE (FRONT AND REAR)

TYPE OF HIGHWAY	COUNTY POPULATION	USAGE RATE (PERCENT)	SAMPLE SIZE
Rural Interstate	Over 100,000	100	1
	50,001-100,000	92	13
	25,001-50,000	100	8
	10,000-25,000	89	9
	Under 10,000	100	4
Rural Arterial	Over 50,000	100	4
	25,001-50,000	60	20
	10,000-25,000	58	48
	Under 10,000	57	7
Rural Collector	Over 100,000	100	6
	50,001-100,000	82	28
	25,001-50,000	76	42
	10,000-25,000	64	44
	Under 10,000	88	8
Rural Local	Over 50,000	73	11
	25,000-50,000	50	6
	Under 25,000	67	6
Urban Interstate	Over 100,000	97	39
	50,000-100,000	100	5
	Under 50,000	50	2
Urban Arterial	Over 100,000	93	90
	25,000-100,000	77	116
	Under 25,000	90	21
Urban Collector or Local	All	76	34
ALL	All	79	582

TABLE 10. USAGE RATES FOR DRIVERS AND PASSENGERS BY TYPE OF HIGHWAY

TYPE OF HIGHWAY	PERCENT USAGE		
	DRIVERS	FRONT-SEAT PASSENGERS	CHILDREN UNDER FOUR YEARS OF AGE
Rural Interstate	56	56	65
Rural Arterial	30	29	49
Rural Collector	32	31	53
Rural Local	27	25	46
Urban Interstate	64	61	85
Urban Arterial	44	42	69
Urban Collector or Local	45	42	67
ALL	41	39	62

TABLE 11. STATEWIDE USAGE RATE BY AGE AND SEX OF DRIVER

CATEGORY	USAGE RATE (PERCENT)
Male	37
Female	48
16-30 Years of Age	41
31-50 Years of Age	42
Over 50 Years of Age	40

TABLE 12. STATEWIDE USAGE RATE FOR FRONT SEAT PASSENGERS BY AGE AND SEX

CATEGORY	USAGE RATE (PERCENT)
Under 4	49
4 - 5	41
6 - 12	41
13 - 19	34
Over 19	40

TABLE 13. CHANGE IN USAGE OF SAFETY BELTS BY DRIVERS IN ORIGINAL STATEWIDE SURVEY CITIES

CITY	PERCENT USING SAFETY BELTS									
	1982	1983	1984	1985	1986	1988	1989	1990	1991	1992
Louisville	6	12	13	14	16	25	28	38	70	66
Lexington	8	10	10	17	24	31	42	80	69	61
Covington	8	9	12	16	22	28	32	39	37	51
Hopkinsville	3	3	4	6	10	20	21	24	27	30
Frankfort	5	7	7	11	14	19	24	38	38	46
Henderson	3	5	7	9	11	20	22	29	29	29
Newport	5	6	5	6	9	20	26	35	34	34
Madisonville	2	3	5	8	12	20	22	26	26	27
Elizabethtown	3	4	5	8	14	20	26	31	34	39
Winchester	2	3	6	9	12	25	33	37	35	38
Glasgow	3	3	3	5	6	12	15	19	27	29
Somerset	2	4	6	7	9	19	26	21	29	28
Maysville	2	3	6	6	13	19	25	29	34	33
Morehead	3	3	3	5	7	12	15	22	23	26
Princeton	2	2	2	3	6	12	15	17	19	20
Bardstown	4	4	6	7	13	19	21	23	30	40
Hazard	4	3	4	6	5	10	12	15	19	19
Lawrenceburg	1	2	3	6	5	9	15	19	22	24
Carrollton	3	5	5	7	10	16	19	35	34	30

TABLE 14. CHANGE IN USAGE OF SAFETY SEATS OR BELTS BY CHILDREN UNDER 4 YEARS OF AGE IN ORIGINAL STATEWIDE SURVEY CITIES

	PERCENT USING SAFETY BELTS									
CITY	1982	1983	1984	1985	1986	1988	1989	1990	1991	1992
Louisville	22	36	49	42	40	68	65	80	86	87
Lexington	32	46	50	44	46	78	78	91	90	87
Covington	22	39	49	47	50	59	53	66	67	72
Hopkinsville	12	19	19	20	21	33	38	40	51	54
Frankfort	15	26	30	27	30	43	43	57	72	72
Henderson	14	18	26	30	31	36	42	53	53	58
Newport	11	27	20	22	22	60	60	57	75	57
Madisonville	12	18	29	35	38	52	51	54	60	57
Elizabethtown	11	27	34	30	32	41	42	51	46	63
Winchester	12	14	33	29	26	56	68	51	53	58
Glasgow	14	17	20	18	21	36	38	39	47	50
Somerset	7	23	24	22	26	48	47	48	62	54
Maysville	12	18	17	19	25	31	34	36	55	58
Morehead	10	14	13	15	14	25	27	35	51	61
Princeton	10	12	12	16	20	33	41	52	52	53
Bardstown	20	21	31	31	31	41	39	42	76	67
Hazard	7	10	9	11	13	19	20	25	34	50
Lawrenceburg	7	6	22	23	20	32	29	35	77	65
Carrollton	6	10	16	22	19	26	28	31	45	62

TABLE 15. ACCIDENT SEVERITY VERSUS SAFETY BELT USAGE (ALL DRIVERS)*

	NOT WEARING SAFETY BELT		WEARING SAFETY BELT		PERCENT
TYPE OF INJURY	NUMBER	PERCENT	NUMBER	PERCENT	REDUCTION
Fatal	2,087	0.31	261	0.06	81**
Incapacitating	22,398	3.33	7,499	1.70	49**
Non-Incapacitating	38,295	5.70	16,505	3.74	34**
Possible Injury	41,817	6.22	24,174	5.48	12**
Fatal or Incapacitating	24,485	3.64	7,760	1.76	52**

* Based on 1987 through 1991 accident data. Total sample size for not wearing a safety belt was 672,101 compared to 440,869 for wearing a safety belt.

** Statistically significant reduction (probability of 0.99).

TABLE 16. ACCIDENT SEVERITY VERSUS SAFETY BELT USAGE BY TYPE OF VEHICLE, SPEED LIMIT, AND TYPE OF ACCIDENT (ALL DRIVERS)*

		PERCENT SUSTAINING FATAL OR SEVERE INJURY		
VARIABLE	CATEGORY	NOT WEARING SAFETY BELT	WEARING SAFETY BELT	PERCENT REDUCTION
Type of Vehicle	Passenger Car	3.47	1.80	48
	Single-Unit Truck	1.89	0.73	61
	Combination Truck	2.51	1.13	55
Type of Accident (Non-Intersection)	Rear End	1.57	1.08	32
	Fixed Object	13.81	5.48	60
	Head-On	17.16	11.95	30
	Overturned	17.35	7.38	57
Speed Limit (mph)	35	2.39	1.25	48
	45	3.39	1.44	57
	55	8.03	3.83	52

* Based on 1986 through 1990 accident data.

TABLE 17. ACCIDENT SEVERITY VERSUS SAFETY SEAT AND BELT USAGE (CHILDREN AGE THREE AND UNDER)*

TYPE OF INJURY	NOT USING SAFETY SEAT OR BELT		USING SAFETY SEAT		USING SAFETY BELT		PERCENT REDUCTION	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	SAFETY SEAT	SAFETY BELT
Fatal	24	0.10	17	0.09	6	0.04	9	58
Incapacitating	502	2.13	108	0.59	121	0.87	72**	59**
Non-Incapacitating	1,282	5.43	530	2.90	380	2.72	47**	50**
Possible Injury	1,753	7.43	803	4.39	700	5.02	41**	33**
Fatal or Incapacitating	526	2.23	125	0.68	127	0.91	69**	59**

* Based on 1987 through 1991 accident data. Total sample sizes were 23,590 for not using a safety seat or belt, 18,290 for using a safety seat, and 13,957 for using a safety belt.

** Statistically significant reduction (probability of 0.99).

TABLE 18. ACCIDENT SEVERITY VERSUS SAFETY SEAT AND BELT USAGE BY SEATING POSITION (CHILDREN AGE THREE AND UNDER)*

SEATING POSITION	TYPE OF INJURY	NOT USING SAFETY SEAT OR BELT		USING SAFETY SEAT OR BELT		PERCENT REDUCTION
		NUMBER	PERCENT	NUMBER	PERCENT	
Front	Fatal	17	0.10	10	0.07	35
	Incapacitating	373	2.26	130	0.87	61**
	Non-Incapacitating	944	5.72	493	3.32	42**
	Possible Injury	1,341	8.13	800	5.38	34**
	Fatal or Incapacitating	390	2.36	140	0.94	60**
Rear	Fatal	7	0.10	13	0.07	24
	Incapacitating	129	1.82	99	0.57	69**
	Non-Incapacitating	338	4.76	417	2.40	50**
	Possible Injury	412	5.81	703	4.04	30**
	Fatal or Incapacitating	136	1.92	113	0.64	66**

* Based on 1987 through 1991 accident data. Total sample sizes were 16,495 and 7,095 for not using a safety seat or belt in the front and rear seats, respectively, and 14,862 and 17,385 for using either a safety seat or belt in the front and rear seats, respectively.

** Statistically significant reduction (probability of 0.99).

TABLE 19. ACCIDENT SEVERITY VERSUS SAFETY BELT OR SEAT USAGE (OCCUPANTS OTHER THAN DRIVERS)*

	NOT USING LAP BELT OR SHOULDER HARNESS		USING LAP BELT AND/OR SHOULDER HARNESS		
TYPE OF INJURY	NUMBER	PERCENT	NUMBER	PERCENT	PERCENT REDUCTION
Fatal	908	0.27	132	0.08	70**
Incapacitating	13,266	3.96	3,097	1.88	52**
Non-Incapacitating	25,832	7.70	7,428	4.52	41**
Possible Injury	27,681	8.26	11,219	6.82	17**
Fatal or Incapacitating	14,174	4.23	3,229	1.96	54**

* Based on 1987 through 1991 accident data. Total sample sizes were 335,272 not using a safety belt or seat compared to 164,473 using a safety belt.

** Statistically significant reduction (probability of 0.99).

TABLE 20. ACCIDENT SEVERITY VERSUS SAFETY BELT USAGE (OCCUPANTS OTHER THAN DRIVERS)*

POSITION	TYPE OF INJURY	NOT USING LAP BELT OR SHOULDER HARNESS		USING LAP BELT AND/OR SHOULDER HARNESS		PERCENT REDUCTION
		NUMBER	PERCENT	NUMBER	PERCENT	
Front	Fatal	704	0.29	103	0.09	69***
	Incapacitating	10,233	4.19	2,516	2.18	48***
	Non-Incapacitating	19,491	7.97	5,618	4.87	39***
	Possible Injury	21,284	8.71	8,581	7.44	15***
	Fatal or Incapacitating	10,937	4.47	2,619	2.27	49***
Rear**	Fatal	204	0.22	29	0.06	74***
	Incapacitating	3,033	3.34	581	1.18	65***
	Non-Incapacitating	6,341	6.99	1,810	3.69	47***
	Possible Injury	6,397	7.05	2,638	5.38	24***
	Fatal or Incapacitating	3,237	3.57	610	1.24	65***

* Based on 1987 through 1991 accident data. Total sample sizes were 244,503 and 90,769 for not using a safety belt in the front seat and rear seat, respectively, and 115,410 and 49,063 for using a safety belt in the front and rear seat, respectively.

** Lap belts only primarily used in rear seats.

*** Statistically significant reduction (probability of 0.99).

TABLE 21. POTENTIAL ANNUAL REDUCTION IN TRAFFIC ACCIDENT FATALITIES AND ACCIDENT SAVINGS FROM INCREASE IN DRIVER SAFETY BELT USAGE*

	POTENTIAL ANNUAL REDUCTION IN NUMBER OF		ANNUAL ACCIDENT SAVINGS MILLION $ FROM REDUCTION IN		
DRIVER USAGE RATE (PERCENT)	FATALITIES	SERIOUS INJURIES**	FATALITIES	SERIOUS INJURIES	TOTAL
50	61	405	91.5	15.8	107.3
60	117	767	175.5	29.9	205.4
70	172	1,129	258.0	44.0	302.0
80	228	1,491	342.0	58.1	400.1
90	254	1,852	381.0	72.2	453.2
100	339	2,214	508.5	86.3	594.8

* Based on increase from the 39 usage rate determined in the 1991 survey, the percent reductions listed in Table 15, and accident cost estimates recommended by the Federal Highway Administration (11). These costs are $1,500,000 for a fatality and $39,000 for an incapacitating injury.

** Serious injuries were defined as those listed as incapacitating on the accident report.

TABLE 22. STATEWIDE USAGE RATES

	PERCENT USING SAFETY BELTS	
YEAR	DRIVERS	CHILDREN UNDER FOUR YEARS OF AGE*
1982	4	15
1983	6	24
1984	7	30
1985	9	29
1986	13	30
1988	21	48
1989	26	49
1990	32	57
1991	39	57
1992	41	62

* Children using either safety seat or safety belt.
Children seated in either front or rear seat.

APPENDIX

SUMMARY OF DATA

LIST OF SURVEY LOCATIONS

1 Fayette, I64 at KY 859
2 Boyd, I64 at US 23
3 Christian,I24 at US 41A,Hopkinsville
4 Hardin, I65 at rest area, Sonora
5 Barren, I65 at KY 70, Cave City
6 Boone, I75 at rest area, Florence
7 Clark, I64 at KY 627, Winchester
8 Franklin, I64 at US 60, Frankfort
9 Laurel, I75 at KY 80, London
10 Henry, I71 at Ky 153, Sligo
11 Rockcastle, I75 at US 25, Mt. Vernon
12 Scott, I75 at rest area, Georgetown
13 Shelby, I64 at KY 53, Shelbyville
14 Woodford, I64 at KY 341, Midway
15 Trigg, I24 at US 68, Cadiz
16 Pike, US 460 at KY 122, Shelbiana
17 Daviess, US 60 at KY 144, Owensboro
18 Hardin, US 31W at KY 835, West Point
19 Perry, KY 15X at KY 476, Hazard
20 Knox, US 25E at KY 225, Barbourville
21 Harlan, US 119 at KY 179, Cumberland
22 Floyd, KY 80 at US 23, Allen
23 Bullitt, US 31E at KY 44, Mt. Washington
24 Carter, KY 1 at I64, Grayson
25 Laurel, US 25 at KY 80, London
26 Mason, US 62 at KY 11, Maysville
27 Clay, US 421 at KY 80, Manchester
28 Bourbon,US68 at 5th St., Millersburg
29 Casey, US 127 at KY 70, Liberty
30 Meade, US 31W at KY 1638, Muldraugh
31 Lincoln, US127 at KY 78, Hustonville
32 Russell,US127 at KY80,Russell Sprgs.
33 Washington,US 150 at KY 55, Springfield
34 Cumberland, KY 90 at KY 61, Burkesville
35 Ballard, US 60 at KY 358, LaCenter
36 Fayette, KY 418 at I75, Lexington
37 Christian, US 41 at KY 1682, Hopkinsville
38 McCracken, US 62 at KY 68, Paducah
39 Madison, KY 52 at KY 876, Richmond
40 Barren, KY 255 at US 31W, Park City
41 Nelson, US 62 at KY 48, Bloomfield
42 Boone, KY 18 at KY 237, Burlington
43 Oldham, KY 146 at KY 393, Buckner
44 Knox, KY 11 at US 25E, Barbourville
45 Henderson, KY 145 at US 60, Corydon
46 Boyle, US 68 at US 150, Perryville
47 Greenup, KY 1 at US 23, Greenup
48 Caldwell,KY 139 at Jefferson, Princeton
49 Grayson, US 62 at KY 259, Leitchfield
50 Allen, US 231 at US 31E, Scottsville
51 Bath, US 60 at KY36, Owingsville
52 Larue, KY 84 at KY 61, Hodgenville
53 Scott, US 62 at I75, Georgetown
54 Anderson, US 127 at US 127B, Lawrenceburg
55 Breathitt, KY 30 at KY 15, Jackson
56 Webster, US 41 at KY 56, Sebree
57 Garrard, KY 39 at US 27, Lancaster
58 Carroll, US 42 at Highland, Carrollton
59 Elliott, KY 32 at KY 7, Sandy Hook
60 McCracken, KY 1286 at US 62, Paducah
61 Harlan, KY 413 at US 119, Loyall
62 Greenup, KY 7 at US 23, South Shore
63 Lewis, KY 10 at KY 57, Tollesboro
64 Simpson, KY 73 at KY 100, Franklin
65 Adair, KY 2290 at KY 55, Columbia
66 Taylor, KY 208 at US 68, Campbellsville
67 Kenton, I275 at KY 17, Covington
68 Kenton,I75 at KY 371, Crescent Springs
69 Fayette, I75 at US 68, Lexington
70 Jefferson, I64 at KY 1747, Louisville
71 Jefferson, I65 at KY 1631, Louisville
72 Jefferson, I264 at US 31E, Louisville
73 Jefferson, I264 at US 42, Louisville
74 Jefferson, I264 at US 60, Louisville
75 Warren, I65 at US 231, Bowling Green
76 Boone, I71 at KY 14, Verona
77 Jefferson, US 31W at Gagel, Louisville
78 Jefferson,KY 1447 at Hubbards, Louisville
79 Jefferson,KY 1703 at Trevillian,Louisville
80 Fayette, US 27 at KY 1683, Lexington
81 Fayette, Reynolds at Lansdowne, Lexington
82 Fayette, KY 4 at KY 353, Lexington
83 Kenton, US 25 at KY 236, Covington
84 Kenton, KY 8 at KY 17, Covington
85 Kenton, KY 16 at KY 177, Covington
86 Fayette, US 25 at Fontaine, Lexington
87 Campbell, US 27 at Carothers, Newport
88 Christian, US 41 at 9th, Hopkinsville
89 Hopkins, US 41A at KY 70, Madisonville
90 Pulaski, US 27 at KY 80, Somerset
91 Franklin, US 60 at Sunset, Frankfort
92 Henderson, US 41A at First St., Henderson
93 Nelson, US 31E at Beall, Bardstown
94 Barren, US 68 at Race St., Glasgow
95 Clark, US 60 at KY 1958, Winchester
96 Warren, US 31W at US 231, Bowling Green
97 Anderson, US 62 at US 127, Lawrenceburg
98 Rowan, US 60 at KY 32, Morehead
99 Hardin, Poplar at Sycamore, Elizabethtown
100 Kenton, KY 1072 at Highland, Covington

TABLE A-1. SUMMARY OF DATA

LOCATION NUMBER	DRIVERS		FRONT-SEAT PASSENGERS										FRONT AND REAR			
			4-5 Years		6-12 Years		13-19 Years		OVER 19 Years		UNDER 4 Years		1-3 Years		UNDER 1 Year	
	SAMPLE	USAGE*	SAMPLE	USAGE	SAMPLE	USAGE	SAMPLE	USAGE	SAMPLE	USAGE	SAMPLE	USAGE	SAMPLE	USAGE	SAMPLE	USAGE
1	286	66	7	57	3	67	10	40	78	67	4	75	7	86	1	100
2	352	42	2	50	9	44	16	38	123	32	13	15	36	47	1	100
3	625	55	15	53	11	45	46	35	161	58	6	33	10	70	10	90
4	442	72	2	100	14	57	22	73	284	66	8	38	21	38	2	100
5	360	58	6	50	11	64	26	58	162	58	10	60	33	73	4	100
6	328	64	3	67	11	64	25	56	166	57	4	25	10	40	0	**
7	456	40	6	50	5	80	12	33	90	40	3	33	5	60	0	**
8	441	65	1	100	5	60	13	38	122	64	6	83	7	86	3	100
9	511	53	13	54	18	56	21	38	151	55	3	100	5	80	1	100
10	463	44	8	50	13	46	22	55	114	43	11	64	32	56	3	100
11	409	51	4	75	11	55	20	50	144	48	19	53	28	64	3	67
12	370	66	5	80	16	38	20	55	229	66	1	100	10	90	0	**
13	304	55	2	50	1	100	10	30	82	55	3	67	9	56	3	100
14	218	67	1	0	0	**	8	63	43	63	3	67	4	75	0	**
15	536	55	13	69	17	71	12	67	249	56	6	50	16	63	4	100
16	762	23	15	13	22	23	49	14	187	19	15	47	24	50	1	100
17	934	31	10	50	32	31	34	26	154	26	10	70	26	69	2	100
18	879	56	9	33	12	50	43	33	255	61	13	46	25	44	1	100
19	1,241	19	21	19	41	20	67	10	303	15	31	23	62	50	6	50
20	762	24	15	13	23	17	71	17	247	28	22	32	41	39	3	33
21	374	24	1	0	14	43	34	9	137	22	10	0	15	13	3	0
22	941	33	5	40	19	37	31	26	246	31	9	22	18	39	2	50
23	1,075	40	20	50	64	41	74	35	236	42	26	58	62	68	7	71
24	767	22	7	43	25	16	52	19	205	17	28	25	42	31	3	100
25	1,332	27	26	15	21	24	80	20	379	29	25	48	34	56	6	83
26	1,244	33	20	35	19	37	46	26	277	40	35	37	81	54	19	74
27	843	15	10	0	34	18	64	3	316	10	48	6	55	15	8	13
28	692	35	10	40	10	20	30	13	189	35	12	33	27	52	1	100
29	980	19	19	21	26	19	75	23	224	25	32	41	44	48	6	67
30	1,101	62	12	67	22	55	97	48	321	63	18	61	39	67	6	83
31	451	23	11	9	12	50	29	28	149	28	26	23	32	31	6	50
32	600	30	12	25	15	33	27	30	149	33	12	42	21	62	2	0
33	910	28	4	25	27	33	53	34	156	26	27	52	49	57	0	**
34	1,168	20	11	0	55	15	77	18	281	17	23	13	39	26	5	40
35	644	27	7	29	26	23	54	28	133	32	12	42	22	55	2	100
36	1,011	60	7	57	13	69	37	43	263	54	13	85	28	89	6	100
37	699	31	17	29	28	32	28	18	164	35	25	20	40	33	13	77
38	683	42	4	50	11	36	16	31	134	40	11	36	18	50	5	60
39	1,519	45	26	42	48	38	106	42	314	45	21	71	37	65	10	100
40	354	32	4	100	11	64	17	35	118	47	3	67	15	53	0	**
41	428	26	5	40	7	29	18	28	123	19	10	30	18	61	3	67
42	1,025	43	21	43	32	31	87	38	211	44	43	51	96	56	13	85
43	883	46	22	59	32	47	48	40	135	41	29	66	47	74	13	77
44	952	23	17	18	27	30	46	17	235	24	30	33	48	38	10	70
45	235	26	4	50	6	17	6	17	36	17	8	38	13	54	1	100
46	405	29	15	33	11	36	29	17	110	33	7	43	17	65	0	**
47	701	24	8	13	32	16	52	31	262	19	34	15	50	28	2	50
48	1,037	20	12	25	32	19	67	16	234	21	26	35	41	49	6	83
49	1,659	20	24	29	74	18	130	20	407	19	38	34	69	54	4	100
50	702	32	9	11	14	43	62	16	253	33	21	48	39	54	4	75
51	867	13	10	0	37	11	72	11	194	7	24	25	38	50	9	44
52	350	31	4	25	2	50	13	46	99	37	6	100	11	82	1	100
53	707	55	7	71	13	69	27	48	229	58	5	60	14	79	2	100
54	537	35	9	11	19	37	30	27	143	34	19	42	42	40	2	100
55	421	17	14	21	18	17	33	9	138	9	24	17	29	21	5	20
56	566	19	7	14	12	17	28	7	119	24	19	16	31	19	5	60
57	420	24	4	75	19	42	19	32	70	11	19	42	26	54	6	50
58	1,127	30	9	0	37	38	59	37	323	30	26	50	62	60	4	100
59	572	13	8	13	24	17	62	8	151	11	34	15	48	31	4	75
60	630	43	16	44	16	38	18	11	113	43	27	70	38	79	11	73
61	308	25	5	0	17	41	46	28	92	15	14	14	24	17	2	50
62	612	23	5	40	25	12	58	24	174	26	19	26	37	46	4	50
63	231	12	7	29	9	11	30	0	69	16	5	0	15	13	0	**
64	492	26	8	25	13	31	22	18	102	26	20	20	40	38	3	33
65	701	24	16	0	18	22	55	22	134	23	14	43	21	57	2	100
66	333	22	4	25	11	27	31	13	116	28	10	10	22	32	1	100
67	829	48	18	72	37	62	55	38	179	47	18	83	48	83	6	100
68	958	60	12	83	21	57	52	56	214	59	25	76	48	88	8	100
69	727	65	13	62	14	57	36	56	255	60	14	64	30	73	2	50

TABLE A-1. SUMMARY OF DATA (continued)

LOCATION NUMBER	DRIVERS		FRONT-SEAT PASSENGERS										FRONT AND REAR			
			4-5 Years		6-12 Years		13-19 Years		OVER 19 Years		UNDER 4 Years		1-3 Years		UNDER 1 Year	
	SAMPLE	USAGE*	SAMPLE	USAGE	SAMPLE	USAGE	SAMPLE	USAGE	SAMPLE	USAGE	SAMPLE	USAGE	SAMPLE	USAGE	SAMPLE	USAGE
70	1,039	73	7	86	11	91	29	69	188	70	7	86	20	95	7	100
71	1,304	58	4	75	15	60	21	52	281	56	11	73	29	79	0	**
72	1,501	69	7	86	15	93	30	60	283	68	18	83	40	88	9	100
73	1,173	70	26	65	11	73	37	51	125	66	13	92	27	96	7	100
74	1,059	70	3	100	15	87	23	57	217	61	10	80	35	94	0	**
75	741	67	4	50	12	58	28	61	153	57	14	57	35	51	5	100
76	317	32	4	25	3	67	6	0	50	32	5	80	7	100	2	50
77	1,705	53	15	60	50	46	109	47	310	52	24	63	58	71	8	75
78	1,624	79	10	100	25	88	47	62	184	74	24	96	70	99	14	100
79	1,133	65	18	56	16	69	35	49	200	75	32	91	35	86	13	100
80	1,108	64	7	71	16	63	49	57	262	60	29	79	68	88	5	80
81	1,138	61	16	63	19	63	39	31	183	49	22	73	94	86	15	87
82	1,361	60	22	59	22	45	39	51	322	57	19	84	38	84	4	100
83	1,105	39	12	58	15	53	28	36	265	39	23	78	70	89	5	100
84	968	39	4	75	18	33	32	34	243	37	12	50	39	49	2	50
85	1,086	40	24	29	28	43	38	37	238	42	22	68	45	69	13	100
86	1,199	65	11	55	14	50	30	33	218	55	24	88	38	92	11	100
87	1,317	34	22	23	32	38	91	24	326	34	28	39	46	61	8	38
88	1,598	30	14	36	38	26	59	25	245	24	36	42	69	51	10	80
89	1,562	27	23	35	45	31	94	21	357	29	40	48	68	54	4	100
90	1,108	28	10	30	37	22	70	31	372	24	113	42	223	50	39	79
91	934	46	9	44	14	50	18	28	197	50	28	71	48	71	9	78
92	1,494	29	16	38	17	24	44	14	187	36	29	38	53	57	7	71
93	1,443	40	52	35	58	33	99	30	296	43	43	58	85	64	10	100
94	1,214	29	34	24	39	33	60	30	298	31	30	30	44	52	8	38
95	940	38	16	25	24	33	55	33	262	37	20	35	30	53	3	100
96	1,236	59	22	68	25	52	89	53	294	61	29	69	55	75	18	83
97	1,317	24	19	26	13	15	55	11	243	20	41	59	74	64	4	100
98	1,415	26	12	33	59	25	95	23	409	20	54	43	107	57	17	88
99	1,169	39	27	37	24	25	46	26	262	33	38	61	68	62	18	67
100	1,065	51	11	73	16	63	42	38	167	51	43	63	66	68	16	88

* Percent
** No data available.