Research Report
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1998 SAFETY BELT USAGE SURVEY AND EVALUATION OF EFFECTIVENESS IN KENTUCKY

by

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EXECUTIVE SUMMARY

The objective of this study was to establish 1998 safety belt and child safety seat usage rates in Kentucky. The 1998 survey documents the continuing results from enacting a statewide mandatory safety belt law in 1994. 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 the report is an analysis of accident records evaluating the effectiveness of safety belts.

The data show that the usage rate has stabilized at a level slightly below the high value which occurred in 1994 immediately after enactment of the statewide usage law. The usage rate for front seat occupants was 54 percent in 1998, compared to 54 percent in 1997 and 1995, 55 percent in 1996, and 58 percent in 1994. The current usage is substantially above the 1993 level prior to enactment of the statewide law of 42 percent.

The 1998 statewide usage rate for children under the age of four was determined to be 80 percent. This continues the high rate found for this age category and compares to the high of 82 percent in 1997.

Benefits in the reduction of injuries for occupants involved in police-reported accidents who were wearing a safety belt or in a safety seat were shown through the analysis of accident records. For example, there was a 73 percent reduction in the probability of a driver sustaining a fatal or incapacitating injury in a traffic accident when a safety belt was worn compared to not wearing a safety belt.

1.0 INTRODUCTION

The use of safety belts and child safety seats has been shown to be an effective means to reduce the injuries of motor-vehicle occupants involved in a traffic accident. There have been various methods used in the attempt to increase safety belt and safety seat usage. Past efforts have included public information campaigns, both local and statewide legislation, and enforcement of the legislation. The most recent legislation in this area was statewide legislation requiring the use of safety belts for all vehicle occupants. This law was passed in 1994 with an effective date in July 1994.

The first legislation in this area was a law 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, prior to the statewide law, local safety belt usage laws were enacted in several jurisdictions in Kentucky. The first such local law, with an effective date of July 1990, was enacted by the Lexington-Fayette Urban County Government. The second local law, with an effective date of July 1991, was enacted by the city of Louisville. Jefferson County later adopted such a law. Other cities and one county which had local safety belt ordinances prior to the statewide legislation included Murray, Bowling Green, Kenton County, Corbin, Bardstown, and Midway. Prior to the statewide law, the combined population of the counties and cities having a local ordinance represented approximately one-third of the statewide population. The statewide law replaced the various local ordinances.

Statewide observational surveys were first conducted in Kentucky in 1982, with data collected in 19 cities across the state. These surveys have been conducted annually since 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, 10, 11, 12, 13, 14, 15). The number of sites was increased in 1990 in order 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. After a financial penalty was added to the law, this percentage increased to almost 50 percent in 1988 and 1989, 57 percent in 1990 and 1991, and slightly over 60 percent in 1992 and 1993. There has been a continued increasing trend in usage with 72 percent in 1994, 66 percent in 1995, 79 percent in 1996, and 82 percent in 1997.

Safety belt usage for the driver increased each survey year from 1982 through 1994. The statewide driver safety belt usage rate was only 4 percent in 1982. It steadily increased to a level of approximately 40 percent in 1991 through 1993. There was a large increase to 58 percent in 1994 after enactment of the statewide law. The first decrease was in 1995 when usage decreased to 54 percent with the rate remaining fairly constant at 55 percent in 1996 and 54 percent in 1997. Considering all front seat occupants, the usage rate was 54 percent in 1996 and 1997.

The objective of the survey summarized in this report is to establish statewide 1998 safety belt and child safety seat usage rates in Kentucky. These rates can be compared to those determined from previous surveys. The 1998 survey will determine whether the relatively small decrease in occupants using safety belts in 1995 through 1997, compared to the high rate in 1994 after enactment of the statewide mandatory safety belt law in that year, has continued. Other objectives of this study are to analyze accident data to evaluate the effectiveness of safety belts in reducing injuries to occupants of motor vehicles involved in traffic accidents and to summarize related citation and conviction data.

2.0 PROCEDURE

2.1 DATA COLLECTION PROCEDURE

The data collection procedure used in the surveys was modified starting with the 1990 survey. The procedure used in the 1990 through 1997 surveys was again used in the 1998 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 along with the site selection procedure.

The data collection form used in the survey is shown in Figure 1. Safety belt usage was recorded for drivers as well as front-seat passengers sitting in the outboard position. These occupant positions are equipped with the combination lap belt/shoulder harness type of safety belt which enables observations to be performed more easily than positions equipped only with a lap belt. The exception was for children under four years of age, for which data were collected for both the front and the rear seats. Drivers were classified into three age categories and were also classified by sex. Passengers were placed 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 not using a 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.

Three additional types of information were obtained. Starting with the 1993 survey, the use of motorcycle helmets was noted as well as the usage rate for minority drivers. The 1997 survey was the first in which the use of bicycle helmets was noted.

Each data collector went through a training period prior to starting the collection of data. As part of the training period, the data collectors reviewed the guidelines and previous reports and collected trial sets of field data. The observers then collected data simultaneously at a sample of different types of locations. The data were then reviewed by the project manager before formal data collection was started.

The quality control of the data was the responsibility of the project manager. This included a review of each of the completed data collection forms as the survey progressed to check for any problem areas or questionable data.

The following list of guidelines for data collection was given to each observer.

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

2. Include all vehicles on the approach 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. Data is collected on two approaches when two hours, rather than four hours, of data is collected. The roadway approach (the highway and direction of travel) for which data is to be collected is specified.

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 for 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 (typically those vehicles without a head rest).

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

11. Collect four "observer hours" of data at each site. This could be four hours for one approach or two hours for two approaches.

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

13. Collect data for specified types of passenger motor vehicles (cars, pickup trucks, vans, and sport utility vehicles).

14. Collect data for both in-state and out-of-state vehicles.

15. If a problem such as weather or road construction prevents data from being collected on the assigned day and time for a specific location, a new day and time will be randomly selected by the project manager for data collection.

16. The time period data are collected at the sites are randomly assigned to the data collectors by the project manager. Data are collected during daylight hours on weekdays with occasional data collected on a weekend.

As noted, data were collected for four hours at each location. This could consist of either four hours for one observer or two hours using two observers on different approaches for the specified route. 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 was started early in 1998 and continued through August with the majority of the data obtained in June and July.

2.2 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 and in counties and cites with varying populations, 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 with varying populations. The variables considered in the stratification process were the rural or urban designation of the road, the functional classification of the road, vehicle miles traveled, and the county population. This procedure was used 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 the total vehicle miles driven statewide which occurred on roadways having the given characteristics. The data apply to roads for which a traffic volume was available. This is the state-maintained highway system which consists of slightly over 27,000 miles. Local county and city roadways would not be included. The data shown in Table 1 were obtained using the latest available data which was for 1996. Data from 1990 had been used in previous surveys and the distribution shown in Table 1 show minor changes which resulted in a few new data collection locations.

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, seven percent of all vehicle miles travelled was on rural arterial highways in counties having a population between 25,000 and 50,000, so seven 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 a historical record at these sites; therefore, these sites were included. 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 chances of a specific site being chosen in a county would depend on many subjective factors such as whether data could be taken. This would not allow the calculation of a site-specific probability.

The sites had to be selected at a location where traffic would stop. A list of all locations having a traffic signal was used as input in the selection of sites. Except for some interstate locations, all the data collection 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. The rest area sites were the only exceptions to the sites being at an intersection. To obtain data for the interstate, data at an exit ramp were taken for traffic exiting the interstate at the intersection between 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 originally selected in 62 of the 120 counties with these locations used through the 1997 survey. A slight adjustment was made in the sites in the 1998 survey. Using the same selection criteria, a few sites in counties having more than one data collection location were moved to another county. This resulted in sites in 71 counties with the population of these counties representing 85 percent of the total population of Kentucky. The largest number in any one county was nine 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. A list of the 120 counties in Kentucky along with their population and number of sites in each county is given in Appendix A. The probability of a county having a data collection site is directly related to its population since these counties had roadways with higher vehicle miles of travel.

In summary, the selection of the sites involved the use of a random process with the probability of selection based on the stratification criteria in combination with the use of judgment to assure that proper sites were selected. Judgment had to be used to assure that the sites would allow for the proper collection of data and that the sites were geographically distributed across the state.

2.3 SURVEY DATA ANALYSIS

The survey data were input into a LOTUS spreadsheet to summarize the data and obtain the results. The results for each survey site were reviewed to determine if there was any possible problem with either the data collection or input. The computer results were checked manually if a potential problem was observed. A second set of data were collected if the data at a specific site appeared to be inconsistent with other data.

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, using a LOTUS spreadsheet analysis, 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. The following general formula describes the procedure used to obtain a weighted statewide percentage.

Statewide percentage = sum of products of: a) percentage of statewide vehicle miles given in Table 1 driven on a given type of highway in a county population category and b) usage rate for the specific category

Relative error and confidence intervals for the statewide usage rates were calculated based on the sample size, statewide usage rate, and level of statistical significance (16). Relative error and confidence intervals were also determined for each survey location using sample size and usage rate for that location. The following formula gives relative error:

$$d = \text{sqrt}\,(x(1-p)/(np))$$

in which

d = upper bound on relative error (in percent),
x = constant related to level of statistical significance (3.84 for .95 probability),
p = observed percentage, and
n = sample size.

The relative error could then be multiplied by the observed percentage to obtain a confidence interval.

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

The 1998 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.

2.4 ACCIDENT ANALYSIS

The computer files containing all reported accidents in Kentucky (for the years 1993 through 1997) 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 reductions in the number of traffic accident fatalities and serious injuries, as well as the related dollar savings in accident costs, from an increase in driver safety belt usage were estimated.

2.5 SAFETY BELT AND SAFETY SEAT CITATION AND DISPOSITION

The number of citations written, by county, for failure to use a safety belt or safety seat was obtained from the Administrative Office of the Courts (AOC) for a 12-month time period (July 1, 1996 through June 30, 1997). For each county the total citations issued were obtained as well as the number of convictions. A separate listing was obtained from Jefferson County since their data were not included in the AOC data.

3.0 RESULTS

3.1 SURVEY DATA ANALYSIS

Usage rates for all front seat occupants (driver and passenger) for the various types of highways and county population categories are summarized in Table 3. The overall statewide rate in 1998, using the data collected at 100 sites and the described weighting procedure, was 54 percent. The sample size was 137,191. The confidence limits for a probability of 0.95 would be plus or minus 0.3 percent (16). For a given type of highway (excluding rural interstates), 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.

Usage rates for drivers for the various types of highways and county population categories are summarized in Table 4. The overall statewide rate in 1998 was also 54 percent. Drivers accounted for 78 percent of front seat occupants so they dominate the percentage determined for all front seat occupants.

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 statewide driver usage rates had steadily increased from 4.2 percent in 1982 to 42 percent in 1993. However, the rate of the increase had decreased. Only a three percentage point increase occurred in the two-year period from 1991 to 1993. The 58 percent usage in the 1994 survey showed that a dramatic increase occurred between the 1993 and 1994 data collection periods. This increase was directly related to the enactment of a statewide safety belt law. The 1995 survey showed that driver usage (54 percent) remained substantially higher than before enactment of the law, but there was a slight decrease in usage from the rate immediately after

enactment of the law. This trend has continued with usage rates of 54 percent in 1995 and 1997, 55 percent in 1996, and 54 percent again in 1998. The highest rate remains the 58 percent the year the statewide law was enacted. There was no statistically significant difference in the driver usage rates for 1997 and 1998 (probability of 0.95) (17).

Usage rates for front seat occupants (right front seat) for the various types of highways and county population categories are summarized in Table 5. The overall statewide rate in 1998 was also 54 percent. This is the same percentage found for drivers.

Usage rates for children under four years of age are given in Table 6. These rates are for children in both the front and the rear seats. The usage rate for children under one year of age (98 percent) was higher than that for children one to three years of age (78 percent). The usage rate for the combination of these categories, or children under four years of age, was 80 percent with confidence limits for a probability of 0.95 percent of about 1.4 percent.

The sample size for children under four years of age was 3,214. This age category corresponds to the children for which the mandatory child restraint law would apply. The 1998 usage rate of 80 percent compares to 82 percent in 1997, 79 percent in 1996, 66 percent in 1995, 72 percent in 1994, 61 percent in 1993, 62 percent in 1992, and 57 percent in 1990 and 1991. This percentage was about 15 percent in 1982 before enactment of the child restraint law, 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 monetary penalty to the child restraint law.

The usage rate for children under four years of age was higher in the rear seat compared to the front seat. For children one to three years of age, the usage rate was 83 percent for the rear seat compared to 54 percent for the front seat. For children under one year old, the usage rate was 98 percent for the rear seat compared to 94 percent for the front seat. The large percentage of children were observed in the rear seat for both age groups (about 80 percent). This compares to 75 percent in the rear seat in 1997 and 57 percent in 1996.

Safety belt usage rates, by type of highway, are presented in Table 7. The highest usage rates were on interstates (both rural and urban). This would be related in part to the longer trip lengths and higher speeds on interstates, and the tendency to use safety belts more often for this type of travel. The lowest usage rates were on rural, non-interstate highways with the lowest rate on rural, local highways. There was substantial variation between highway types. For drivers, the percentage using a safety belt varied from 43 percent on rural, local highways to

65 percent on rural and urban interstates. For front-seat passengers, the percentage for those using a safety belt varied from 44 percent on rural, local highways to 65 percent on rural and urban interstates. For children under four years of age, there was less variation with the percentage using a safety seat or safety belt ranging from 71 percent on rural, local roads to 83 percent on rural interstate and urban collectors.

There was a variation in usage by the age and sex of the driver (Table 8). Females had a substantially higher usage rate than males. The category of over 50 years of age had a slightly higher usage rate than either the 31 to 50 or 16 to 30 years of age categories.

Usage rates for front seat passengers by age category are summarized in Table 9. The highest usage rate for front-seat passengers was for the under four years of age category. This would be expected, since the mandatory child restraint law has applied to this age category for several years. Teenagers had the lowest usage rate. Usage for children in the four to five years of age category was 57 percent plus or minus about 2.6 percent (95 percent confidence interval). This compares to 65 percent for the 1997 survey. For children in the 6 to 12 years of age category, the usage rate was 59 percent plus or minus about 2.1 percent. This compares to 61 percent in 1997. For the 13 to 19 years of age category, the usage rate was 48 percent plus or minus about 1.4 percent compared to 47 percent in 1996. For the category of over 19 years of age, the usage rate was 55 percent plus or minus about 0.7 percent. This compares to 56 percent in 1997.

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 10. The usage rates in 1998 were very similar to that in 1997. The rate increased in nine cities, decreased in nine cities, and was the same in the remaining city. The largest change was eight percent. Considering all 19 cities, the usage rate ranged from 62 percent in Lexington and Covington down to 41 percent in Glasgow. Using the procedure followed in the original surveys where data were taken only at sites in these 19 cities results in a statewide usage rate of 54 percent. This rate is identical to that determined using the revised procedure in which data are collected at 100 sites.

The change which occurred in the first four years after the law can be seen by comparing the usage rates for drivers at the 100 data collection sites. In 1994 when the statewide law was passed, the rates increased at 99 of the locations compared to the 1993 data. In 1995, compared to 1994, the rates decreased at 75 sites, increased at 22 sites and remained the same at three sites. In 1996, compared to 1995, the rates increased at 51 sites, decreased at 44 sites and remained the same at five sites. In 1997, compared to 1996, the rates increased at 36 sites, decreased at 54 sites, and remained the same at 10 sites. Due to some changes in sites,

comparisons between 1997 and 1998 data could be made at 83 locations. In 1998, compared to 1997, the rates increased at 33 sites, decreased at 39 sites, and remained the same at 11 sites. The largest increase was 10 percent, while the largest decrease was also 10 percent.

Usage rates for drivers ranged from 25 percent in Owingsville and Tollesboro to 79 percent at Interstate 75 in Rockcastle County. There were four sites which had a usage rate of 70 percent or above with all of these an interstate location. There were only two sites with a usage rate under 30 percent, and seven sites with a usage rate under 40 percent. All of these low rates occurred in small towns.

The change in usage of safety seats or belts by children under four years of age in the original 19 cities is presented in Table 11. The usage rate was higher in 1998 than in 1997 in 12 of the 19 cities, while it decreased in 7 cities. The usage rates ranged from 96 percent in Covington and Madisonville down to 62 percent in Morehead. Using the procedure followed in the original surveys, in which data were taken only at sites in these 19 cities, results in a statewide usage rate of 84 percent which is slightly higher than the rate found using the revised procedure in which data are collected at 100 sites.

A summary of the data collected is given in Appendix B. For each of the 100 data sites, the usage rate and sample size are given for all front seat occupants, drivers, front-seat passengers, and children under four years of age (both front and rear seat). The relative error and confidence interval is given for the "all front seat occupant" category.

Obvious improper usage of safety seats had been estimated in the first several surveys. However, improper usage could only be determined when there was a very obvious problem. Since a detailed study of the method the safety seat was being used was not done, improper usage data were not summarized for this survey.

Helmet use by motorcyclists was noted during the survey. Kentucky has had a statewide law requiring the use of a helmet by a motorcyclist until it was repealed starting July 15, 1998. The results of past surveys have found a usage rate of over 95 percent. The 1998 data were taken both before and after the effective data of the repeal. Prior to July 15, only 10 of the 240 observed motorcyclists were not wearing a helmet, giving a usage rate of 96 percent (confidence interval of 2.5 percent). After this date, 29 of 148 motorcyclists were observed not wearing a helmet giving a usage rate of 76 percent (confidence interval of 6.9 percent). The effect of the repeal of the helmet law is obvious and was found to be statistically significant (probability of 0.95).

Usage for minority drivers was obtained with a sample size of almost 3,800 drivers. The same procedure used for all drivers was utilized to obtain a statewide usage rate. The statewide usage rate for minority drivers was determined to be 45 percent compared to 45 percent for all drivers. This shows the usage rates for minority drivers was slightly less than for the general driving population.

Bicycle helmet use was observed for 87 bicyclists. Only 8 of these bicyclists were wearing a helmet. This low rate (9 percent) shows the need for additional public information about this subject. This rate was almost identical to that found in 1997 (8 percent).

3.2 ACCIDENT ANALYSIS

The number and percentage of all drivers involved in police-reported accidents sustaining a given injury, as a function of whether a safety belt was used, are summarized in Table 12 (based on 1993 through 1997 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 (92 percent reduction) with the reduction decreasing for less severe injuries. For comparison, the reduction was 26 percent for the "possible injury" category. The reductions in the percentage for each of the types of injuries were determined to be statistically significant (probability of 0.99) (17). 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 73 percent reduction in a driver sustaining a fatal or severe injury in a traffic accident when a safety belt was worn compared to not wearing a safety belt. The data are in general agreement, although the percent reductions are somewhat higher, 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 (18).

The effectiveness of safety belts in reducing driver injuries was related to several variables. In Table 13, 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 the percentage of fatal or severe injuries for drivers of passenger cars, single-unit trucks, and combination trucks. The reduction was slightly 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 of fatal or severe injuries 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 three and under sustaining a given injury as a function of whether a safety seat or safety belt was used are summarized in Table 14. There were substantial reductions, higher for the most severe injury types, associated with using either a safety seat or safety belt. The reductions were fairly similar for use of either the safety seat or safety belt. The reductions in injuries were statistically significant (probability of 0.99). Of 56 fatalities, 22 involved children not using a safety seat or safety belt. The percent reductions were similar to that for drivers (as given in Table 12). There was a 82 percent reduction in the chance of a child less than age four, involved in a traffic accident, sustaining a fatal or severe injury when a safety seat was used as compared to not using any restraining device. Also, as shown in Table 15, the reductions in injuries applied to both the rear-and front-seating positions. The data in Table 15 show that accident severity was less in the rear than in the front seat.

The number and percentage of occupants other than drivers sustaining a given injury as a function of whether a safety belt was used are listed in Table 16. 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 very similar to those 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 70 percent if a safety belt was worn compared to not wearing a safety belt.

The accident severities associated with using a combination shoulder harness/lap belt or only lap belt for occupants other than the driver (by seating position in the front or rear seat) are listed in Table 17. Only a lap belt was available in the rear seat in a substantial percentage 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 either a combination shoulder harness/lap belt or only 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. 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 which would result from an increase in driver safety belt usage are presented in Table 18. The reduction in fatalities and associated accident cost savings were calculated using the reduction factors listed in Table 12, accident data for the years of 1993 through 1997, the 54 percent usage rate determined from the

1997 observational survey, and accident cost estimates recommended by the Federal Highway Administration (19).

3.3 Safety Belt and Safety Seat Citation and Disposition

The number and disposition of safety belt and safety seat citations, by county, are summarized in Appendix C. Except for Jefferson County, this information was obtained from the Administration Office of the Courts (AOC) for the one-year period of July 1, 1996 through June 30, 1997. A separate printout was obtained for Jefferson County. The dispositions, such as prepaid, guilty, dismissed, and merged, were summarized by county. The specific dispositions used by AOC to define a conviction were summarized to determine the conviction percentage. The largest number of seat belt citations were written in Fayette County (4,491) with the smallest number in Crittenden County (9). There was a large range in the conviction percentage with six counties over 90 percent (Butler, Fayette, Hickman, Owen, Robinson, and Spencer) with three under 10 percent (Harlan, Knott, and Monroe). The largest number of safety seat citations was in Jefferson County (182) with only one written in Carlisle, Gallatin, and Robinson Counties. For counties which had written a minimum of 50 citations, the conviction percentage ranged from a high of 85 percent in Campbell and Fayette Counties to a low of 6 percent in Harlan County.

Considering the total state, there were 42,802 seat belt and 3,659 safety seat citations written in the one-year period. Failure to use a seat belt is a secondary violation which requires stopping a motorist for a separate violation. The statewide conviction rate was very similar for seat belt (64 percent) and safety seat citations (62 percent).

4.0 SUMMARY

Observations were taken at 100 sites across Kentucky to obtain safety belt usage rates. A sample of approximately 137,191 front seat occupants was obtained (including 106,970 drivers). The data collection procedure and site selection criteria were based on national criteria.

A statewide safety belt law was passed in Kentucky in 1994. The law applies to all vehicle occupants. Prior to the statewide law, there were local ordinances passed in several cities and counties which covered approximately one-third of the statewide population. The data collected in 1994, after the effective date of the statewide law, showed that enactment of the statewide law had a dramatic effect on usage rates. The usage rate for front seat occupants increased from 42 percent in 1993 to 58 percent in 1994. It then decreased slightly to 54 percent in 1995 and 1997 and 55 percent in 1996. The survey data collected in 1998 show that the rate

has remained at the same level as the past three years (54 percent). The trend in usage rates from 1982 through 1998 is given in Table 19.

With the exception of rural interstates, the rate was generally higher in urban compared to rural areas. The lowest rates were on local roadways in rural counties. Usage varied with age, with the highest usage for the "under four years of age" category and the lowest usage for the teenage category. The usage rate determined for minority drivers was slightly less than that for all drivers.

Kentucky had a statewide law requiring children under 40 inches in height to be placed in a child restraint prior to the law applying to all occupants. The statewide usage rate for children under the age of four (including both the front and rear seat) was determined to be 80 percent. This compares to 82 percent in 1997 survey and continues to show the high usage for this age group.

The motorcycle helmet law was repealed in 1998. The very high compliance of motorcyclists with the requirement to wear a helmet (over 95 percent) was reduced to 76 percent after repeal of the law. The percentage of bicyclists observed wearing a safety helmet was very low (9 percent).

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 73 percent reduction in fatal or incapacitating injuries for drivers involved in a traffic accident wearing a safety belt compared to those who were not. The benefit, in terms of the reduction in injuries, from 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. For example, an increase in the driver usage rate up to 70 percent usage would result in a potential annual reduction of 146 fatalities and an annual accident savings from the reduction in fatalities and serious injuries of about 259 million dollars.

5.0 RECOMMENDATIONS

The data show that the increased level of safety belt usage which occurred after enactment of the statewide safety belt law in 1994 has remained. However, the usage has not continued to increase and is actually slightly below the 1994 level. While the usage rate in 1998 is still substantially above the level prior to the statewide law, efforts must be made to increase usage. The efforts should include both education and enforcement. Public information and education concerning the law and the reasons to wear safety belts should continue. Also, enforcement of the law, along with public information about this enforcement and resulting citations,

should be increased. The survey data can be used to identify areas in need of additional enforcement and education.

The benefits which can be gained through education and enforcement of a secondary law is limited. To obtain a substantial increase in usage, the current law should be modified to allow primary, rather than secondary, enforcement.

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Figure 1. Data Collection Form

SAFETY BELT DATA COLLECTION FORM

Date: _____ **Starting Time:** _____ **Ending Time:** _____ **Int #:** _____

Location: _____ **Sheet No:** _____

Observer: _____ **Comment:** _____

DRIVER USAGE

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

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	Booster Seat	Harness or Belt	None
Front				
Rear				

USAGE FOR INFANTS (UNDER 1 YEAR OF AGE)

	Safety Seat	None
Front		
Rear		

Motorcycle Helmet: Y- N-

Bicycle Helmet: Children Y- N-

Adult Y- N-

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 50,000	2.9
	25,001-50,000	3.7
	10,000-25,000	5.6
	Under 10,000	1.2
Rural Arterial	Over 50,000	3.3
	25,001-50,000	7.0
	10,000-25,000	8.5
	Under 10,000	2.2
Rural Collector	Over 50,000	3.0
	25,001-50,000	5.9
	10,000-25,000	9.3
	Under 10,000	2.1
Rural Local	Over 25,000	1.0
	Under 25,000	1.3
Urban Interstate	Over 100,000	10.1
	50,000-100,000	2.3
	Under 50,000	1.1
Urban Arterial	Over 100,000	11.5
	25,000-100,000	11.1
	Under 25,000	1.8
Urban Collector or Local	All	5.1

TABLE 2. STATEWIDE SURVEY LOCATIONS

TYPE LOCATION	COUNTY POPULATION	SURVEY SITE
Rural Interstate	Over 50,000	Boyd, I 64 at US 23, Catlettsburg
		Christian, I 24 at US 41A, Hopkinsville
		Hardin, I 65 at rest area, Sonora
	25,001-50,000	Whitley, I 75 at US 25W, Corbin
		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	Montgomery, I 64 at US 460, Mt. Sterling
		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, US31 W at BR US31 W, West Point
	25,001-50,000	Greenup, US 23 at KY 7, South Shore
		Harlan, US 421 at US 119, Harlan
		Marshall, US 641 at KY 80, Hardin
		Floyd, KY 80 at US 23, Allen
		Bullitt, US 31E at KY 44, Mt. Washington
		Carter, KY 1 at I 64, Grayson
		Letcher, US 119 at KY 15, Whitesburg
	10,000-25,000	Mason, US 62 at KY 11, Maysville*
		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
		Scott, US 62 at I 75, Georgetown
	Under 10,000	Cumberland, KY 90 at KY 61, Burkesville
		Ballard, US 60 at KY 358, LaCenter

TABLE 2. STATEWIDE SURVEY LOCATIONS (continued)

TYPE LOCATION	COUNTY POPULATION	SURVEY SITE
Rural Collector	Over 50,000	Fayette, KY 418 at I 75, Lexington
		McCracken, US 62 at US 68, Reidland
		Madison, KY 52 at KY 876, Richmond
	25,001-50,000	Bell, US 25E at US 119, Pineville
		Graves, KY 339 at US 45, Wingo
		Oldham, KY 146 at KY 393, Buckner
		Muhlenberg, US 62 at KY 281, Greenville
		Boyle, US 68 at US 150, Perryville
		Jessamine, KY 29 at US 68, Wilmore
	10,000-25,000	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
		Johnson, US 460 at US 23, Paintsville
		Logan, KY 103 at US 68, Auburn
		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 6th Street, Carrollton*
		Elliott, KY 32 at KY 7, Sandy Hook
Rural Local	Over 25,000	McCracken, KY 1286 at US 62, Paducah
	Under 25,000	Lewis, KY 10 at KY 57, Tollesboro
		Simpson, KY 73 at KY 100, Franklin
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 65 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
		Fayette, I 75 at US 60, Lexington
		Jefferson, I 265 at US 60, Louisville

TABLE 2. STATEWIDE SURVEY LOCATIONS (continued)

TYPE LOCATION	COUNTY POPULATION	SURVEY SITE
Urban Interstate	50,000-100,000	Warren, I 65 at US 231, Bowling Green Hardin, I 65 at US 62, Elizabethtown
	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, KY1703-Trevillian Way,Louisville* Fayette, US 27 at KY 1683, Lexington* Fayette, Reynolds - 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 Christian, US 41 at KY 1682, Hopkinsville*
	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, US31W at US231, Bowling Green Knox, US 25E at KY 11, Barbourville
	Under 25,000	Anderson, US 62 at US 127, Lawrenceburg* Rowan, US 60 at KY 32, Morehead*
Urban Collector or Local	All	Hardin, Poplar at Sycamore, Elizabethtown* Kenton, KY 1072 at Highland, Covington* Caldwell, KY 139 at Jefferson, Princeton* Perry, KY 15X at KY 476, Hazard* Calloway, KY 121 at US 641B, Murray

* Original data collection site.

TABLE 3. ALL FRONT SEAT OCCUPANTS (DRIVER AND PASSENGER) USAGE RATES

TYPE OF HIGHWAY	COUNTY POPULATION	SAMPLE SIZE	USAGE RATE (PERCENT)	RELATIVE ERROR*	CONFIDENCE INTERVAL*
Rural Interstate	Over 50,000	2,174	64	3.1	2.0
	25,001-50,000	3,705	65	2.4	1.5
	10,000-25,000	3,805	64	2.4	1.5
	Under 10,000	525	69	5.7	4.0
Rural Arterial	Over 50,000	5,012	57	2.4	1.4
	25,001-50,000	8,730	52	2.0	1.0
	10,000-25,000	12,151	49	1.8	0.9
	Under 10,000	2,554	39	4.9	1.9
Rural Collector	Over 50,000	4,465	58	2.5	1.4
	25,001-50,000	7,624	49	2.3	1.1
	10,000-25,000	9,139	43	2.4	1.0
	Under 10,000	2,245	38	5.3	2.0
Rural Local	Over 25,000	1,036	58	5.1	3.0
	Under 25,000	1,003	30	9.4	2.8
Urban Interstate	Over 100,000	15,281	65	1.2	0.8
	50,000-100,000	2,341	64	3.0	1.9
	Under 50,000	259	63	9.4	5.9
Urban Arterial	Over 100,000	21,160	58	1.1	0.7
	25,000-100,000	22,042	52	1.3	0.7
	Under 25,000	2,541	48	4.0	1.9
Urban Collector or Local	All	9,399	53	1.9	1.0
ALL	All	137,191	54	0.5	0.3

* 95 percent probability or confidence

TABLE 4. DRIVER USAGE RATES

TYPE OF HIGHWAY	COUNTY POPULATION	SAMPLE SIZE	USAGE RATE (PERCENT)	RELATIVE ERROR*	CONFIDENCE INTERVAL*
Rural Interstate	Over 50,000	1,588	64	3.7	2.4
	25,001-50,000	2,870	65	2.7	1.7
	10,000-25,000	2,814	64	2.8	1.8
	Under 10,000	385	69	6.7	4.6
Rural Arterial	Over 50,000	3,979	57	2.7	1.5
	25,001-50,000	6,461	52	2.4	1.2
	10,000-25,000	9,293	49	2.1	1.0
	Under 10,000	1,917	38	5.7	2.2
Rural Collector	Over 50,000	3,576	58	2.8	1.6
	25,001-50,000	5,948	49	2.6	1.3
	10,000-25,000	7,001	44	2.7	1.2
	Under 10,000	1,649	38	6.2	2.3
Rural Local	Over 25,000	801	56	6.1	3.4
	Under 25,000	766	30	10.9	3.2
Urban Interstate	Over 100,000	12,313	65	1.3	0.8
	50,000-100,000	1,739	64	3.5	2.3
	Under 50,000	185	60	11.8	7.1
Urban Arterial	Over 100,000	16,926	58	1.3	0.7
	25,000-100,000	17,510	52	1.4	0.7
	Under 25,000	1,969	48	4.6	2.2
Urban Collector or Local	All	7,280	53	2.2	1.1
ALL	All	106,970	54	0.5	0.3

* 95 percent probability or confidence

TABLE 5. FRONT-SEAT PASSENGER USAGE RATES

TYPE OF HIGHWAY	COUNTY POPULATION	SAMPLE SIZE	USAGE RATE (PERCENT)	RELATIVE ERROR*	CONFIDENCE INTERVAL*
Rural Interstate	Over 50,000	586	66	5.8	3.8
	25,001-50,000	835	65	5.0	3.2
	10,000-25,000	991	64	4.6	3.0
	Under 10,000	140	69	11.0	7.6
Rural Arterial	Over 50,000	1,033	59	5.1	3.0
	25,001-50,000	2,269	52	4.0	2.1
	10,000-25,000	2,858	50	3.7	1.8
	Under 10,000	637	40	9.6	3.8
Rural Collector	Over 50,000	889	61	5.2	3.2
	25,001-50,000	1,676	49	4.9	2.4
	10,000-25,000	2,138	42	5.0	2.1
	Under 10,000	596	39	10.1	3.9
Rural Local	Over 25,000	235	66	9.1	6.0
	Under 25,000	237	32	18.5	5.9
Urban Interstate	Over 100,000	2,968	65	2.7	1.7
	50,000-100,000	602	64	6.0	3.8
	Under 50,000	74	69	15.3	10.5
Urban Arterial	Over 100,000	4,234	60	2.5	1.5
	25,000-100,000	4,532	52	2.8	1.5
	Under 25,000	572	51	8.1	4.1
Urban Collector or Local	All	2,119	51	4.1	2.1
ALL	All	30,221	54	1.0	0.6

* 95 percent probability or confidence

TABLE 6. USAGE RATES FOR CHILDREN UNDER FOUR YEARS OF AGE (FRONT AND REAR)

TYPE OF HIGHWAY	COUNTY POPULATION	SAMPLE SIZE	USAGE RATE (PERCENT)	RELATIVE ERROR*	CONFIDENCE INTERVAL*
Rural Interstate	Over 50,000	57	77	14.1	10.9
	25,001-50,000	67	82	11.2	9.2
	10,000-25,000	101	90	6.5	5.8
	Under 10,000	21	86	17.5	15.0
Rural Arterial	Over 50,000	84	81	10.4	8.4
	25,001-50,000	198	75	8.0	6.0
	10,000-25,000	234	74	7.7	5.7
	Under 10,000	35	60	27.0	16.2
Rural Collector	Over 50,000	51	80	13.6	10.9
	25,001-50,000	221	76	7.4	5.6
	10,000-25,000	230	80	6.5	5.2
	Under 10,000	50	72	17.3	12.4
Rural Local	Over 25,000	38	82	15.1	12.3
	Under 25,000	42	69	20.2	14.0
Urban Interstate	Over 100,000	365	84	4.5	3.7
	50,000-100,000	37	89	11.2	10.0
	Under 50,000	10	90	20.7	18.6
Urban Arterial	Over 100,000	573	83	3.7	3.1
	25,000-100,000	531	85	3.6	3.0
	Under 25,000	52	65	19.8	12.9
Urban Collector or Local	All	217	86	5.3	4.6
ALL	All	3,189	80	1.7	1.4

* 95 percent probability or confidence

TABLE 7. USAGE RATES BY TYPE OF HIGHWAY

TYPE OF HIGHWAY	PERCENT USAGE			
	ALL FRONT SEAT OCCUPANTS	DRIVERS	FRONT-SEAT PASSENGERS	CHILDREN UNDER FOUR YEARS OF AGE
Rural Interstate	65	65	65	83
Rural Arterial	50	50	51	70
Rural Collector	47	48	47	74
Rural Local	44	43	49	71
Urban Interstate	65	65	65	81
Urban Arterial	55	55	55	80
Urban Collector or Local	53	53	51	83
ALL	54	54	55	80

TABLE 8. STATEWIDE USAGE RATE BY AGE AND SEX OF DRIVER

CATEGORY	USAGE RATE (PERCENT)
Male	47
Female	64
16-30 Years of Age	51
31-50 Years of Age	54
Over 50 Years of Age	59

TABLE 9. STATEWIDE USAGE RATE FOR FRONT SEAT PASSENGERS BY AGE CATEGORY

CATEGORY	USAGE RATE (PERCENT)
Under 4	74
4 - 5	57
6 - 12	59
13 - 19	48
Over 19	55

TABLE 10. CHANGE IN USAGE OF SAFETY BELTS BY DRIVERS IN ORIGINAL STATEWIDE SURVEY CITIES

	PERCENT USING SAFETY BELTS															
CITY	1982	1983	1984	1985	1986	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Louisville	6	12	13	14	16	25	28	38	70	66	60	66	66	61	65	61
Lexington	8	10	10	17	24	31	42	80	69	61	65	70	66	68	60	62
Covington	8	9	12	16	22	28	32	39	37	51	58	59	58	60	59	62
Hopkinsville	3	3	4	6	10	20	21	24	27	30	27	63	58	54	55	56
Frankfort	5	7	7	11	14	19	24	38	38	46	44	63	64	63	56	57
Henderson	3	5	7	9	11	20	22	29	29	29	32	62	54	56	53	55
Newport	5	6	5	6	9	20	26	35	34	34	29	39	45	42	44	46
Madisonville	2	3	5	8	12	20	22	26	26	27	28	70	63	62	60	58
Elizabethtown	3	4	5	8	14	20	26	31	34	39	34	60	55	58	60	58
Winchester	2	3	6	9	12	25	33	37	35	38	32	59	55	55	52	51
Glasgow	3	3	3	5	6	12	15	19	27	29	26	53	44	46	39	47
Somerset	2	4	6	7	9	19	26	21	29	28	28	59	54	54	51	47
Maysville	2	3	6	6	13	19	25	29	34	33	34	54	47	48	50	49
Morehead	3	3	3	5	7	12	15	22	23	26	28	59	53	50	50	51
Princeton	2	2	2	3	6	12	15	17	19	20	21	54	45	48	46	50
Bardstown	4	4	6	7	13	19	21	23	30	40	45	58	50	47	49	45
Hazard	4	3	4	6	5	10	12	15	19	19	29	52	49	52	54	52
Lawrenceburg	1	2	3	6	5	9	15	19	22	24	23	43	40	44	45	45
Carrollton	3	5	5	7	10	16	19	35	34	30	31	51	47	45	43	41

TABLE 11. CHANGE IN USAGE OF SAFETY SEATS OR BELTS BY CHILDREN UNDER FOUR YEARS OF AGE IN ORIGINAL STATEWIDE SURVEY CITIES

	PERCENT USING SAFETY SEATS OR BELTS															
CITY	1982	1983	1984	1985	1986	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Louisville	22	36	49	42	40	68	65	80	86	87	83	88	89	85	84	89
Lexington	32	46	50	44	46	78	78	91	90	87	81	83	77	84	89	87
Covington	22	39	49	47	50	59	53	66	67	72	84	74	86	81	92	96
Hopkinsville	12	19	19	20	21	33	38	40	51	54	56	76	78	80	82	92
Frankfort	15	26	30	27	30	43	43	57	72	72	62	97	75	88	83	88
Henderson	14	18	26	30	31	36	42	53	53	58	58	78	76	83	88	93
Newport	11	27	20	22	22	60	60	57	75	57	46	63	80	64	83	89
Madisonville	12	18	29	35	38	52	51	54	60	57	59	86	85	90	91	96
Elizabethtown	11	27	34	30	32	41	42	51	46	63	71	69	57	88	89	76
Winchester	12	14	33	29	26	56	68	51	53	58	64	74	72	76	80	79
Glasgow	14	17	20	18	21	36	38	39	47	50	36	67	61	70	74	79
Somerset	7	23	24	22	26	48	47	48	62	54	61	60	61	82	79	76
Maysville	12	18	17	19	25	31	34	36	55	58	62	70	58	70	66	73
Morehead	10	14	13	15	14	25	27	35	51	61	62	72	85	87	87	62
Princeton	10	12	12	16	20	33	41	52	52	53	60	71	71	70	89	91
Bardstown	20	21	31	31	31	41	39	42	76	67	75	84	76	79	91	92
Hazard	7	10	9	11	13	19	20	25	34	50	40	65	61	76	66	89
Lawrenceburg	7	6	22	23	20	32	29	35	77	65	41	52	59	52	78	77
Carrollton	6	10	16	22	19	26	28	31	45	62	43	62	56	81	81	77

TABLE 12. ACCIDENT SEVERITY VERSUS SAFETY BELT USAGE (ALL DRIVERS)*

TYPE OF INJURY	NOT WEARING SAFETY BELT		WEARING SAFETY BELT		PERCENT REDUCTION
	NUMBER	PERCENT	NUMBER	PERCENT	
Fatal	1,788	0.96	636	0.07	92**
Incapacitating	11,111	5.96	15,744	1.79	70**
Non-Incapacitating	18,827	10.10	39,010	4.43	56**
Possible Injury	18,028	9.67	62,714	7.12	26**
Fatal or Incapacitating	12,899	6.92	16,380	1.86	73**

* Based on 1993 through 1997 accident data. Total sample size for not wearing a safety belt was 186,477 compared to 880,244 for wearing a safety belt.

** Statistically significant reduction (probability of 0.99).

TABLE 13. ACCIDENT SEVERITY VERSUS SAFETY BELT USAGE BY TYPE OF VEHICLE, SPEED LIMIT, AND TYPE OF ACCIDENT (ALL DRIVERS)*

VARIABLE	CATEGORY	PERCENT SUSTAINING FATAL OR SEVERE INJURY		PERCENT REDUCTION
		NOT WEARING SAFETY BELT	WEARING SAFETY BELT	
Type of Vehicle	Passenger Car	7.05	1.91	73
	Single-Unit Truck	3.72	0.85	77
	Combination Truck	5.15	1.21	76
Type of Accident (Non-Intersection)	Rear End	2.80	1.08	61
	Fixed Object	17.70	5.15	71
	Head-On	26.41	10.17	61
	Overturned	22.55	8.02	64
Speed Limit (mph)	35	4.75	1.32	72
	45	6.27	1.85	70
	55	12.88	3.77	71

* Based on 1993 through 1997 accident data.

TABLE 14. ACCIDENT SEVERITY VERSUS SAFETY SEAT AND BELT USAGE (CHILDREN AGE THREE AND UNDER)*

TYPE OF INJURY	NOT USING SAFETY SEAT OR BELT NUMBER	PERCENT	USING SAFETY SEAT NUMBER	PERCENT	USING SAFETY BELT NUMBER	PERCENT	PERCENT REDUCTION SAFETY SEAT	SAFETY BELT
Fatal	22	0.35	29	0.11	5	0.02	67**	93**
Incapacitating	286	4.53	191	0.75	272	1.35	84**	70**
Non-Incapacitating	612	9.69	780	3.05	665	3.31	69**	66**
Possible Injury	764	12.10	14492	5.67	1,622	8.07	53**	33**
Fatal or Incapacitating	308	4.88	220	0.86	277	1.38	82**	72**

* Based on 1993 through 1997 accident data. Total sample sizes were 6,316 for not using a safety seat or belt, 25,570 for using a safety seat, and 20,098 for using a safety belt.

** Statistically significant reduction (probability of 0.99).

TABLE 15. 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 NUMBER	PERCENT	USING SAFETY SEAT OR BELT NUMBER	PERCENT	PERCENT REDUCTION
Front	Fatal	11	0.26	12	0.06	76**
	Incapacitating	203	4.74	257	1.31	72**
	Non-Incapacitating	443	10.35	727	3.71	64**
	Possible Injury	546	12.76	1,647	8.41	34**
	Fatal or Incapacitating	214	5.00	269	1.37	73**
Rear	Fatal	11	0.54	22	0.08	84**
	Incapacitating	83	4.07	206	0.79	81**
	Non-Incapacitating	169	8.30	652	2.51	70**
	Possible Injury	218	10.70	1,424	5.47	49**
	Fatal or Incapacitating	94	4.61	228	0.88	81**

* Based on 1993 through 1997 accident data. Total sample sizes were 4,279 and 2,037 for not using a safety seat or belt in the front and rear seats, respectively, and 19,950 and 26,012 for using either a safety seat or belt in the front and rear seats, respectively.

** Statistically significant reduction (probability of 0.99).

TABLE 16. ACCIDENT SEVERITY VERSUS SAFETY BELT OR SEAT USAGE (OCCUPANTS OTHER THAN DRIVERS)*

TYPE OF INJURY	NOT USING LAP BELT OR SHOULDER HARNESS NUMBER	NOT USING LAP BELT OR SHOULDER HARNESS PERCENT	USING LAP BELT AND/OR SHOULDER HARNESS NUMBER	USING LAP BELT AND/OR SHOULDER HARNESS PERCENT	PERCENT REDUCTION
Fatal	791	0.73	316	0.10	87**
Incapacitating	7,112	6.57	6,774	2.06	69**
Non-Incapacitating	14,237	13.15	18,443	5.61	57**
Possible Injury	13,400	12.38	30,823	9.37	24**
Fatal or Incapacitating	7,903	7.30	7,090	2.15	70**

* Based on 1993 through 1997 accident data. Total sample sizes were 108,240 not using a safety belt or seat compared to 329,019 using a safety belt.

** Statistically significant reduction (probability of 0.99).

TABLE 17. ACCIDENT SEVERITY VERSUS SAFETY BELT USAGE BY SEATING POSITION (OCCUPANTS OTHER THAN DRIVERS)*

SEATING POSITION	TYPE OF INJURY	NOT USING LAP BELT OR SHOULDER HARNESS NUMBER	NOT USING LAP BELT OR SHOULDER HARNESS PERCENT	USING LAP BELT AND/OR SHOULDER HARNESS NUMBER	USING LAP BELT AND/OR SHOULDER HARNESS PERCENT	PERCENT REDUCTION
Front	Fatal	590	0.78	245	0.11	86***
	Incapacitating	5,229	6.93	5,269	2.31	67***
	Non-Incapacitating	10,211	13.54	13,622	5.98	56***
	Possible Injury	9,600	12.73	23,086	10.13	20***
	Fatal or Incapacitating	5,819	7.72	5,514	2.42	69***
Rear**	Fatal	201	0.61	71	0.07	89***
	Incapacitating	1,883	5.74	1,505	1.49	74***
	Non-Incapacitating	4,026	12.26	4,821	4.77	61***
	Possible Injury	3,800	11.58	7,737	7.66	34***
	Fatal or Incapacitating	2,084	6.35	1,576	1.56	75***

* Based on 1993 through 1997 accident data. Total sample sizes were 75,413 and 32,827 for not using a safety belt in the front seat and rear seat, respectively, and 227,971 and 101,048 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 18. POTENTIAL ANNUAL REDUCTION IN TRAFFIC ACCIDENT FATALITIES AND ACCIDENT SAVINGS FROM INCREASE IN DRIVER SAFETY BELT USAGE*

DRIVER USAGE RATE (PERCENT)	POTENTIAL ANNUAL REDUCTION IN NUMBER OF		ANNUAL ACCIDENT SAVINGS SAVINGS MILLION $ FROM REDUCTION IN		
	FATALITIES	SERIOUS INJURIES**	FATALITIES	SERIOUS INJURIES	TOTAL
60	59	418	88.5	16.3	104.8
70	146	1,016	219.0	39.6	258.6
80	234	1,614	351.0	62.9	413.9
90	321	2,212	481.5	86.3	567.8
100	409	2,809	613.5	109.6	723.1

* Based on increase from the 54% usage rate determined in the 1997 survey, the percent reductions listed in Table 15, and accident cost estimates recommended by the Federal Highway Administration (19). These costs are $1,500,000 for a fatality and $39,000 for an incapacitating injury. The actual number of fatalities and incapacitating injuries for 1993 through 1997 were used along with the average usage rate over this time period.

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

TABLE 19. TREND IN STATEWIDE USAGE RATES

YEAR	PERCENT USING SAFETY BELTS		
	ALL FRONT SEAT OCCUPANTS	DRIVERS	CHILDREN UNDER FOUR YEARS OF AGE*
1982	**	4	15
1983	**	6	24
1984	**	7	30
1985	9	9	29
1986	13	13	30
1988	20	21	48
1989	25	26	49
1990	33	32	57
1991	39	39	57
1992	40	41	62
1993	42	42	61
1994	58	58	72
1995	54	54	66
1996	55	55	79
1997	54	54	82
1998	54	54	80

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

** Data not available.

APPENDIX A

COUNTY POPULATIONS AND NUMBER OF DATA COLLECTION SITES

COUNTY	POPULATION	NUMBER OF SITES
Adair	15,360	0
Allen	14,628	1
Anderson	14,571	1
Ballard	7,902	1
Barren	34,001	1
Bath	9,692	1
Bell	31,506	1
Boone	57,589	1
Bourbon	19,236	1
Boyd	51,150	1
Boyle	25,641	1
Bracken	7,766	0
Breathitt	15,703	1
Breckinridge	16,312	0
Bullitt	47,567	1
Butler	11,245	0
Caldwell	13,232	1
Calloway	30,735	1
Campbell	83,866	1
Carlisle	5,238	0
Carroll	9,292	1
Carter	24,340	1
Casey	14,211	1
Christian	68,941	3
Clark	29,496	2
Clay	21,746	1
Clinton	9,135	0
Crittenden	9,196	0
Cumberland	6,784	1
Daviess	87,189	1
Edmonson	10,357	0
Elliott	6,455	1
Estill	14,614	0
Fayette	225,366	7
Fleming	12,292	0
Floyd	43,586	1
Franklin	43,781	2
Fulton	8,271	0
Gallatin	5,393	0
Garrard	11,579	1
Grant	15,737	0

COUNTY	POPULATION	NUMBER OF SITES
Graves	33,550	1
Grayson	21,050	1
Green	10,371	0
Greenup	36,742	1
Hancock	7,864	0
Hardin	89,240	4
Harlan	36,574	1
Harrison	16,248	0
Hart	14,890	0
Henderson	43,044	1
Henry	12,823	1
Hickman	5,566	0
Hopkins	46,126	1
Jackson	11,955	0
Jefferson	664,937	9
Jessamine	30,508	1
Johnson	23,248	1
Kenton	142,031	6
Knott	17,906	0
Knox	29,676	1
Larue	11,679	1
Laurel	43,438	1
Lawrence	13,998	0
Lee	7,422	0
Leslie	13,642	0
Letcher	27,000	1
Lewis	13,029	1
Lincoln	20,045	1
Livingston	9,062	0
Logan	24,416	1
Lyon	6,624	0
McCracken	62,879	2
McCreary	15,603	0
McLean	9,628	0
Madison	57,508	1
Magoffin	13,077	0
Marion	16,499	0
Marshall	27,205	1
Martin	12,526	0
Mason	16,666	1
Meade	24,170	1

COUNTY	POPULATION	NUMBER OF SITES
Menifee	5,092	0
Mercer	19,148	0
Metcalfe	8,963	0
Monroe	11,401	0
Montgomery	19,561	1
Morgan	11,648	0
Muhlenberg	31,318	1
Nelson	29,710	1
Nicholas	6,725	0
Ohio	21,105	0
Oldham	33,263	1
Owen	9,035	0
Owsley	5,036	0
Pendelton	12,036	0
Perry	30,283	1
Pike	72,583	1
Powell	11,686	0
Pulaski	49,489	1
Robertson	2,124	0
Rockcastle	14,803	1
Rowan	20,353	1
Russell	14,716	1
Scott	23,867	2
Shelby	24,824	1
Simpson	15,145	1
Spencer	6,801	0
Taylor	21,146	0
Todd	10,940	0
Trigg	10,361	1
Trimble	6,090	0
Union	16,557	0
Warren	76,673	2
Washington	10,441	1
Wayne	17,468	0
Webster	13,955	1
Whitley	33,326	1
Wolfe	6,503	0
Woodford	19,955	1
TOTALS	3,685,278	100

APPENDIX B

SUMMARY OF DATA

LIST OF SURVEY LOCATIONS

1 Boyd, I64 at US 23
2 Christian,I24 at US 41A,Hopkinsville
3 Hardin, I65 at rest area, Sonora
4 Whitley, I 75 at US 25W, Corbin
5 Clark, I64 at KY 627, Winchester
6 Franklin, I64 at US 60, Frankfort
7 Laurel, I75 at KY 80, London
8 Montgomery, I64 at US 460, Mt. Sterling
9 Henry, I71 at KY 153, Sligo
10 Rockcastle, I75 at US 25, Mt. Vernon
11 Scott, I75 at rest area, Georgetown
12 Shelby, I64 at KY 53, Shelbyville
13 Woodford, I64 at KY 341, Midway
14 Trigg, I24 at US 68, Cadiz
15 Pike, US 460 at KY 122, Shelbiana
16 Daviess, US 60 at KY 144, Owensboro
17 Hardin, US 31W at BR US 31W, West Point
18 Greenup, US 23 at KY 7, South Shore
19 Harlan, US 421 at US 119, Harlan
20 Marshall, US 641 at KY 80, Hardin
21 Floyd, KY 80 at US 23, Allen
22 Bullitt, US 31E at KY 44, Mt. Washington
23 Carter, KY 1 at I64, Grayson
24 Letcher, US 119 at KY 15, Whitesburg
25 Mason, US 62 at KY 11, Maysville
26 Clay, US 421 at KY 80, Manchester
27 Bourbon,US68 at 5th St., Millersburg
28 Casey, US 127 at KY 70, Liberty
29 Meade, US 31W at KY 1638, Muldraugh
30 Lincoln, US127 at KY 78, Hustonville
31 Russell,US127 at KY80,Russell Sprgs.
32 Washington,US 150 at KY 55, Springfield
33 Scott, US 62 at I75, Georgetown
34 Cumberland, KY 90 at KY 61, Burkesville
35 Ballard, US 60 at KY 358, LaCenter
36 Fayette, KY 418 at I75, Lexington
37 McCracken, US 62 at US 68, Reidland
38 Madison, KY 52 at KY 876, Richmond
39 Bell, US 25E at US 119, Pineville
40 Graves, KY 339 at US 45, Wingo
41 Oldham, KY 146 at KY 393, Buckner
42 Muhlenberg, US 62 at KY 281, Greenville
43 Boyle, US 68 at US 150, Perryville
44 Jessamine, KY 29 at US 68, Wilmore
45 Grayson, US 62 at KY 259, Leitchfield
46 Allen, US 231 at US 31E, Scottsville
47 Bath, US 60 at KY 36, Owingsville
48 Larue, KY 84 at KY 61, Hodgenville
49 Johnson, US 460 at US 23, Paintsville
50 Logan, KY 103 at US 68, Auburn
51 Breathitt, KY 30 at KY 15, Jackson
52 Webster, US 41 at KY 56, Sebree
53 Garrard, KY 39 at US 27, Lancaster
54 Carroll, US 42 at 6th Street, Carrollton
55 Elliott, KY 32 at KY 7, Sandy Hook
56 McCracken, KY 1286 at US 62, Paducah
57 Lewis, KY 10 at KY 57, Tollesboro
58 Simpson, KY 73 at KY 100, Franklin
59 Kenton, I 275 at KY 17, Covington
60 Kenton, I 75 at KY 371, Crescent Springs
61 Fayette, I 75 at US 68, Lexington
62 Jefferson, I 64 at KY 1747, Louisville
63 Jefferson, I 65 at KY 1631, Louisville
64 Jefferson, I 264 at US 31E, Louisville
65 Jefferson, I 264 at US 42, Louisville
66 Jefferson, I 264 at US 60, Louisville
67 Fayette, I 75 at US 60, Lexington
68 Jefferson, I 265 at US 60, Louisville
69 Warren, I 65 at US 231, Bowling Green
70 Hardin, I 65 at US 62, Elizabethtown
71 Boone, I 71 at KY 14, Verona
72 Jefferson, US 31W at Gagel, Louisville
73 Jefferson, KY 1447 at Hubbards, Louisville
74 Jefferson, KY 1703 at Trevillian, Louisville
75 Fayette, US 27 at KY 1683, Lexington
76 Fayette, Reynolds at Lansdowne, Lexington
77 Fayette, KY 4 at KY 353, Lexington
78 Kenton, US 25 at KY 236, Covington
79 Kenton, KY 8 at KY 17, Covington
80 Kenton, KY 16 at KY 177, Covington
81 Fayette, US 25 at Fontaine, Lexington
82 Christian, US 41 at KY 1682, Hopkinsville
83 Campbell, US 27 at Carothers, Newport
84 Christian, US 41 at 9th, Hopkinsville
85 Hopkins, US 41A at KY 70, Madisonville
86 Pulaski, US 27 at KY 80, Somerset
87 Franklin, US 60 at Sunset, Frankfort
88 Henderson, US 41A at First St., Henderson
89 Nelson, US 31E at Beall, Bardstown
90 Barren, US 68 at Race St., Glasgow
91 Clark, US 60 at KY 1958, Winchester
92 Warren, US 31W at US 231, Bowling Green
93 Knox, US 25E at KY 11, Barbourville
94 Anderson, US 62 at US 127, Lawrenceburg
95 Rowan, US 60 at KY 32, Morehead
96 Hardin, Poplar at Sycamore, Elizabethtown
97 Kenton, KY 1072 at Highland, Covington
98 Caldwell, KY 139 at Jefferson, Princeton
99 Perry, KY 15X at KY 476, Hazard
100 Calloway, KY 121 at US 641B, Murray

TABLE B-1. SUMMARY OF DATA

LOCATION NUMBER	ALL FRONT SEAT OCCUPANTS				CATEGORY					
					DRIVERS		FRONT SEAT PASSENGERS		UNDER FOUR (FRONT AND REAR)	
	SAMPLE	USAGE	RELATIVE ERROR*	CONFIDENCE INTERVAL*	SAMPLE	USAGE	SAMPLE	USAGE	SAMPLE	USAGE
1	816	62	5.4	3.3	600	59	216	68	20	75
2	790	63	5.4	3.4	609	65	181	55	18	89
3	568	70	5.3	3.8	379	69	189	74	19	68
4	1209	58	4.8	2.8	942	57	267	61	21	76
5	581	63	6.2	3.9	456	62	125	67	9	100
6	886	70	4.4	3.0	696	69	190	70	17	76
7	1029	70	4.0	2.8	776	72	253	63	20	85
8	952	58	5.4	3.1	720	59	232	54	33	91
9	538	54	7.7	4.2	402	52	136	62	14	93
10	717	77	4.0	3.1	541	79	176	72	15	100
11	576	74	4.9	3.6	350	73	226	74	20	90
12	527	60	7.0	4.2	420	61	107	55	9	89
13	495	62	6.8	4.3	381	61	114	66	10	70
14	525	69	5.7	4.0	385	69	140	69	21	86
15	1217	52	5.4	2.8	945	53	272	48	20	85
16	1887	55	4.0	2.2	1522	54	365	60	41	78
17	1908	63	3.5	2.2	1512	62	396	65	23	83
18	1211	50	5.7	2.8	870	50	341	48	41	73
19	1471	45	5.7	2.5	1054	44	417	46	40	60
20	1087	57	5.2	2.9	816	56	271	57	13	85
21	1149	60	4.8	2.8	879	62	270	53	13	85
22	759	56	6.3	3.5	588	54	171	63	23	78
23	1651	49	4.9	2.4	1204	48	447	53	36	78
24	1402	52	5.0	2.6	1050	53	352	51	32	84
25	2108	50	4.3	2.1	1564	49	544	50	66	73
26	1558	38	6.4	2.4	1103	38	455	37	33	70
27	1167	54	5.3	2.9	974	55	193	49	21	57
28	1122	39	7.4	2.9	830	38	292	40	25	68
29	2090	58	3.6	2.1	1631	57	459	61	31	81
30	634	41	9.3	3.8	463	40	171	43	6	83
31	1155	49	5.9	2.9	873	48	282	53	18	89
32	1192	44	6.4	2.8	958	43	234	49	21	67
33	1125	58	5.0	2.9	897	56	228	64	13	92

TABLE B-1. SUMMARY OF DATA (continued)

LOCATION NUMBER	ALL FRONT SEAT OCCUPANTS				CATEGORY					
					DRIVERS		FRONT SEAT PASSENGERS		UNDER FOUR (FRONT AND REAR)	
	SAMPLE	USAGE	RELATIVE ERROR*	CONFIDENCE INTERVAL*	SAMPLE	USAGE	SAMPLE	USAGE	SAMPLE	USAGE
34	1177	32	8.3	2.7	846	30	331	37	20	60
35	1377	45	5.9	2.6	1071	45	306	42	15	60
36	1444	63	3.9	2.5	1092	63	352	66	7	86
37	1307	57	4.7	2.7	1020	56	287	61	25	76
38	1714	55	4.3	2.4	1464	55	250	55	19	84
39	1910	47	4.8	2.2	1591	46	319	50	45	69
40	629	41	9.4	3.8	455	41	174	40	19	63
41	1340	60	4.4	2.6	1057	60	283	57	49	88
42	2367	45	4.4	2.0	1823	46	544	43	49	71
43	672	45	8.4	3.8	511	44	161	46	20	75
44	706	57	6.4	3.6	511	57	195	57	39	82
45	1941	48	4.6	2.2	1483	48	458	48	51	82
46	893	46	7.1	3.3	695	46	198	46	23	91
47	1270	24	9.7	2.4	966	25	304	23	20	70
48	371	43	11.6	5.0	267	41	104	50	20	70
49	1491	50	5.1	2.5	1128	52	363	44	29	79
50	296	48	11.9	5.7	227	50	69	41	14	86
51	1328	48	5.6	2.7	1010	49	318	47	41	73
52	882	40	8.2	3.2	727	40	155	37	21	81
53	667	39	9.4	3.7	498	40	169	38	11	91
54	1512	41	6.1	2.5	1129	41	383	41	31	77
55	733	33	10.4	3.4	520	32	213	34	19	63
56	1036	58	5.1	3.0	801	56	235	66	38	82
57	557	26	14.0	3.6	423	25	134	29	28	61
58	446	35	12.5	4.4	343	35	103	36	14	86
59	1505	62	4.0	2.5	1186	62	319	61	60	75
60	1816	71	2.9	2.1	1540	72	276	66	56	88
61	1006	67	4.4	2.9	773	68	233	63	7	86
62	1770	65	3.4	2.2	1417	65	353	68	41	90
63	2225	58	3.6	2.1	1844	57	381	60	19	79
64	1783	62	3.6	2.3	1444	62	339	62	41	80
65	1524	70	3.3	2.3	1293	69	231	71	31	84
66	1254	67	3.9	2.6	948	67	306	65	30	83

TABLE B-1. SUMMARY OF DATA (continued)

LOCATION NUMBER	ALL FRONT SEAT OCCUPANTS				CATEGORY					
					DRIVERS		FRONT SEAT PASSENGERS		UNDER FOUR (FRONT AND REAR)	
	SAMPLE	USAGE	RELATIVE ERROR*	CONFIDENCE INTERVAL*	SAMPLE	USAGE	SAMPLE	USAGE	SAMPLE	USAGE
67	1091	66	4.3	2.8	776	64	315	69	29	83
68	1307	69	3.6	2.5	1092	69	215	66	51	92
69	1127	59	4.9	2.9	842	58	285	60	28	89
70	1249	60	4.5	2.7	910	60	339	62	19	84
71	259	63	9.4	5.9	185	60	74	69	10	90
72	2463	52	3.8	2.0	1973	53	490	50	79	87
73	1948	68	3.1	2.1	1612	67	336	71	36	94
74	1838	66	3.3	2.2	1553	65	285	71	27	89
75	2964	68	2.5	1.7	2309	67	655	71	119	93
76	1125	64	4.4	2.8	935	63	190	68	46	85
77	2023	55	4.0	2.2	1612	55	411	55	45	71
78	2026	54	4.1	2.2	1700	52	326	62	71	83
79	1663	49	4.9	2.4	1266	48	397	54	30	67
80	1928	42	5.3	2.2	1447	43	481	40	81	72
81	2069	66	3.1	2.0	1670	65	399	70	27	85
82	1113	52	5.6	2.9	849	52	264	53	12	58
83	1632	45	5.3	2.4	1332	46	300	40	45	89
84	1982	55	4.0	2.2	1631	56	351	51	52	92
85	2230	58	3.6	2.0	1802	58	428	55	50	96
86	2337	48	4.2	2.0	1854	47	483	52	51	76
87	2107	56	3.8	2.1	1673	57	434	52	51	88
88	1928	55	4.0	2.2	1558	55	370	55	29	93
89	2155	46	4.6	2.1	1674	45	481	50	59	92
90	1383	47	5.6	2.6	1157	47	226	46	28	79
91	1536	51	4.9	2.5	1145	51	391	50	42	79
92	2853	56	3.3	1.8	2170	55	683	59	93	83
93	1899	51	4.4	2.2	1514	51	385	51	31	58
94	1298	46	5.9	2.7	1041	45	257	49	13	77
95	1243	51	5.4	2.8	928	51	315	53	39	62
96	1701	59	4.0	2.3	1282	58	419	61	63	76
97	1315	62	4.3	2.6	1034	62	281	60	55	96
98	1687	50	4.8	2.4	1325	50	362	50	32	91
99	2279	50	4.1	2.1	1739	52	540	44	38	89
100	2417	48	4.1	2.0	1900	49	517	47	29	79

* 0.95 probability or confidence

APPENDIX C

SAFETY BELT AND SAFETY SEAT CITATION AND DISPOSITION DATA

TABLE C-1. SAFETY BELT AND SAFETY SEAT CITATION AND DISPOSITION DATA

	SEAT BELT CITATION			SAFETY SEAT CITATION		
COUNTY	TOTAL	CONVICTION*	PERCENT CONVICTION	TOTAL	CONVICTION*	PERCENT CONVICTION
Adair	353	189	54	38	7	18
Allen	82	56	68	37	33	89
Anderson	234	203	87	7	5	71
Ballard	44	25	57	6	4	67
Barren	299	189	63	35	17	49
Bath	64	24	38	5	3	60
Bell	740	428	58	65	41	63
Boone	371	245	66	51	36	71
Bourbon	180	110	61	15	14	93
Boyd	276	208	75	17	9	53
Boyle	177	148	84	11	8	73
Bracken	66	58	88	2	2	100
Breathitt	256	199	78	24	19	79
Breckinridge	130	94	72	2	2	100
Bullitt	680	305	45	42	30	71
Butler	115	106	92	7	6	86
Caldwell	64	53	83	41	21	51
Calloway	200	176	88	18	17	94
Campbell	655	564	86	54	46	85
Carlisle	19	12	63	1	1	100
Carroll	310	228	74	29	18	62
Carter	296	213	72	14	10	71
Casey	183	145	79	9	4	44
Christian	724	446	62	95	54	57
Clark	291	201	69	20	15	75
Clay	345	205	59	29	25	86
Clinton	120	25	21	4	1	25
Crittenden	9	8	89	3	2	67
Cumberland	41	5	12	3	0	0
Daviess	913	708	78	59	36	61
Edmonson	27	12	44	5	4	80

TABLE C-1. SAFETY BELT AND SAFETY SEAT CITATION AND DISPOSITION DATA (continued)

	SEAT BELT CITATION			SAFETY SEAT CITATION		
COUNTY	TOTAL	CONVICTION*	PERCENT CONVICTION	TOTAL	CONVICTION*	PERCENT CONVICTION
Elliott	84	52	62	9	6	67
Estill	275	222	81	31	12	39
Fayette	4,491	4259	95	158	134	85
Fleming	47	39	83	7	6	86
Floyd	1,521	506	33	126	53	42
Franklin	1,057	845	80	99	71	72
Fulton	34	25	74	19	16	84
Gallatin	88	56	64	1	1	100
Garrard	119	79	66	15	13	87
Grant	296	247	83	22	20	91
Graves	241	208	86	11	11	100
Grayson	108	95	88	16	16	100
Green	50	40	80	2	2	100
Greenup	168	121	72	23	20	87
Hancock	79	55	70	7	6	86
Hardin	511	277	54	82	68	83
Harlan	958	91	9	139	8	6
Harrison	363	324	89	29	29	100
Hart	151	126	83	8	8	100
Henderson	701	502	72	34	17	50
Henry	513	452	88	31	24	77
Hickman	30	29	97	2	2	100
Hopkins	327	151	46	76	63	83
Jackson	280	198	71	44	32	73
Jefferson	2,308	760	33	182	86	47
Jessamine	251	199	79	15	13	87
Johnson	417	78	19	16	8	50
Kenton	751	566	75	39	33	85
Knott	465	12	3	56	7	13
Knox	1,117	919	82	89	74	83
Larue	69	62	90	14	11	79
Laurel	1,228	901	73	110	72	65

TABLE C-1. SAFETY BELT AND SAFETY SEAT CITATION AND DISPOSITION DATA (continued)

	SEAT BELT CITATION			SAFETY SEAT CITATION		
COUNTY	TOTAL	CONVICTION*	PERCENT CONVICTION	TOTAL	CONVICTION*	PERCENT CONVICTION
Lawrence	295	85	29	29	20	69
Lee	69	34	49	7	4	57
Leslie	425	267	63	25	16	64
Letcher	409	170	42	40	20	50
Lewis	62	54	87	6	5	83
Lincoln	126	92	73	10	6	60
Livingston	145	103	71	7	5	71
Logan	167	144	86	16	13	81
Lyon	303	231	76	20	9	45
McCracken	431	335	78	77	62	81
McCreary	375	215	57	67	32	48
McLean	117	26	22	10	1	10
Madison	636	407	64	29	26	90
Magoffin	362	54	15	6	1	17
Marion	385	293	76	15	12	80
Marshall	805	677	84	24	18	67
Martin	197	22	11	17	3	18
Mason	88	70	80	6	2	33
Meade	196	114	58	17	13	76
Menifee	26	9	35	5	2	40
Mercer	233	208	89	22	18	82
Metcalfe	321	156	49	27	14	52
Monroe	58	5	9	5	1	20
Montgomery	161	91	57	16	5	31
Morgan	213	114	54	35	9	26
Muhlenberg	455	65	14	36	0	0
Nelson	246	192	78	17	15	88
Nicholas	112	97	87	4	3	75
Ohio	210	171	81	14	10	71
Oldham	394	302	77	12	8	67
Owen	48	44	92	5	4	80

TABLE C-1. SAFETY BELT AND SAFETY SEAT CITATION AND DISPOSITION DATA (continued)

	SEAT BELT CITATION			SAFETY SEAT CITATION		
COUNTY	TOTAL	CONVICTION*	PERCENT CONVICTION	TOTAL	CONVICTION*	PERCENT CONVICTION
Owsley	32	20	63	3	2	67
Pendleton	133	118	89	8	7	88
Perry	672	462	69	87	59	68
Pike	1,618	730	45	224	159	71
Powell	103	69	67	5	4	80
Pulaski	442	246	56	44	29	66
Robertson	30	29	97	1	1	100
Rockcastle	371	118	32	14	6	43
Rowan	326	247	76	26	10	38
Russell	237	70	30	30	12	40
Scott	183	156	85	20	15	75
Shelby	356	295	83	46	45	98
Simpson	76	55	72	14	11	79
Spencer	154	147	95	7	7	100
Taylor	351	266	76	12	11	92
Todd	62	52	84	5	5	100
Trigg	134	96	72	11	9	82
Trimble	67	56	84	7	7	100
Union	167	149	89	14	13	93
Warren	835	227	27	122	26	21
Washington	284	227	80	6	3	50
Wayne	66	11	17	4	1	25
Webster	62	48	77	15	12	80
Whitley	312	211	68	22	16	73
Wolfe	78	60	77	5	5	100
Woodford	219	194	89	21	15	71
Statewide	42,802	27,290	64	3,659	2,279	62

* The dispositions used by AOC to define a conviction (prepaid, guilty, dismissed, and merged) were summarized to determine the percent conviction.