

1. Report No.		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle 1984 Safety Belt and Child Safety Seat Usage Rates in Kentucky and Evaluation of a Public Information Campaign				5. Report Date September 1984	
				6. Performing Organization Code	
7. Author(s) K. R. Agent and J. M. Salsman				8. Performing Organization Report No. UKTRP-84-27	
9. Performing Organization Name and Address Kentucky Transportation Research Program College of Engineering University of Kentucky Lexington, Kentucky 40506-0043				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No.	
12. Sponsoring Agency Name and Address Kentucky State Police 919 Versailles Road Frankfort, Kentucky 40601				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract <p>There were two objectives of the survey summarized in this report. One was to establish 1984 safety belt and child safety seat usage rates in Kentucky which were compared to 1983 and 1982 rates. The other was to evaluate the effectiveness of public information campaigns as a means of increasing safety belt and seat usage rates.</p> <p>Statewide usage rates in the 19 cities previously surveyed in 1982 and 1983 showed that both driver safety belt and child safety seat and belt usage rates had increased in 1984. The 1984 statewide usage rate of safety belts by drivers was 6.9 percent while the percentage of children in either a safety seat or belt was 30.3.</p> <p>An analysis found that the increase in driver safety belt rates in cities with public information campaigns was higher than the increase in control cities. When all cities were included in the analysis, the difference was statistically significant. While the increase in child safety seat and belt usage was higher in the target compared to control cities, the difference was not statistically significant.</p>					
17. Key Words Safety Belt Child Safety Seat Public Information				18. Distribution Statement	
19. Security Classif. (of this report)		20. Security Classif. (of this page)		21. No. of Pages	22. Price

Research Report
UKTRP-84-27

1984 SAFETY BELT AND CHILD SAFETY SEAT USAGE RATES IN KENTUCKY
AND
EVALUATION OF A PUBLIC INFORMATION CAMPAIGN

by

Kenneth R. Agent
Senior Transportation Research Engineer

and

J. Michael Salsman
Transportation Research Engineer

Kentucky Transportation Research Program
College of Engineering
University of Kentucky
Lexington, Kentucky

in cooperation with
Kentucky State Police
Commonwealth of Kentucky

The contents of this report reflect the views of the authors who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the University of Kentucky or the Kentucky State Police. This report does not constitute a standard, specification, or regulation.

September 1984

Table of Contents

	Page
Introduction.	1
Procedure	2
Data Collection Plan.	2
Data Collection Locations	3
Identification of Child Safety Seats.	3
Data Analysis	4
Results	4
Statewide Usage Rates	4
Effectiveness of Public Information Campaigns	5
General Summary of Survey	6
1984 Usage Rates.	6
Trends in Usage Rates by City	6
Summary by Type of Safety Seat.	7
Factors Affecting Usage	7
Summary and Conclusions	8
References.	9
Figures	10
Tables.	12

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. However, usage of these restraint systems has remained low. 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. Surveys were conducted before and after the law became effective (1, 2). These surveys revealed that the statewide usage of child safety seats increased from 14.4 percent in 1982 to 22.7 percent in 1983. These same surveys indicated a statewide driver safety belt usage rate of 5.8 percent in 1983 compared to 4.2 percent in 1982. The increase in usage of child safety seats may be attributed to both enactment of the mandatory usage law and to increased public information, which may have also contributed to the increase in safety belt usage.

In an effort to further increase the use of safety belts and seats, the Kentucky State Police included an Occupant Protection Public Information segment into the 1984 Highway Safety Plan. One county from each of the 16 state police posts was selected for trial public information campaigns. The counties were selected considering both their past usage rates as well as their accident and fatality rates.

The public information campaign was centered around a "Make It Click" program. First, students in kindergarten through fifth grade in selected schools in each county participated in a student/parent pledge contest. In that contest, the children were given pledge cards for their parents to sign and forms to record safety belt usage for a four-week period. In each school, children in the homeroom having the highest percent usage were awarded prizes (coupons to use at McDonalds' or Druther's restaurants). The object of the contest was to reach the adult population with a safety belt message, while also educating the young about the benefits of occupant restraints. Many parents place their children in safety seats but do not use safety belts themselves. The contest provided a reverse situation where children asked their parents to buckle-up so that their homeroom could win. The contest lasted four weeks in order to give parents and children an opportunity to form a habit of wearing safety belts. The second phase of the program involved organization of a "Click Club" in each county. A steering committee of community leaders was organized in each county to coordinate the campaign. An information kit containing ideas and examples of activities related to the public information campaign was furnished to each committee. This phase was designed to form a basis for continuing community education in which community leaders and motivators could work together. It also established a network through which service organizations could provide publicity through various events and projects.

There were two objectives of the survey summarized in this report. One was to establish 1984 safety belt and child safety seat usage rates in Kentucky to compare to 1982 and 1983 rates. The other was to evaluate the effectiveness of public information campaigns as a means to increase safety belt and seat usage rates.

PROCEDURE

DATA COLLECTION PLAN

The data collection plan used in the two previous surveys (1, 2) was used in this study. The data collection form is shown in Figure 1. The procedure involved collecting data by observations only. This allowed all data to be collected quickly by one person.

An explanation of information collected is given in Figure 2. The data sheet was divided into three sections. General information (Section 1) described when and where data were collected. The section pertaining to cars containing children under four years of age (Section 2) included basic information concerning type of safety seat used and, when used, the brand and whether it was used properly. Information also was obtained for the driver of any vehicle containing a child under four years of age. That information consisted of the driver's age category, sex, and safety belt usage. Section 3 of the data sheet contained similar information for drivers of other vehicles.

Child safety seat usage was obtained only for children under four years of age. Kentucky's law requires the use of child safety seats for children 40 inches in height or less. Since no interviews were conducted, a judgment concerning age or height had to be made, and the decision was made to use four years of age as the cutoff. Using this procedure, it would also be possible to relate the survey results to traffic accident data which report age of occupant. Children were further classified as being less than one year old or from one through three years old. In this report, children less than one year of age will be referred to as "infants", and children from one through three years of age will be termed "toddlers".

This was the third year of data collection for most cities, and each year's data has been collected at the same sites in each city. Sites were located either at traffic signals or four-way stops. Some general instructions were followed during data collection. Manuals providing suggestions for data collection procedures were reviewed when developing the data collection plan. A summary of some of the major instructions follows:

1. Data will be collected by observation.
2. Data will be taken at intersections having either a traffic signal or four-way stop control. Observers will stand on the curb or at the edge of the roadway and observe stopped cars. Data also may be included for cars as they begin moving through a signalized intersection if the car is moving slowly enough to allow accurate observations. Only passenger cars and station wagons are to be included. Kentucky's law only addresses passenger vehicles, and specifically excludes recreational vehicles and trucks of more than one ton.
3. All data should be collected during daylight hours at various times throughout the day.
4. Priority will be given to any car containing a child under four years old. Driver safety belt information for other cars will be collected when time permits.

5. Observers shall use their best judgment in estimating age. However, they shall not guess on child safety seat usage. When the type of safety seat cannot be determined, it should be left blank.

6. Proper or improper usage, along with the reason for improper usage, should be determined whenever possible, even when the type of child safety seat cannot be determined. (Note: The reasons for improper usage were those that could be identified quickly by observation. Such errors as improper routing of the belt through the seat could not be identified in most cases).

DATA COLLECTION LOCATIONS

Data were collected in 27 cities. This included the 19 cities used to estimate "statewide" usage in the two previous surveys. The "statewide" survey cities and the child safety seat survey size in each city are given in Table 1. The sample had to be distributed across the state and be representative of a range of populations to account for social and economic factors. The sample distribution was based on county population categories. From the 1980 census, the number of children under five years of age in each county was used to distribute the sample. This was the youngest age category available in census data. The sample size was determined so that the relative error of the observed proportion (percent using child safety seats) would be within acceptable bounds for a given probability (3). This resulted in a statewide sample size of 5,000 for child safety seats. The sample of drivers safety belt usage was much higher.

In addition to the cities listed in Table 1, data were collected in other cities included in the public information campaign. Data were collected in one city in each of the 16 counties having a campaign. Of the 19 cities included in the statewide survey analysis, eight were in counties receiving a public information campaign. In addition to the 19 cities for which data had to be collected to establish statewide usage rates, data were collected in eight other cities giving a total of 27 cities. Surveys were conducted in those eight cities in 1983 to establish "before" rates.

IDENTIFICATION OF CHILD SAFETY SEATS

A list of various child safety seats examined while preparing for the survey is presented in Table 2. The manufacturer and seat name are shown as well as a description of the type of protection afforded and the age range for which the restraint is to be used. Usage requirements for each safety seat had to be known in order to determine whether the seat was used properly. For example, when a tether was required but not used, the safety seat would be classified as improperly used. As part of the training process, a notebook containing photographs and literature describing the various seats was prepared. That notebook was used for review before and during the data collection process.

DATA ANALYSIS

The child safety seat data were entered into a computer file. That allowed summaries and cross-tabulations to be performed rapidly for any of the recorded data. Safety belt usage data for drivers of vehicles not containing children under four years of age were summarized manually.

Statewide usage rates for drivers wearing safety belts and for children under four in either a safety seat or belt were determined. To calculate these statewide rates, the percentage of the state population in various population categories was used. Data were obtained in cities having a wide range in population; this procedure allowed the effect of population on usage rates to be taken into account.

The effectiveness of the public information campaigns was evaluated by comparing changes in safety belt and child safety seat usage in cities having campaigns to changes in "control" cities. For driver safety belt usage, three sets of comparisons were made with stratifications based on city population. For child safety seat and belt usage, the control and target cities were each grouped into one category.

The 1984 usage rates for each city were tabulated as well as the change in usage compared to that found in the 1982 and 1983 surveys. The usage determined for the various types of child safety seats was summarized along with the reasons for and extent of improper usage for the various seats. Also, various factors affecting child safety seat and driver safety belt usage were analyzed.

RESULTS

STATEWIDE USAGE RATES

Statewide usage rates determined for the 1984 survey for child safety seats and driver safety belt usage are given in Tables 3 and 4, respectively. The rates were calculated using data from the 19 cities previously surveyed in 1982 and 1983. The statewide percentage was derived using the percentage of the state population in the respective population categories.

Statewide, the 1984 survey indicated that 27.3 percent of children under four years of age were in child safety seats. That percentage was 14.4 percent in 1982 before implementation of the child restraint law and 22.7 percent in 1983. The percentage of children in either a safety seat or belt was 30.3 percent in 1984, up from 15.4 percent in 1982 and 24.2 percent in 1983.

For a sample size of 5,000, a probability of 0.95, and a proportion of 27.3 percent, a bound on the relative error of the proportion was calculated to be 4.5 percent (3). This means there is an absolute error of 1.2 percent; therefore, the confidence limits of statewide child safety usage in 1984 were 26.1 to 28.5 percent. Using the same procedure, the confidence limits of the usage of either a safety seat or belt were 29.0 to 31.6 percent.

The percentage of child safety seats properly used was 56 percent. This compares to 44 percent in 1982 and 50 percent in 1983.

Statewide, the 1984 survey indicated that 6.9 percent of drivers were using a safety belt. The percentage has increased from 4.2 percent in 1982 and 5.8 percent in 1983. For a sample size of 50,240, a probability of 0.95, and a proportion of 6.9 percent, the bound on relative error of the proportion is 3.2 percent (3). This yields an absolute error of 0.2 percent; therefore, the confidence limits of statewide driver safety belt usage were 6.7 to 7.1 percent.

EFFECTIVENESS OF PUBLIC INFORMATION CAMPAIGNS

As previously noted, public information campaigns were implemented in one county in each of the 16 state police posts. Data were obtained in a city in each of those counties as shown in Tables 5 and 6. These tables include driver safety belt usage rates and child safety seat and safety belt usage, respectively, for 1983 and 1984. The percentage change in usage for each city along with the statistical significance of the changes also are tabulated (4). It should be noted that the majority of cities (14 out of 16) had a statistically significant increase in driver safety belt usage. Six of the cities had a statistically significant increase in child safety seat and safety belt usage, while one (Bowling Green) had a significant decrease. No reason could be found to explain this decrease in usage in Bowling Green.

To assess the effectiveness of the public information campaign on safety seat and safety belt usage, it is necessary to compare the increase in usage for the targeted cities to the increase for a group of control cities. Results of the statistical comparison are summarized in Tables 7 and 8. For the analysis of driver safety belt usage (Table 7), the cities were divided into three population categories. For each city, the percentage change in usage from 1983 to 1984 is tabulated. Also, the percentage change in usage by population category is included. In addition, the child safety seat and safety belt usage rates were compared (Table 8). Due to the small sample that would result if the cities were stratified, control and target cities were each grouped into one large category. Using data given in Tables 7 and 8, the statistical significance of the changes in usage for targeted cities versus control cities were determined (4). Data from Louisville and Lexington were not included as control cities in either analysis since their populations differed greatly from any of the other cities.

Driver safety belt usage rates increased in each county population category from 1983 to 1984 (Table 7). However, the increase was higher in the targeted cities. The difference in the increase in usage in the target cities as compared to control cities was statistically significant for both of the two lowest population categories while it was not statistically significant in the highest population category. It appears the public information campaigns were most effective in lesser populated areas where the usage rates were lower initially and the public campaign may have impacted a greater percentage of the population. When all population categories were combined, the increase in usage in the targeted

cities (45 percent) was statistically higher than that in the control cities (19 percent).

As shown in Table 8, there was an increase in child safety seat and belt usage in both target and control cities. While the increase was higher in target cities (23 percent) compared to control cities (18 percent), the percentage difference was not statistically significant.

GENERAL SUMMARY OF SURVEY

Following is a summary of data by city and by type of safety seat as well as an analysis of factors affecting usage.

1984 Usage Rates

Safety belt usage rates of drivers, by city, as determined from the 1984 survey are given in Table 9. The total sample size for 27 cities was 76,577. As noted in previous surveys, usage was greater in the larger cities. Usage rates varied from 13.1 percent in Louisville to 2.4 percent in Princeton.

Usage of child safety seats and safety belts (children under four year of age), by city, as determined from the 1984 survey is given in Table 10. There were a total of 7,034 children included in the survey of the 27 cities. As with driver safety belt usage rates, these rates were higher in the larger cities. The "percent using any restraint" varied from 50.0 percent in Lexington to 9.0 percent in Hazard.

Another 358 children (5.1 percent) were in a vehicle having a child safety seat that was not in use. Many children who were not in a safety seat or belt were in especially dangerous positions. A total of 1,354 children (19.2 percent) were observed to be standing in the seat and the percentage of children observed sitting on adults' laps was 14.8.

Trends in Usage Rates by City

The change in the usage of safety belts by drivers in the survey cities is summarized in Table 11. In 17 of the 19 cities for which data were collected in 1982, the usage rate was higher in 1984.

The change in usage of child safety seats or belts by children under four years of age in the survey cities is shown in Table 12. In all 19 cities for which data were obtained in 1982, the usage rate was higher in 1984 than that found in 1982.

Data in Tables 11 and 12 illustrate the increasing trend in usage of safety belts and child safety seats. This has been the result of both the child safety seat law and increased public information.

Summary by Type of Safety Seat

Usage of various types of child safety seats is summarized in Table 13. For each safety seat, the number observed as well as the percentage properly used are listed. Data are presented for all children, infants only, and toddlers only. Observers were trained to identify specific seats and their proper usage. The seat used was identified 97 percent of the time.

The Questor Kantwet One-Step was the single most frequently noted safety seat of all models observed. Questor Kantwet also had the highest number of safety seats noted of any single manufacturer. The second most commonly observed seat was the Strolee Wee Care. In previous surveys, the Strolee seat had been the most commonly observed. Other commonly observed seats which are distributed by Questor Kantwet included the Dyn-O-Mite infant seat and the Bobby-Mac Champion and Deluxe II. Seats distributed by Cosco/Peterson and Century were also observed frequently. The most common Century model was the Century 100 and the most common Cosco/Peterson model was the Safe-T-Seat. Several other seats, as noted in Table 13, were observed frequently.

Proper usage varied substantially for the various safety seats. Of the most common safety seats, the Strolee had the lowest proper-usage percentage. This is related to the requirement to use a tether in the toddler position. The Bobby-Mac also had a low proper-usage percentage. Proper-usage percentages for the other major manufacturers were similar. The major reasons for improper usage are summarized in Table 14. Considering all children, as well as toddlers, the major problem was failure to harness the child into the seat. For infants, the major problem was facing the infant forward rather than in the required backward position. Another major problem for toddlers was failure to use the tether.

The most frequent improper usages for common child safety seats are given in Table 15. The highest percentages were for failure to harness the child in the "old type" seat, failure to use a tether with the Strolee seat, failure to use a shield with the Bobby-Mac seat, and facing an infant forward in several different seats.

As given in Table 3, the proper usage percentage in 1984 was 56 percent which was higher than that found in 1982 and 1983. This increase was probably related to the decreased use of seats which have low proper-usage percentages.

Factors Affecting Usage

Several other factors, shown in Table 16, were noted as being related to child safety seat usage. Those relationships were very similar to those observed in previous surveys. There was a large reduction in usage when there were more than two small children in a car. Usage was especially related to age of the child, with the usage rate for infants about twice that for toddlers. Usage was also much higher for children in the rear seat when compared to children in the front seat. Driver age and

sex were also related, with usage higher when a female was driving and lower when an older person was driving.

Usage also was much higher for children when the driver was wearing a safety belt. In addition to the 66 percent of the children in a safety seat, another 21 percent were wearing a safety belt. Almost all children (87 percent) riding in a vehicle in which the driver was wearing a safety belt were also either in a safety seat or belt.

Driver age and sex were related to safety belt usage (Table 17). Usage was slightly higher for drivers in the middle-age category (31 to 50 years of age) and was slightly higher for females.

SUMMARY AND CONCLUSIONS

Statewide usage rates in the 19 cities previously surveyed in 1982 and 1983 showed that both driver safety belt and child safety seat and belt rates had increased in 1984. The statewide usage rate of safety belts by drivers was 6.9 percent in 1984 compared to 5.8 percent in 1983 and 4.2 percent in 1982. The percentage of children in either a safety seat or belt was 30.3 percent in 1984 compared to 24.2 percent in 1983 and 15.4 percent in 1982. This percentage could be increased if the existing law was modified as recommended in a previous report (2).

The increase in driver safety belt rates in cities having public information campaigns was higher than the increase in control cities. When all population categories were combined, this difference was statistically significant. There was a 45 percent increase in driver safety belt usage rates in target cities compared to a 19 percent increase in control cities. While the increase in child safety seat and belt usage was higher in target cities (23 percent) compared to control cities (18 percent), the difference was not statistically significant.

The public information campaigns have been successful in increasing safety belt usage rates. Potential savings associated with increased safety belt usage is shown in Table 18. This table is based on Kentucky accident data and shows that an annual potential accident savings of slightly over 100 million dollars could be achieved if all drivers wore safety belts. For each percent increase in safety belt usage statewide, approximately one million dollars in traffic accident savings could be achieved annually.

REFERENCES

1. Agent, K. R.; and Crabtree, J. D.; "Child Restraint Usage in Kentucky (Pre-Legislation)", University of Kentucky, Transportation Research Program Report UKTRP-82-15, September 1982.
2. Agent, K. R.; "Child Safety Seat Usage in Kentucky after Enactment of a Mandatory Usage Law", University of Kentucky, Transportation Research Program Report UKTRP-83-18, September 1983.
3. Elementary Sampling for Traffic Engineers, Engineering Foundation for Highway Traffic Control, 1962.
4. Natrello, M. G.; Experimental Statistics, National Bureau of Standards Handbook 91, United States Department of Commerce, August 1, 1963.

Occupant Restraint Survey

Date _____ Time _____ City _____ Location _____

Comments _____

Cars with Children under 4

No. Ch.	Age		Restraint				Child Restraint			Position					Driver											
	<1	1-3	N	B	H	CR	Type	P	I	Reason	F	R	C	S	L	O	N	B	H	M	F	Y	M	O		

Cars with No Children Under 4

Driver 16-30			
	None	Belt	Harness
M			
A			
L			
E			
F			
E			
M			
A			
L			
E			

Driver 31-50			
	None	Belt	Harness
M			
A			
L			
E			
F			
E			
M			
A			
L			
E			

Driver 51 or more			
	None	Belt	Harness
M			
A			
L			
E			
F			
E			
M			
A			
L			
E			

Figure 1. Survey Data Collection Form

Figure 2. Data Collection Coding Instructions.*

1. General Information

DATE --Date of Data Collection
TIME --Time Data Sheet Started
CITY --City Where Data Collected
LOCATION --Intersection Where Data Collected
COMMENTS --Relevant Comments Concerning Data

2. Data for Cars Containing Children under Four:

NO. CH. --Number of Children under Four in Vehicle
Record Once for Each Vehicle
AGE --Check Best Estimate of Child's Age
RESTRAINT --Check Appropriate Code
N -- None
B -- Belt Only
H -- Harness and Belt
CR -- Child Restraint (Safety Seat)
CHILD SAFETY SEAT
TYPE -- Brand and Model (e.g., Kantwet One-Step)
P-I -- Check Whether Properly (P) or
Improperly (I) Used
REASON -- If Improperly Used, Give Explanation
(e.g., Not Tethered)
POSITION -- Check One in Two Categories
1. F - Front Seat
R - Rear Seat
C - Cargo Area
Do Not Check Following Category if Child
Restraint Used
2. S - Seated in a Normal Manner
L - Held in Lap
O - Other (e.g., Standing or Sitting on
Front Edge of Seat)
DRIVER -- Check One in Three Categories
1. N - No Restraint
B - Belt only
H - Harness and Belt
2. M - Male
F - Female
3. Y - Young (16 - 30 Years)
M - Middle (31-50 Years)
O - Older (51 or More)

3. Data for Drivers of Other Vehicles

For Each Driver, Determine Restraint Usage and Place a
Mark in the Appropriate Age and Sex Category.
Put Maximum of Ten Marks in a Given Space.

* When data have been recorded for ten children or when
fifty drivers are recorded in any single category, it
will be necessary to start a new sheet.

TABLE 1. DISTRIBUTION OF SAMPLE USED TO ESTIMATE "STATEWIDE"
USAGE OF CHILD SAFETY SEATS

COUNTY POPULATION CATEGORY (NUMBER OF CHILDREN UNDER FIVE YEARS OLD)	PERCENTAGE OF STATEWIDE TOTAL	SAMPLE SIZE	SURVEY COUNTIES	SURVEY CITIES
10,000 or more	26.6	1,330	Fayette Jefferson Kenton	Lexington Louisville Covington
5,000-9,999	14.0	700	Campbell Christian Hardin	Newport Hopkinsville Elizabethtown
2,500-4,999	23.3	1,165	Franklin Henderson Hopkins Perry Pulaski	Frankfort Henderson Madisonville Hazard Somerset
1,000-2,499	26.0	1,300	Barren Clark Mason Nelson Rowan	Glasgow Winchester Maysville Bardstown Morehead
Under 1,000	10.1	505	Anderson Caldwell Carroll	Lawrenceburg Princeton Carrollton

TABLE 2. LISTING OF AVAILABLE CHILD SAFETY SEATS*

MANUFACTURER	MODEL	DESCRIPTION
Cosco/Peterson	Safe-T-Shield	Convertible; three-point harness for infants; shield only for toddlers
	Safe-T-Seat	Convertible; five-point harness
	Safe and Easy	Convertible; five-point harness
	Safe and Snug	Convertible; combination shield and harness system
	Safe-T-Mate	Convertible; combination shield and harness system
	First Ride	Infants only; Y-harness
	Travel Hi-Lo	Children to 65 lbs; lap and shoulder belt in front seat, belt and tethered body harness in rear
	Deluxe Travel Hi-Lo	Children to 65 lbs; backrest and three-point harness
Century	Century 100	Convertible; five-point harness
	Century 200	Convertible; combination shield and harness system
	Century 300	Convertible; five-point harness with armrest
	Infant Love Seat	Infants only; Y-harness
	Child Love Seat	Toddlers only; five-point harness, tether required
	Safe-T-Rider	Toddlers and children to 10 years; lap and shoulder belt in front seat, lap belt and tethered body harness in rear seat
	Trav-1-guard	Convertible; five-point harness with armrest
Strolee	Wee Care 599	Convertible; five-point harness with armrest; tether required
	Wee Care 612	Convertible; five-point harness with armrest
	Wee Care 618	Convertible; five-point harness
	Wee Care Booster Seat	Children to 70 lbs; auto lap and shoulder belt in front seat, auto lap belt with tethered harness in rear seat
Questor Kantwet	Dyn-O-Mite	Infants only; Y-harness
	One-Step	Convertible; combination shield and harness system
	Care Seat	Convertible; five-point harness
	Safe Guard	Toddlers only; five-point harness
	Britax Handicapped	Toddlers and children; five-point harness
	Bobby Mac Champion	Convertible; five-point harness for infant, add shield for toddler
	Bobby Mac Deluxe II	Convertible; three-point harness for infant, add swing-down shield for toddler
	Bobby Mac Super	Convertible; five-point harness, tether required
	Bobby Mac Wings	Toddler and children; full shield

*Convertible restraints can be used by infants and toddlers, infants in a rear-facing position and toddlers in a forward-facing position. Tethers, where required, are for toddler position only.

TABLE 2. LISTINGS OF AVAILABLE CHILD SAFETY SEATS* (Continued)

MANUFACTURER	MODEL	DESCRIPTION
International	Astroseat (9300A)	Convertible; five-point harness with armrest
	Astroseat (9100A) Astrorider	Convertible; five-point harness Children to 55 lbs; used with adult three-point belt system or adult lap belt with harness
Kolcraft	Hi-Rider	Convertible; five-point harness, optional shield
	Hi-Rider XL	Convertible; five-point harness with armrest
	Quikstep	Convertible; combination shield and harness system
	Tot-Rider	Toddlers and children to 10 yrs; lap and shoulder belt in front seat, lap belt and tethered body harness in rear
	Tot-Rider XL	Toddlers and children to 10 yrs; lap and shoulder belt in front seat, harness system in rear
	Tot-Rider Quikstep Redi-Rider (17430) Redi-Rider (19530)	Toddlers and children; full shield Convertible; five-point harness Convertible; combination shield and harness system
Ford	Tot Guard	Toddlers only; shield only
	Infant Carrier	Infants only; three-point harness
General Motors	Infant Love Seat	Infants only; Y-harness
	Child Love Seat	Toddlers only; five-point harness, tether required
Welsh	Travel Tot	Convertible five-point harness with shield
Collier-Keyworth	Safe and Sound	Convertible; combination shield and harness system
	Roundtripper	Convertible; combination shield and harness system
	Co-Pilot	Toddlers and children; full protective shield
Pride Trimble	Pride Ride (820)	Convertible; five-point harness
	Pride Ride (830)	Convertible; five-point harness with armrest
Graco	Little Traveler (315)	Convertible; five-point harness with armrest
	Little Traveler (310)	Convertible; five-point harness
Nissan/Datsun	Nissan	Convertible; combination shield and harness system
Rupert	E-Z-On Vest	Toddlers and children; auto harness system, tether required

*Convertible restraints can be used by infants and toddlers, infants in a rear-facing position and toddlers in a forward-facing position. Tethers, where required, are for toddler position only.

TABLE 3. 1984 "STATEWIDE" CHILD SAFETY SEAT USAGE RATES

COUNTY POPULATION CATEGORY (NUMBER OF CHILDREN UNDER FIVE YEARS OLD)	SAMPLE SIZE	NUMBER USING CHILD SAFETY SEAT	PERCENT USING CHILD SAFETY SEAT	PERCENT OF CHILD SAFETY SEATS USED PROPERLY	NUMBER USING SAFETY BELT	PERCENT USING SAFETY BELT	PERCENT USING ANY RESTRAINT
10,000 or more	1,330	580	43.6	55	77	5.8	49.3
5,000-9,999	700	159	22.7	47	19	2.7	25.4
2,500-4,999	1,165	262	22.5	60	19	1.6	24.1
1,000-2,499	1,300	292	22.5	58	24	1.8	24.3
Under 1,000	505	74	14.7	54	10	2.0	16.6
All	5,000	1,367	27.3	56	149	3.0	30.3

TABLE 4. 1984 "STATEWIDE" DRIVER SAFETY BELT USAGE RATES

COUNTY POPULATION CATEGORY (NUMBER OF LICENSED DRIVERS)	NUMBER OF COUNTIES IN CATEGORY	PERCENTAGE OF STATEWIDE DRIVING POPULATION	SURVEY COUNTIES	SURVEY CITIES	SAMPLE SIZE	PERCENT DRIVERS USING SAFETY BELTS	OVERALL PERCENT USAGE CATEGORY
Over 75,000	3	30.0	Jefferson	Louisville	6,051	13.1	11.6
			Fayette	Lexington	6,525	9.8	
			Kenton	Covington	2,489	12.5	
30,001-75,000	9	17.0	Campbell	Newport	2,500	5.4	5.0
			Hardin	Elizabethtown	2,075	5.0	
			Christian	Hopkinsville	1,420	4.5	
20,001-30,000	13	14.6	Hopkins	Madisonville	1,796	4.8	5.9
			Henderson	Henderson	1,691	7.0	
			Franklin	Frankfort	4,305	7.4	
			Pulaski	Somerset	2,997	5.6	
			Barren	Glasgow	1,650	2.5	
10,001-20,000	32	20.0	Clark	Winchester	2,537	5.6	5.4
			Nelson	Bardstown	2,710	5.9	
			Perry	Hazard	1,476	4.2	
			Mason	Maysville	2,858	5.5	
Under 10,001	63	18.4	Rowan	Morehead	2,481	3.1	3.5
			Caldwell	Princeton	1,189	2.4	
			Anderson	Lawrenceburg	1,633	3.2	
			Carroll	Carrollton	1,857	5.2	

TABLE 5. DRIVER SAFETY BELT USAGE RATES
IN CITIES WITH PUBLICITY CAMPAIGNS

STATE POLICE POST	CITY	PERCENT OF DRIVERS USING A SAFETY BELT		PERCENT CHANGE	STATISTICALLY SIGNIFICANT*
		1983	1984		
1	Paducah	6.0	8.3	17	YES
2	Madisonville	2.8	4.8	71	YES
3	Bowling Green	5.3	6.6	25	YES
4	Bardstown	4.1	5.9	44	YES
5	La Grange	5.8	8.5	47	YES
6	Covington	9.3	12.5	34	YES
7	Winchester	2.9	5.6	93	YES
8	Maysville	3.3	5.5	67	YES
9	Pikeville	2.5	5.4	116	YES
10	Middlesboro	3.9	4.4	13	NO
11	Somerset	3.6	5.6	56	YES
12	Frankfort	7.1	7.4	4	NO
13	Hazard	2.7	4.2	56	YES
14	Grayson	1.2	2.6	117	YES
15	Lebanon	0.9	3.4	278	YES
16	Owensboro	4.1	7.1	73	YES

*Level of statistical significance of 0.95

TABLE 6. CHILD SAFETY SEAT AND SAFETY BELT USAGE RATES FOR CHILDREN
UNDER FOUR YEARS OLD IN CITIES WITH PUBLICITY CAMPAIGNS

STATE POLICE POST	CITY	PERCENT USING CHILD SAFETY SEAT OR SAFETY BELT		PERCENT CHANGE	STATISTICALLY SIGNIFICANT*
		1983	1984		
1	Paducah	29.2	40.1	37	YES
2	Madisonville	18.4	29.4	60	YES
3	Bowling Green	39.5	29.8	-25	YES
4	Bardstown	21.0	31.0	48	YES
5	La Grange	22.1	23.4	6	NO
6	Covington	38.6	49.1	27	YES
7	Winchester	13.9	33.4	140	YES
8	Maysville	18.2	17.1	-13	NO
9	Pikeville	22.3	21.0	-7	NO
10	Middlesboro	15.8	24.7	56	YES
11	Somerset	23.3	23.7	2	NO
12	Frankfort	25.9	30.0	16	NO
13	Hazard	9.5	9.0	-6	NO
14	Grayson	15.3	13.1	-17	NO
15	Lebanon	16.1	20.9	23	NO
16	Owensboro	24.4	30.6	20	NO

* Level of statistical significance of 0.95

TABLE 7. COMPARISON OF THE CHANGE IN SAFETY BELT USAGE FROM 1983 TO 1984
FOR TARGET VERSUS CONTROL CITIES

COUNTY POPULATION CATEGORY (NUMBER OF LICENSED DRIVERS)	CONTROL CITIES	PERCENT CHANGE	PERCENT CHANGE BY CATEGORY	TARGET CITIES	PERCENT CHANGE	AVERAGE PERCENT CHANGE BY CATEGORY	STATISTICALLY SIGNIFICANT DIFFERENCE (TARGET VERSUS CONTROL GROUP)*
20,001-75,000	Hopkinsville	50	22	Owensboro	73	27	NO
	Henderson	52		Covington	34		
	Newport	-16		Bowling Green	25		
				Paducah	17		
				Frankfort	4		
10,001-20,000	Elizabethtown	43	19	Madisonville	71	47	YES
	Glasgow	-11		Winchester	93		
				Middlesboro	13		
				Somerset	56		
Under 10,001	Morehead	-3	21	Maysville	67	76	YES
	Princeton	41		Lebanon	278		
	Lawrenceburg	39		Bardstown	44		
	Carrollton	6		Hazard	56		
				Pikeville	116		
				Grayson	117		
				LaGrange	47		
All			19			45	YES

*Level of statistical significance of 0.95

TABLE 8. COMPARISON OF THE CHANGE IN CHILD SAFETY SEAT AND SAFETY BELT USAGE FROM 1983 TO 1984 FOR TARGET VERSUS CONTROL CITIES

	1983 PERCENT USAGE	1984 PERCENT USAGE	PERCENT CHANGE	PERCENT DIFFERENCE	STATISTICALLY SIGNIFICANT DIFFERENCE (TARGET VERSUS CONTROL GROUP)*
CONTROL CITIES**	17.8	21.0	18	28	NO
TARGET CITIES	22.3	27.5	23		

*Level of statistical significance of 0.95

**All cities that did not have a public information campaign except Louisville and Lexington

TABLE 9. 1984 USAGE RATES OF SAFETY BELTS BY DRIVERS BY CITY

CITY	POPULATION	SAMPLE SIZE	NUMBER USING SAFETY BELT	PERCENT USING SAFETY BELT
Louisville	298,451	6,051	793	13.1
Lexington	204,165	6,521	640	9.8
Owensboro	54,450	2,204	156	7.1
Covington	49,013	2,484	310	12.5
Bowling Green	40,450	6,214	408	6.6
Paducah	29,758	1,990	165	8.3
Hopkinsville	27,318	1,420	64	4.5
Frankfort	25,973	4,305	317	7.4
Henderson	24,834	1,691	118	7.0
Newport	21,587	2,500	135	5.4
Madisonville	16,979	1,796	87	4.8
Elizabethtown	15,380	2,075	103	5.0
Winchester	15,216	2,537	143	5.6
Glasgow	12,958	1,650	42	2.5
Middlesboro	12,251	1,325	58	4.4
Somerset	10,649	2,997	167	5.6
Maysville	7,982	2,858	157	5.5
Morehead	7,789	2,481	76	3.1
Princeton	7,073	1,189	28	2.4
Lebanon	6,590	2,118	71	3.4
Bardstown	6,155	2,710	160	5.9
Hazard	5,429	1,476	62	4.2
Lawrenceburg	5,167	1,633	52	3.2
Pikeville	4,756	1,344	72	5.4
Carrollton	3,967	1,857	97	5.2
Grayson	3,423	1,458	38	2.6
LaGrange	2,971	1,617	137	8.5

TABLE 10. 1984 USAGE RATES, BY CITY, FOR CHILD SAFETY SEATS AND SAFETY BELTS (CHILDREN UNDER FOUR YEARS OF AGE)

CITY	POPULATION	SAMPLE SIZE	NUMBER	PERCENT	PERCENT	NUMBER	PERCENT	PERCENT
			USING CHILD SAFETY SEAT	USING CHILD SAFETY SEAT	OF CHILD SAFETY SEATS USED PROPERLY	CHILDREN USING SAFETY BELT	CHILDREN USING SAFETY BELT	CHILDREN USING ANY RESTRAINT
Louisville	298,451	546	233	42.7	57	35	6.4	49.1
Lexington	204,165	507	223	44.0	57	30	5.9	50.0
Owensboro	54,450	252	69	27.4	67	8	3.2	30.6
Covington	49,013	277	124	44.8	49	12	4.3	49.1
Bowling Green	40,450	621	164	26.4	49	21	3.4	29.8
Paducah	29,758	202	72	35.6	57	9	4.5	40.1
Hopkinsville	27,318	178	29	16.3	45	5	2.8	19.1
Frankfort	25,977	293	84	28.7	60	4	1.4	30.0
Henderson	24,874	200	47	23.5	62	5	2.5	26.0
Newport	21,587	237	43	18.1	28	5	2.1	20.3
Madisonville	16,979	201	54	26.9	65	5	2.5	29.4
Elizabethtown	15,380	285	87	30.5	57	9	3.2	33.7
Winchester	15,216	353	107	30.3	52	11	3.1	33.4
Glasgow	12,958	151	30	19.9	53	1	0.7	20.5
Middlesboro	12,251	150	35	23.3	51	2	1.3	24.7
Somerset	10,649	270	62	23.0	60	2	0.7	23.7
Maysville	7,982	280	44	15.7	57	4	1.4	17.1
Morehead	7,789	226	27	11.9	56	2	0.9	12.8
Princeton	7,073	171	20	11.7	55	1	0.6	12.3
Lebanon	6,590	253	50	19.8	56	3	1.2	20.9
Bardstown	6,155	290	84	29.0	68	6	2.1	31.0
Hazard	5,429	201	15	7.5	40	3	1.5	9.0
Lawrenceburg	5,167	158	31	19.6	65	4	2.5	22.2
Pikeville	4,756	166	32	19.3	53	3	1.8	21.1
Carrollton	3,967	176	23	13.1	39	5	2.8	15.9
Grayson	3,423	236	28	11.9	54	3	1.3	13.1
LaGrange	2,971	154	36	23.4	67	0	0	23.4

TABLE 11. CHANGE IN USAGE OF SAFETY BELTS BY DRIVERS IN SURVEY CITIES

CITY	PERCENT USING SAFETY BELTS		
	1982	1983	1984
Louisville	6.2	11.9	13.1
Lexington	8.2	10.1	9.8
Owensboro	*	4.1	7.1
Covington	8.2	9.3	12.5
Bowling Green	*	4.8	6.6
Paducah	*	6.0	8.3
Hopkinsville	2.6	3.0	4.5
Frankfort	4.8	7.1	7.4
Henderson	3.1	4.6	7.0
Newport	4.7	6.4	5.4
Madisonville	1.9	2.8	4.8
Elizabethtown	2.6	3.5	5.0
Winchester	2.3	2.9	5.6
Glasgow	2.9	2.8	2.5
Middlesboro	*	3.9	4.4
Somerset	2.4	3.6	5.6
Maysville	1.5	3.3	5.5
Morehead	2.9	3.2	3.1
Princeton	1.6	1.7	2.4
Lebanon	*	0.9	3.4
Bardstown	3.5	4.1	5.9
Hazard	4.4	2.7	4.2
Lawrenceburg	0.8	2.3	3.2
Pikeville	*	2.5	5.4
Carrollton	2.6	4.9	5.2
Grayson	*	1.2	2.6
LaGrange	*	5.8	8.5

*No data collected in this city in 1982

TABLE 12. CHANGE IN USAGE OF SAFETY SEATS OR BELTS BY CHILDREN UNDER FOUR YEARS OF AGE IN SURVEY CITIES

CITY	PERCENT USING SAFETY SEATS OR BELTS		
	1982	1983	1984
Louisville	21.6	36.3	49.1
Lexington	32.1	45.8	50.0
Owensboro	*	24.4	30.6
Covington	22.4	38.6	49.1
Bowling Green	*	39.5	29.8
Paducah	*	29.2	40.1
Hopkinsville	11.8	19.1	19.1
Frankfort	15.4	25.9	30.0
Henderson	13.5	18.5	26.0
Newport	11.0	27.4	20.3
Madisonville	12.4	18.4	29.4
Elizabethtown	11.2	26.7	33.7
Winchester	12.5	13.9	33.4
Glasgow	13.9	16.6	20.5
Middlesboro	*	15.8	24.7
Somerset	7.4	23.3	23.7
Maysville	11.8	18.2	17.1
Morehead	10.2	14.1	12.8
Princeton	9.9	11.7	12.3
Lebanon	*	16.1	20.9
Bardstown	19.7	21.0	31.0
Hazard	7.0	9.5	9.0
Lawrenceburg	7.0	6.3	22.2
Pikeville	*	22.3	21.0
Carrollton	6.3	10.2	15.9
Grayson	*	15.3	13.1
LaGrange	*	22.1	23.4

*No data collected in this city in 1982

TABLE 13. USAGE OF VARIOUS TYPES OF CHILD SAFETY SEATS

CHILD SAFETY SEAT	ALL CHILDREN		INFANTS ONLY		TODDLERS ONLY	
	NUMBER OBSERVED	PERCENT PROPERLY USED	NUMBER OBSERVED	PERCENT PROPERLY USED	NUMBER OBSERVED	PERCENT PROPERLY USED
Questor Kantwet	667	63	207	48	460	70
One-Step	379	76	78	40	301	89
Dyn-O-Mite	71	75	71	75	0	DNA**
Care Seat	16	69	1	0	15	73
Safe Guard	5	60	1	0	4	75
Bobby-Mac						
Deluxe II	70	34	16	62	54	26
Champion	65	34	19	32	47	34
Super	21	52	5	80	16	44
Two-in-One	17	18	8	25	9	11
Unclassified	22	36	8	75	14	14
Strolee Wee Care	260	16	32	28	228	14
Cosco/Peterson	247	67	79	33	168	83
Safe-T-Seat	86	62	35	31	51	82
Safe and Easy	52	75	11	27	41	88
Safe and Snug	61	67	14	21	47	81
Safe-T-Shield	21	86	0	DNA	21	86
First Ride	15	53	15	53	0	DNA
Peterson	5	0	3	0	2	0
Safe-T-Mate	4	50	1	0	3	67
Travel Hi-Lo	3	100	0	DNA	3	100
Century	211	69	54	44	157	77
100	82	73	21	48	61	82
200	48	77	11	18	37	95
300	33	64	8	62	25	64
Trav-l-Guard	18	56	2	100	16	50
Unclassified	30	57	12	42	18	67
Old Type*	96	18	14	14	82	18
Collier Keyworth	77	79	17	41	60	90
Safe and Sound	55	71	17	41	38	84
Co-Pilot	22	100	0	DNA	22	100
Booster Seat	55	82	0	DNA	55	82
International						
Astroseat	49	61	20	50	29	69
Infant Love Seat	47	57	47	57	0	DNA
Child Love Seat	46	33	0	DNA	46	33
Kolcraft	19	89	2	100	17	88
Hi-Rider	3	67	0	DNA	3	67
Redi-Rider	3	100	0	DNA	3	100
Tot-Rider						
Quik-Step	5	100	0	DNA	5	100
Unclassified	8	88	2	100	6	83
Graco	9	78	2	100	7	71
Pride Trimble	4	50	2	0	2	100
Welsh	2	100	0	DNA	2	100
Ford Tot-Guard	1	100	0	DNA	1	100

*Seat not currently available. Has armrest and separate headrest.
Made by more than one manufacturer.

**DNA - Does Not Apply.

TABLE 14. MAJOR REASONS FOR IMPROPER USAGE

REASON	NUMBER WITH GIVEN REASON		
	ALL CHILDREN	INFANTS	TODDLERS
Child Not Harnessed as Required	326	53	273
Infant Facing Forward	222	222	0
Restraint Not Tethered as Required	218	0	218
Shield Not Used as Required	96	0	96
Restraint Not Belted to Car	27	14	13

TABLE 15. MOST FREQUENT IMPROPER USAGE FOR COMMON CHILD SAFETY SEATS

RESTRAINT TYPE	TYPE OF MISUSE	PERCENT MISUSED FOR GIVEN REASON
Old Type	Not Harnessed	81
Strolee	Seat Not Tethered*	80
	Infant Facing Forward**	53
	Not Harnessed	22
Child Love Seat	Seat Not Tethered*	57
Infant Love Seat	Infant Facing Forward**	34
Bobby-Mac	Shield Not Used*	61
	Infant Facing Forward**	45
	Not Harnessed	12
Century	Not Harnessed	18
Cosco/Peterson	Infant Facing Forward**	54
	Not Harnessed	15
Questor Dyn-O-Mite	Infant Facing Forward**	13
Kantwet One-Step	Infant Facing Forward**	72

*Toddlers only

**Infant only

TABLE 16. VARIOUS FACTORS AFFECTING CHILD SAFETY SEAT USAGE

VARIABLE	CATEGORY	SAMPLE SIZE	PERCENT USING CHILD SAFETY SEATS
Number of Children Under Four in Car	1	5,537	27.6
	2	1,268	23.7
	3 or More	229	10.5
Age (Years)	Less Than 1	1,087	44.8
	1-3	5,947	23.0
Child's Location	Front	3,732	16.8
	Rear	3,202	38.1
Driver Sex	M	1,705	19.3
	F	5,314	28.6
Driver Age	Y*	2,580	25.9
	M	4,120	27.6
	O	319	14.1
Driver Restrained	Yes	418	66.0
	No	6,600	23.8

*Y -- 16-30 years
M -- 31-50 years
O -- 51 years or older

TABLE 17. DRIVER SAFETY BELT USAGE RATES BY AGE AND SEX

SEX	AGE*	PERCENT USING SAFETY BELTS
Male	Young	5.4
	Middle-Age	6.8
	Older	5.0
	All	6.0
Female	Young	6.1
	Middle-Age	8.1
	Older	5.9
	All	7.0
Male or Female	Young	5.7
	Middle-Age	7.4
	Older	5.4

*Age was estimated as given in Figure 2.

TABLE 18. POTENTIAL SAVINGS ASSOCIATED WITH INCREASED SAFETY BELT USAGE*

TYPE OF INJURY	NUMBER OF DRIVERS	REVISED NUMBERS	ANNUAL REDUCTION IF ALL DRIVERS WORE SAFETY BELTS
	NOT WEARING SAFETY BELT WITH GIVEN INJURY (1978 - 1983)	USING PERCENT INJURIES ASSOCIATED WITH SAFETY BELT USAGE	
Fatal	2,509	608	317
Incapacitating	25,803	14,493	1,885
Non-Incapacitating	50,743	41,994	1,542
TYPE OF INJURY	COST PER INJURY (1983 NATIONAL SAFETY COUNCIL)	ANNUAL POTENTIAL DOLLAR SAVINGS (MILLIONS)	
Fatal	\$210,000	\$66.6	
Incapacitating	10,200	34.3	
Non-Incapacitating	5,500	8.5	

*Based on Kentucky accident data