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16. Abstract

In an attempt to increase child restraint usage, a law was enacted by the 1982 Kentucky Legislature requiring use of child restraints for children forty inches or less in height. To evaluate the effectiveness of this law, a usage survey had to be completed before the law became effective. Objectives of this study were to determine statewide child restraint usage and statistics relating to improper usage. Seatbelt usage of drivers was also analyzed.

A statewide child restraint usage rate of 14.4 percent was obtained. Only 44 percent of restraints were coded as used properly. Several factors, such as population, age of child, and driver restraint usage, were related to child restraint usage. The specific restraint brand was noted and a few, such as the Strolee and Bobby Mac, were the most common. The major overall improper usage was failure to tether the restraint as required. A statewide driver restraint usage rate of 4.2 percent was found.

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Research Report
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CHILD RESTRAINT USAGE IN KENTUCKY
(PRE-LEGISLATION)

by

Kenneth R. Agent
Chief Research Engineer

and

Joseph D. Crabtree
Senior Research Engineer

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

in cooperation with
Kentucky State Police
Commonwealth of Kentucky

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INTRODUCTION

Usage of restraint systems has been shown to be an effective method of reducing accident severity; however, actual usage has remained low (1). An analysis of 1980 Kentucky accident statistics showed, for children under the age of four who were involved in traffic accidents, only about nine percent were coded as using restraint systems (2). Usage of seatbelts was even lower, with five percent of drivers involved in traffic accidents coded as using seatbelts.

In an attempt to increase child restraint usage, a law was enacted by the 1982 Kentucky Legislature requiring use of child restraints for children forty inches or less in height. A copy of the law is presented in Appendix A. An important modification was made to the law as originally proposed. This was the elimination of any penalty, other than a warning, for violation of the law.

To evaluate effectiveness of the law, a survey of child restraint usage had to be completed before the law became effective on July 15, 1982. One objective of this study was to determine statewide child restraint usage as well as usage rates in various areas of the state. Another objective was to determine statistics relating to improper usage. This involved identifying the restraint used and determining whether it was used properly. Also, as part of the survey, seatbelt usage of drivers was noted.

PROCEDURE

IDENTIFICATION OF AVAILABLE RESTRAINTS

All personnel involved in the survey had to become acquainted with each common restraint, noting its usage requirements and method of installation. Literature pertaining to available child restraints was reviewed (3, 4, 5). Letters were sent to all major manufacturers of domestically available child restraints requesting literature describing their various restraints. Almost all manufacturers supplied this information, and several sent samples of their restraints. These samples were installed in a vehicle by data collectors to become familar with proper installation procedures. Other restraint types were borrowed from local sources, and some were examined at local department stores. Photographs were taken of all restraint types.

A list of various child restraints examined while preparing for this study is given in Table 1. The manufacturer and seat name are given, as well as a description of the type of protection afforded and the age range for which the restraint is to be used. Photographs of several restraints are in Appendix B. Usage requirements for each restraint had to be known to determine whether the restraint was used properly. For example, if a tether was required but not used, the restraint would be classified as improperly used. As part of the training process, a quiz was developed dealing with characteristics of various restraints. This quiz was administered to all data collectors.

DEVELOPMENT OF SAMPLING PLAN

A sampling plan was developed to assure a statistically valid sample for cities of various sizes distributed across the state. The sample size was determined so that the relative error of the observed proportion (percent using child restraints) would be within acceptable bounds with a given probability. The required sample size was determined using the following formula (6):

$$n = (X)(1 - p)/((d^2)(p)) \qquad (1)$$

in which
- n = sample size,
- X = cumulative Chi-square distribution for a given probability and one degree of freedom.
- d = bound on the relative error of the proportion, and,
- p = true or assumed proportion.

A probability of 0.95 was assumed. The sample size needed would vary as a function of the proportion of children using child restraints and the required bound on the relative error. For a proportion between 10 and 15 percent and a

10 percent upper bound on relative error, the required sample size varies from 2,176 to 3,456. For a proportion of 15 percent and a 5 percent upper bound on relative error, the required sample size increased substantially to 8,704. The assumption was made that the observed proportion would not be much lower than 15 percent. For a sample size of 5,000, this would yield a 6.6 percent upper bound on relative error. For a proportion of 15 percent, the resulting range would be from 14 to 16 percent. A goal was established to obtain a total sample of 5,000 children in the survey.

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 was distributed based on county population categories. From the 1980 census, the number of children under five years old in each county was used to distribute the sample. This was the youngest age category available. The sample size needed for each population category, as well as the survey counties and cities selected, are given in Table 2. Counties were selected so that a distribution across the state would be obtained. The largest city in each selected county was chosen for data collection. City populations varied from 298,451 in Louisville to 3,967 in Carrollton.

DEVELOPMENT OF DATA COLLECTION PLAN

A review of data collection procedures used by other researchers was performed (7, 8, 9, 10, 11). Most used an observation technique, some used driver interviews, and some used a combination of both. After testing and revisions, the data collection form shown in Figure 1 was developed for use in this study. The procedure involved collecting the data by observation without interviews. This allowed data to be collected much more quickly than with interviews, and it was discovered through testing that observers were able to gather all necessary data through observation. This procedure allowed data to be collected by one person. A total of four observers collected all data, which minimized training requirements. Substantial training was still necessary to acquaint data collectors with the various restraints and their proper usage.

An explanation of information collected is given in Figure 2. The data sheet was divided into three sections. General information described when and where the data were collected. The section pertaining to cars containing children under four included basic information concerning type of restraint used and, if a child restraint was used, the brand used and whether it was used properly. During data collection, some unknown brands of car seats were observed. Often, the child sat in the seat with an armrest in front but with no provision for harnessing the child to the seat. In such instances, the child was classified as using a child restraint, but usage was classified as improper, with the reason being that the restraint was not a type approved by the National Highway Traffic Safety Administration.

It should be noted that child restraint usage was obtained for children under four years of age. Kentucky's law requires the use of child restraints for chidren 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. Children were further classified as being less than one year old or from one to three years old. In this report, children less than one year of age will be referred to as "infants", and children from one to three years of age will be termed "toddlers".

Information was also obtained for the driver of any vehicle containing a child under four years of age. This information consisted of the driver's age category, sex, and restraint usage. The third section of the data sheet contained similar information for drivers of other vehicles. Seatbelt usage was obtained for drivers of those vehicles when it did not interfere with child restraint data collection.

A set of general instructions was developed to assist data collectors. The methodology used was taken primarily from a paper that described guidelines for state surveys of seatbelt and child

restraint usage (10). That procedure had been used in nationwide surveys, and use of that procedure would allow a more valid comparison between data collected in Kentucky and that collected elsewhere in the country.

The general instructions follow:

1. Data will be collected by observation. Data collectors should attempt to be as inconspicuous as possible and avoid conversation, if possible. A message stating "TRAFFIC SURVEY" will be placed on the backs of all clipboards. Data collectors will wear or carry identification and will carry handouts to give to individuals who ask questions.

2. Sites will be selected in cities listed in the survey plan. It is anticipated that most data will be collected at traffic signals and stop signs, probably near shopping centers and other locations where children will most likely be present.

3. For data taken at an intersection, observers will stand on the curb or at the edge of the roadway and observe stopped cars in the near lane. They should not attempt to include moving cars. Only passenger cars and station wagons are to be included. Trucks, vans, or vehicles used for commercial purposes, such as taxicabs, should not be included.

4. All data should be collected during daylight hours at various times throughout the day.

5. Priority will be given to any car containing a child under four years old. Driver restraint information for other cars will be collected in available intervals.

6. Observers shall use their best judgment in estimating age. However, they will not guess on restraint usage. If restraint usage cannot be determined, it should be left blank.

7. Proper or improper usage, along with the reason for improper usage, should be determined whenever possible, even if the type of child restraint cannot be determined.

8. If feasible at traffic signals, data collection will begin with the second vehicle in the queue. However, where the first vehicle obviously had to stop for the signal or where the traffic volume is light, the first vehicle may be included.

DATA ANALYSIS

The child restraint data were entered into a computer file using the format and codes shown in Figures 3 and 4, respectively. This allowed summaries and cross-tabulations to be performed rapidly for any of the recorded data. Restraint usage data for drivers of vehicles not containing children under four were summarized manually.

RESULTS

USAGE RATES

A summary of statewide usage of child restraints is given in Table 3. A total sample of 5,000 children was obtained with a distribution in the various county populations as given in Table 2. All data were collected prior to the effective date of the mandatory child restraint law. Statewide, the data showed that 14.4 percent of children under four years of age were in child restraints. However, only 44 percent of those children were placed in an approved restraint in a proper manner. Therefore, only 6.3 percent of the children were properly restrained with child restraints. An additional one percent of the children were in seatbelts or harnesses. Therefore, 15.4 percent of the children were restrained in some manner.

Using Equation 1 with a sample size (n) of 5,000, a probability of 0.95, and a proportion (p) of 14.4 percent yielded a bound on the relative error of the proportion (d) of 6.8 percent. When applied to the observed proportion (14.4 percent), this yielded an absolute error of 1.0 percent. Therefore, confidence limits of statewide child restraint usage were 13.4 to 15.4 percent.

The relationship between county population category and child restraint usage is shown in Table 3. Highest restraint usage was in the most heavily populated counties; lowest usage was in the least populated counties. The percentage of child restraints used properly showed no relationship to population. The percentage using seatbelts or harnesses showed the same

relationship as for child restraints.

The usage of child restraints in the 19 survey cities is given in Table 4. As expected, restraint usage was highest in the largest cities. This was in agreement with the findings of previous studies. The percentage using child restraints ranged from 29.8 percent in Lexington to 6.3 percent in Carrollton. The percentage using restraints properly showed no relationship to city size and varied from 20 percent in Madisonville to 64 percent in Carrollton. The percentage using seatbelts or harnesses was highest in Covington, followed by Lexington. Several of the smaller cities had no children observed wearing seatbelts or harnesses.

Several other factors were found to be related to child restraint usage, as shown in Table 5. As the number of children in a car increased, child restraint usage decreased. Restraint usage was almost three times higher for infants (30.6 percent) than for toddlers (11.4 percent). Usage was also much higher for children in the rear seat. There was a strong relationship between the restraint usage of the driver and that of the child. Almost 70 percent of children were restrained by a child restraint or seatbelt when the driver was also using a restraint. This compared to only about a 12 percent restraint usage for children when the driver was not restrained. Child restraint usage was also related to driver age and sex, with usage being higher for female drivers and lower for older drivers.

Some of those factors were also related to proper usage. Proper usage was higher for infants than for toddlers. Proper usage was also higher for children travelling with restrained drivers. Driver age was also a factor, with very low proper usage for older drivers.

The seating positions of unrestrained children are summarized in Table 6. The majority of children were classified into the "other" category. This position primarily involved standing on the seat or sitting on the front edge of the seat. About 18 percent were sitting in someone's lap. Only about 25 percent were seated in a normal manner.

SUMMARY BY TYPE OF RESTRAINT

Usage of various types of child restraints is summarized in Table 7. Data are presented for all children, for infants only, and for toddlers only. For each restraint type, the number observed is given as well as the percentage properly used. As stated previously, observers were trained to identify specific restraints and their proper usage. Information regarding type and usage was obtained for a high percentage of restraints.

Overall, the Strolee Wee Care was the most frequently observed child restraint; the Bobby-Mac Champion or Deluxe II was second, and the Kantwet One-Step was third. The Bobby-Mac Champion and Deluxe II were difficult to distinguish from each other and were classified together. A large number of Century seats were observed, but in most instances, the model was not determined. The Cosco/Peterson Safe-T-Seat and the Child Love Seat were also observed frequently. Considering only infants, the Bobby-Mac Champion or Deluxe II, Questor Dyn-O-Mite, and Strolee Wee Care were the most frequently observed. Ranking of restraints for toddlers was very similar to that for all children.

The percentage properly used showed that proper usage varied substantially by type of restraint. Of the major restraints, Strolee and Bobby-Mac had lower proper-usage percentages, and Questor, Century, and Cosco/Peterson had higher proper-usage percentages.

A summary of the types of improper usage is given in Table 8. The major overall improper usage was failure to tether the restraint as required. This was also the major problem for toddlers. For infants, the major problem involved facing the infant forward rather than in the required backward position. Some children judged to be less than one year of age were large enough to be placed in the forward-facing position. This meant that improper usage for an infant could involve failure to tether or failure to use a shield. Not harnessing the child into the restraint was also a problem, especially for toddlers. Another major problem for toddlers was failure to use

the shield required by some restraints. Unapproved types of restraints were observed in 90 instances (12.5 percent of all restraints). Such restraints usually consisted of a seat with an armrest but no provision to harness the child to the seat. These unapproved restraints were used more for toddlers than for infants.

The most frequent improper usages for the common child restraints are given in Table 9. The most prevalent problem was failure to tether the Strolee and Child Love Seat restraints. The other major problem was failure to use the shield with the Bobby-Mac Champion or Deluxe II in the forward-facing toddler position. Other improper usages involved not harnessing the child into the restraint, facing an infant in a forward-facing position, and failure to secure the restraint to the car.

DRIVER RESTRAINT USAGE RATES

A summary of driver restraint usage rates for the survey cities is given in Table 10. Data were obtained for over 31,000 drivers. The summary is divided into categories based on the number of licensed drivers in the county. As with child restraints, driver restraint usage was highest in the large cities. Usage was highest in Lexington and Covington and lowest in Lawrenceburg.

A statewide rate was obtained by weighting the overall percent usage for each category by the percentage of the total driving population in that category. Using that procedure, a statewide driver restraint usage rate of 4.2 percent was determined.

Using Equation 1 with a sample size (n) of 31,143, a probability of 0.95, and a proportion (p) of 4.2 percent yielded a bound on the relative error of the proportion (d) of 5.3 percent. When applied to the observed proportion (4.2 percent), this yielded an absolute error of 0.2 percent. Therefore, confidence limits of statewide driver restraint usage were 4.0 to 4.4 percent.

The variation in driver restraint usage rates as a function of driver age and sex was also investigated (Table 11). Although no substantial differences were noted, drivers in the middle age category had higher rates than either younger or older drivers. Males had a slightly higher usage rate than females. The highest rate was for males in the middle age category, while the lowest rate was for older females.

SUMMARY

1. A statewide child restraint usage rate of 14.4 percent was obtained, with confidence limits of 13.4 to 15.4 percent.
2. Of the children observed in child restraints, only about 44 percent were in approved restraints used in a proper manner.
3. Child restraint usage was related to county and city size, with higher usage in more densely populated areas. Usage ranged from 29.8 percent in Lexington to 6.3 percent in Carrollton.
4. Several factors were found to be related to child restraint usage. For example, usage was higher for infants (under one year of age) compared to toddlers (from one to three years of age) and was much higher in cars driven by restrained drivers.
5. Only one-fourth of unrestrained children were observed to be seated in a normal manner. A majority were standing on the seat, sitting on the front edge of the seat, or sitting on an adult's lap.
6. A few brands of child restraints were very popular. The Strolee Wee Care was the most frequently observed child restraint. Other common restraints included Bobby-Mac Champion or Deluxe II, Kantwet One-Step, various models of Century and Cosco/Peterson seats, Questor Dyn-O-Mite, and Child Love Seat.
7. Proper usage varied substantially by type of restraint. Of the major restraints, Strolee and Bobby-Mac had lower proper-usage percentages, while Questor, Century, and Cosco/Peterson had higher proper-usage percentages.
8. The major overall improper usage was failure to tether the restraint as required. For infants, the major problem involved facing the infant forward rather than in the required backward position.
9. A summary of improper usage for the most common restraints showed that the most prevalent problem was failure to

tether the Strolee and Child Love Seat restraints. The other major problem was failure to use the shield with the Bobby-Mac Champion or Deluxe II in the forward-facing toddler position.

10. A statewide driver restraint usage rate of 4.2 percent was determined. This rate did not vary substantially by driver age or sex.

RECOMMENDATIONS

The finding that only a small percentage of children are being placed in child restraints indicates that efforts to increase usage are warranted. One such effort was undertaken through mandatory usage legislation enacted by the 1982 Kentucky Legislature. The effectiveness of this legislation in increasing child restraint usage should be evaluated, and possible improvements to the law should be identified.

Child restraint usage rates were determined for cities distributed throughout the state. That summary identifies locations where emphasis should be placed on publicity and enforcement concerning the new child restraint law.

Child restraint usage and the percentage of restraints properly used were much higher when the driver was using a restraint. Based upon that result, it may be assumed that an increase in either driver restraint or child restraint usage would result in a corresponding increase in the other. Upcoming campaigns having the objective of increasing either seatbelt or child restraint usage should include a reference to both. In addition, increased expenditures for promoting child restraint usage may be warranted due to potential impact on overall seatbelt usage.

A significant problem was observed with respect to improper usage of child restraints. Consequences of improper usage should be documented through in-depth accident investigations. For example, the consequences of not tethering a child restraint should be documented through accident case studies.

Only 1.2 percent of toddlers were observed to be in seatbelts or harnesses. Future promotional campaigns should stress the importance of using a seatbelt when a child outgrows his child restraint or when no child restraint is available.

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TABLE 1. LISTING OF AVAILABLE CHILD RESTRAINTS*

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
	First Ride	Infants only; Y-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-l-guard	Convertible; five point harness with armrest
Strolee	Wee Care	Convertible; five point harness with armrest; tether required
	Wee Care Booster Seat	Children to 70 lbs; auto lap/shoulder belt in front seat, auto lap belt with tethered harness in rear seat
Bobby-Mac	Champion	Convertible; three point harness for infant, add shield for toddler
	Deluxe II	Convertible; three point harness for infant, add swing-down shield for toddler
	Super	Convertible; five point harness, tether required
Questor	Dyn-O-Mite	Infants only; Y-harness
	Kantwet One-Step	Convertible; combination shield and harness system
	Care Seat	Convertible; five point harness
International	Astroseat	Convertible; five point harness
Kolcraft	Hi-Rider	Convertible; five point harness, optional shield
	Redi-Rider	Convertible; five point harness
Ford	Tot Guard	Toddlers only; shield only
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

* 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. DISTRIBUTION OF SAMPLE

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	Lexington
			Jefferson	Louisville
			Kenton	Covington
5,000-9,999	14.0	700	Campbell	Newport
			Christian	Hopkinsville
			Hardin	Elizabethtown
2,500-4,999	23.3	1,165	Franklin	Frankfort
			Henderson	Henderson
			Hopkins	Madisonville
			Perry	Hazard
			Pulaski	Somerset
1,000-2,499	26.0	1,300	Barren	Glasgow
			Clark	Winchester
			Mason	Maysville
			Nelson	Bardstown
			Rowan	Morehead
Under 1,000	10.1	505	Anderson	Lawrenceburg
			Caldwell	Princeton
			Carroll	Carrollton

TABLE 3. STATEWIDE USAGE OF CHILD RESTRAINTS

COUNTY POPULATION CATEGORY (NUMBER OF CHILDREN (UNDER FIVE YEARS OLD)	SAMPLE SIZE	NUMBER USING CHILD RESTRAINT	PERCENT USING CHILD RESTRAINT	PERCENT OF CHILD RESTRAINTS USED PROPERLY	NUMBER USING SEATBELT OR HARNESS	PERCENT USING SEATBELT OR HARNESS	PERCENT USING ANY RESTRAINT
10,000 or more	1,330	313	23.5	43	30	2.3	25.8
5,000-9,999	700	73	10.4	49	6	0.9	11.3
2,500-4,999	1,165	125	10.7	35	6	0.5	11.2
1,000-2,499	1,300	168	12.9	50	10	0.8	13.7
Under 1,000	505	39	7.7	41	0	0.0	7.7
All	5,000	718	14.4	44	52	1.0	15.4

TABLE 4. USAGE OF CHILD RESTRAINTS BY CITY

CITY	POPULATION	SAMPLE SIZE	NUMBER USING CHILD RESTRAINT	PERCENT USING CHILD RESTRAINT	PERCENT OF CHILD RESTRAINTS USED PROPERLY	NUMBER USING SEATBELT OR HARNESS	PERCENT USING SEATBELT OR HARNESS	PERCENT USING ANY RESTRAINT
Lexington	204,165	507	151	29.8	46	12	2.4	32.1
Louisville	298,451	546	109	20.0	44	9	1.6	21.6
Covington	49,013	277	53	19.1	33	9	3.2	22.4
Newport	21,587	237	24	10.1	52	2	0.8	11.0
Hopkinsville	27,318	178	19	10.7	53	2	1.1	11.8
Elizabethtown	15,380	285	30	10.5	43	2	0.7	11.2
Frankfort	25,973	293	41	14.0	45	4	1.4	15.4
Henderson	24,834	200	27	13.5	22	0	0.0	13.5
Madisonville	16,979	201	25	12.4	20	0	0.0	12.4
Hazard	5,429	201	13	6.5	23	1	0.5	7.0
Somerset	10,649	270	19	7.0	58	1	0.4	7.4
Glasgow	12,958	151	21	13.9	38	0	0.0	13.9
Winchester	15,216	353	39	11.0	56	5	1.4	12.5
Maysville	7,982	280	32	11.4	34	1	0.4	11.8
Bardstown	6,155	290	54	18.6	59	3	1.0	19.7
Morehead	7,789	226	22	9.7	48	1	0.4	10.2
Lawrenceburg	5,167	158	11	7.0	45	0	0.0	7.0
Princeton	7,073	171	17	9.9	24	0	0.0	9.9
Carrollton	3,967	176	11	6.3	64	0	0.0	6.3

TABLE 5. VARIOUS FACTORS AFFECTING CHILD RESTRAINT USAGE

VARIABLE	CATEGORY	SAMPLE SIZE	PERCENT USING CHILD RESTRAINT	PERCENT OF CHILD RESTRAINTS USED PROPERLY	PERCENT USING SEATBELT OR HARNESS
Number of Children Under Four in Car	1	3,273	16.1	43	1.0
	2	1,390	11.5	45	1.2
	3 or More	337	9.2	52	0.3
Age(Years)	Less Than 1	778	30.6	51	0.0
	1-3	4,215	11.4	40	1.2
Child's Location	Front	2,642	9.2	46	1.2
	Rear	2,225	19.5	43	0.9
Driver Restrained	Yes	166	51.2	69	17.5
	No	4,565	12.0	40	0.4
Driver Sex	M	1,251	9.5	47	0.6
	F	3,534	15.0	44	1.1
Driver Age	Y*	1,655	13.0	42	1.0
	M	2,939	14.5	46	1.1
	0	191	3.7	17	0.0

* Y -- 16-30 years M -- 31-50 years 0 -- 51 years or older

TABLE 6. SEATING POSITIONS OF UNRESTRAINED CHILDREN

SEATING POSITION	NUMBER	PERCENT
Seated in a Normal Manner	1,071	25.5
Sitting on Lap	746	17.8
Other*	2,376	56.7

*Primarily standing on the seat or sitting on the front edge of the seat

TABLE 7. USAGE OF VARIOUS TYPES OF CHILD RESTRAINTS

CHILD RESTRAINT	ALL CHILDREN NUMBER OBSERVED	ALL CHILDREN PERCENT PROPERLY USED	INFANTS ONLY NUMBER OBSERVED	INFANTS ONLY PERCENT PROPERLY USED	TODDLERS ONLY NUMBER OBSERVED	TODDLERS ONLY PERCENT PROPERLY USED
Strolee Wee Care	176	25	33	36	143	23
Questor	96	73	56	64	40	85
Kantwet One-Step	53	81	16	63	37	89
Dyn-O-Mite	40	65	40	65	0	DNA
Kantwet Care Seat	3	33	0	DNA	3	33
Century	95	73	27	77	68	72
Unclassified	50	79	20	95	30	69
Trav-l-guard	20	60	3	33	17	65
300	15	67	2	50	13	69
200	8	75	2	0	6	100
100	2	100	0	DNA	2	100
Bobby-Mac	95	41	44	61	51	21
Champion or Deluxe II	81	38	37	62	44	17
Unclassified	9	56	6	50	3	67
Super	5	60	1	100	4	50
Type not Federally Approved	90	0	19	0	71	0
Unknown Type (Federally Approved)	52	42	19	11	33	62
Cosco/Peterson	49	72	19	72	30	72
Safe-T-Seat	27	73	11	73	16	73
Safe and Easy	7	57	0	DNA	7	57
Safe and Snug	6	83	4	75	2	100
Safe-T-Shield	5	80	2	50	3	100
Unclassified	4	67	2	100	2	50
Child Love Seat	30	41	4	0	26	48
Infant Love Seat	13	69	13	69	0	DNA
Kolcraft Hi-Rider	9	71	2	0	7	83
International Astroseat	6	33	2	0	4	50
Booster Seat	5	60	0	DNA	5	60
Ford Tot-Guard	2	100	0	DNA	2	100

TABLE 8. REASONS FOR IMPROPER USAGE

REASON	NUMBER WITH GIVEN REASON		
	ALL CHILDREN	INFANTS	TODDLERS
Restraint not Tethered as Required	106	11	95
Child not Harnessed as Required	91	15	76
Unapproved Restraint	90	19	71
Infant Facing Forward	60	60	0
Shield not Used as Required	38	5	33
Restraint not Belted to Car	6	6	0
Seat Improperly Reclined	3	0	3
Child Facing Backwards	2	0	2

TABLE 9. MOST FREQUENT IMPROPER USAGE FOR COMMON CHILD RESTRAINTS

RESTRAINT TYPE	TYPE OF MISUSE	PERCENT MISUSED FOR GIVEN REASON
Strolee	Seat not Tethered	52
	Child not Harnessed	13
	Infant Facing Forward	7
Century	Child not Harnessed	21
Kantwet One-Step	Infant Facing Forward	9
	Child not Harnessed	8
Bobby-Mac Champion or Deluxe II	Shield not Used	46
	Infant Facing Forward	11
Cosco/Peterson	Child not Harnessed	14
Child Love Seat	Seat not Tethered	37
Questor Dyn-O-Mite	Infant Facing Forward	15
	Child not Harnessed	10
	Restraint not Belted to Car	10

TABLE 10. DRIVER RESTRAINT 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 RESTRAINT	OVERALL PERCENT USAGE FOR CATEGORY
Over 75,000	3	30.0	Jefferson	Louisville	4,622	6.2	7.3
			Fayette	Lexington	3,845	8.2	
			Kenton	Covington	1,522	8.2	
30,001-75,000	9	17.0	Campbell	Newport	1,177	4.7	3.2
			Hardin	Elizabethtown	1,367	2.6	
			Christian	Hopkinsville	1,355	2.6	
20,001-30,000	13	14.6	Hopkins	Madisonville	1,327	1.9	3.2
			Henderson	Henderson	1,104	3.1	
			Franklin	Frankfort	1,944	4.8	
			Pulaski	Somerset	1,114	2.4	
			Barren	Glasgow	1,112	2.9	
10,001-20,000	32	20.0	Clark	Winchester	1,864	2.3	2.8
			Nelson	Bardstown	1,461	3.5	
			Perry	Hazard	1,089	4.4	
			Mason	Maysville	1,402	1.5	
Under 10,001	63	18.4	Rowan	Morehead	2,012	2.9	2.2
			Caldwell	Princeton	1,023	1.6	
			Anderson	Lawrenceburg	897	0.8	
			Carroll	Carrollton	906	2.6	

TABLE 11. DRIVER USAGE RATES BY AGE AND SEX

SEX	AGE*	PERCENT USING RESTRAINT
Male	Young	4.1
	Middle-Age	4.7
	Older	4.1
	All	4.4
Female	Young	4.1
	Middle-Age	4.5
	Older	3.8
	All	4.2
Male or Female	Young	4.1
	Middle-Age	4.6
	Older	3.9

* Age was estimated as given in Figure 2.

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
MALE			
FEMALE			

	Driver 31-50		
	None	Belt	Harness
MALE			
FEMALE			

	Driver 51 or more		
	None	Belt	Harness
MALE			
FEMALE			

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
   - CHILD RESTRAINT
     - 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 (Station Wagon)

     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.

Figure 3. Child Restraint Data Format.

COLUMNS	DESCRIPTION
1-2	City
3-4	Sheet Number
5	Blank
6	Number of Children in Car
7	Age of Child
8	Restraint used for Child
9-10	Blank
11-12	Type of Child Restraint Used
13	Proper or Improper
14	Reason
15	Blank
16	Child's Location in Car
17	Child's Position
18	Driver Restraint
19	Driver Sex
20	Driver Age

Figure 4. Child Restraint Coding Information.

City

1 -- Louisville
2 -- Lexington
3 -- Newport
4 -- Hopkinsville
5 -- Somerset
6 -- Henderson
7 -- Hazard
8 -- Bardstown
9 -- Glasgow
10 -- Winchester
11 -- Morehead
12 -- Lawrenceburg
13 -- Princeton
14 -- Frankfort
15 -- Carrollton
16 -- Madisonville
17 -- Elizabethtown
18 -- Maysville
19 -- Covington

Sheet Number
Number the sheets for each city from 01 to nn

Number of Children in Car
Record this for Every Record, not Just the First One for a Given Vehicle

Age of Child
1 -- Less than 1 year
2 -- 1-3 years

Restraint Used for Child
1 -- None
2 -- Belt
3 -- Harness
4 -- Child Restraint

Type of Child Restraint Used

01--Strolee Wee Care
02--Infant Love Seat
03--Child Love Seat
04--Booster Seat
05--International Astroseat
06--Kolcraft Hi-Rider
07--Ford Tot Guard
10--Cosco/Peterson (Unclassified)
11--Cosco/Peterson Safe-T-Shield
12--Cosco/Peterson Safe-T-Seat
13--Cosco/Peterson Safe and Easy
14--Cosco/Peterson Safe and Snug
20--Century (Unclassified)
21--Century 100
22--Century 200
23--Century 300
24--Century Trav-l-guard
30--Bobby-Mac (Unclassified)
31--Bobby-Mac Champion or Deluxe II
32--Bobby-Mac Super
41--Kantwet One-Step
42--Kantwet Care Seat
43--Questor Dyn-O-Mite
50--Unknown Type (Federally Approved)
51--Type Not Federally Approved

Proper or Improper
1 -- Proper
2 -- Improper

Reason
1 -- Child not Harnessed as Required
2 -- Shield not Used as Required
3 -- Restraint not belted to Car
4 -- Seat Belt not Placed in Proper Place
5 -- Infant Facing Forward
6 -- Toddler Facing Backward
7 -- Restraint not Tethered as Required
8 -- Unapproved Restraint

Child's Location in Car
1 -- F
2 -- R
3 -- C

Child's Position
1 -- S
2 -- L
3 -- O

Driver Information (Code on Every Record, not Just First Record for Vehicle)

Restraint
1 -- N
2 -- B
3 -- H

Sex
1 --M
2 --F

Age
1 -- Y
2 -- M
3 -- O

APPENDIX A

KENTUCKY'S CHILD RESTRAINT LAW

AN ACT relating to traffic safety.

Be it enacted by the General Assembly of the Commonwealth of Kentucky:

Section 1. KRS 189.125 is amended to read as follows:

(1) No person shall sell any new passenger vehicle in this state nor shall any person make application for registering a new passenger vehicle in this state unless the front or forward seat or seats have adequate anchors or attachments secured to the floor and/or sides to the rear of the seat or seats to which seat belts may be secured.

(2) Any resident parent or legal guardian of a child, forty inches (40") in height or less, when transporting his child in a motor vehicle owned by that parent or guardian operated on the roadways, streets and highways of this state, shall have such child properly secured in a child restraint system of a type meeting federal motor vehicle safety standards.

(3) As used in this section, "child restraint system" means any device manufactured to transport children in a motor vehicle which conforms to all applicable federal motor vehicle safety standards.

(4) The term "motor vehicle" as used in subsection (2) of this Act shall not apply to recreational vehicles or trucks having a tonnage rating of more than one (1) ton.

(5) Failure to wear a child passenger restraint shall not be considered as contributory negligence, nor shall such failure to wear said passenger restraint system be admissible as evidence in the trial of any civil action.

(6) KRS 189.990 and 189.993 to the contrary notwithstanding, there shall be no penalty for the violation of this section. No peace officer shall issue a uniform citation or any other citation, other than a warning, for a violation of this section nor shall any arrest be permitted for violation of this section.

APPENDIX B

PHOTOGRAPHS OF VARIOUS CHILD RESTRAINTS

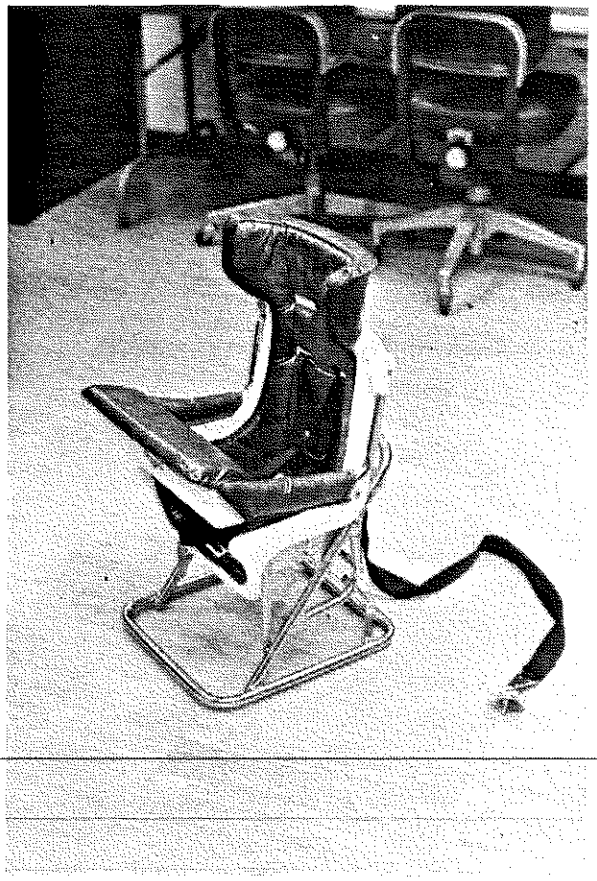

Figure B-1. Strolee Wee Care.

Figure B-2. Kantwet One-Step.

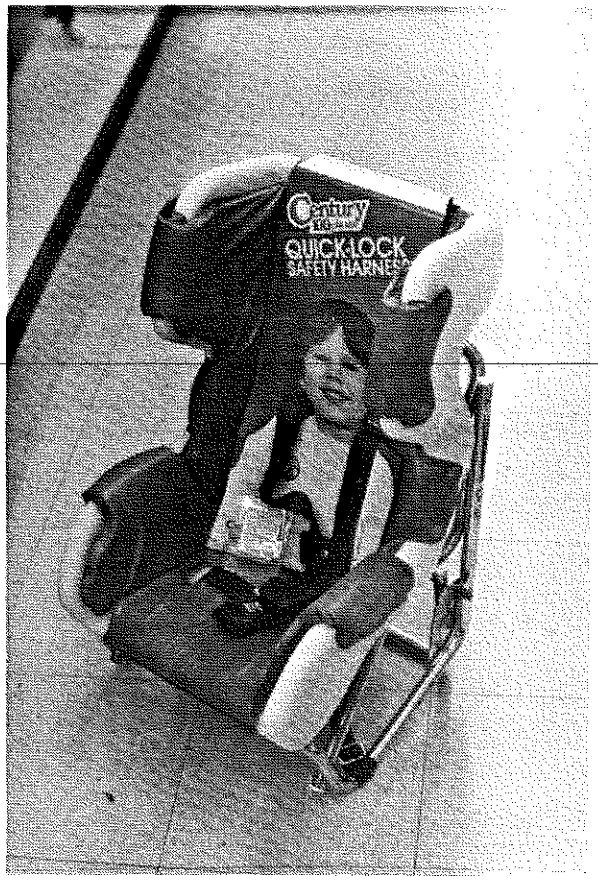

Figure B-3. Century 100.

Figure B-4. Century 300.

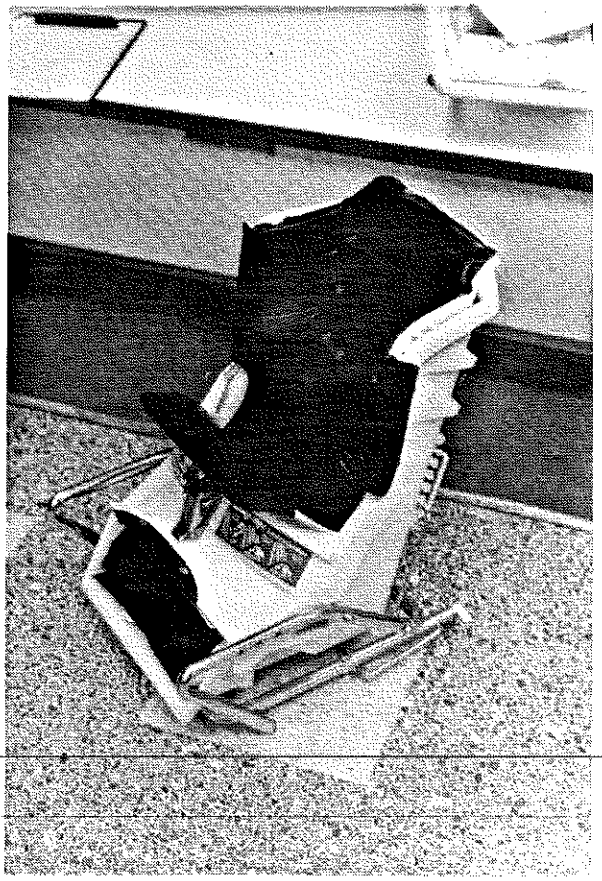

Figure B-5. Bobby-Mac Champion.

Figure B-6. Bobby-Mac Super.

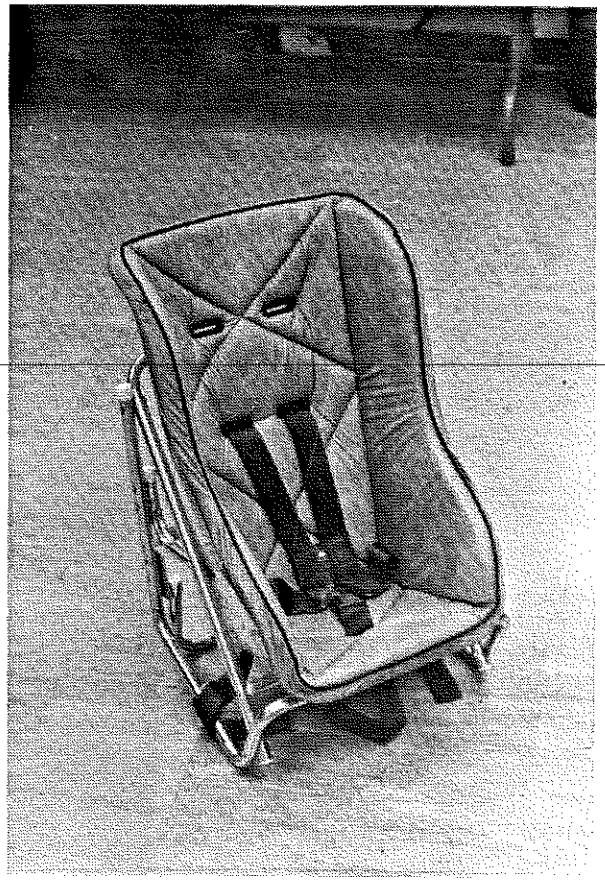

Figure B-7. International Astroseat.

Figure B-8. Questor Care Seat.

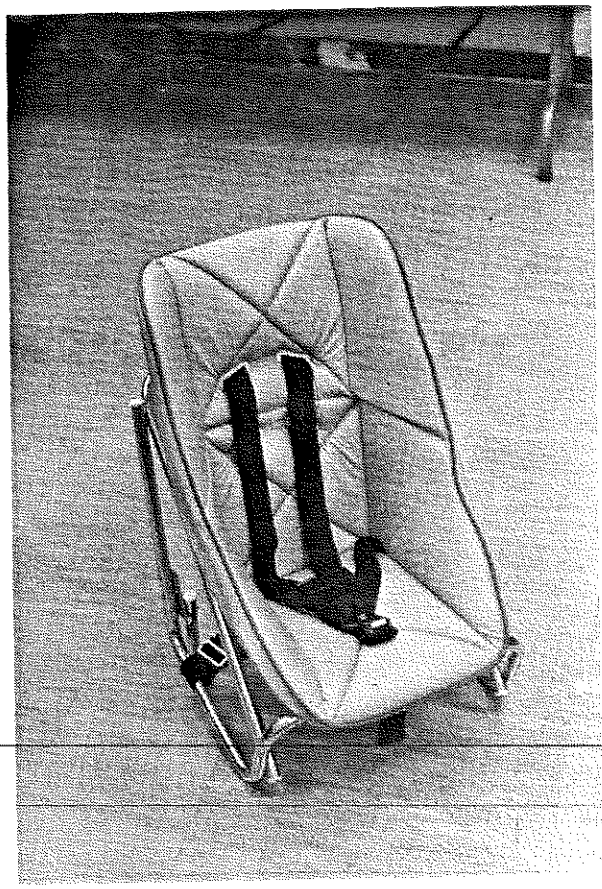

Figure B-9. Cosco/Peterson Safe-T-Seat.

Figure B-10. Cosco/Peterson Safe and Snug.

Figure B-11. Cosco/Peterson Safe-T-Shield.

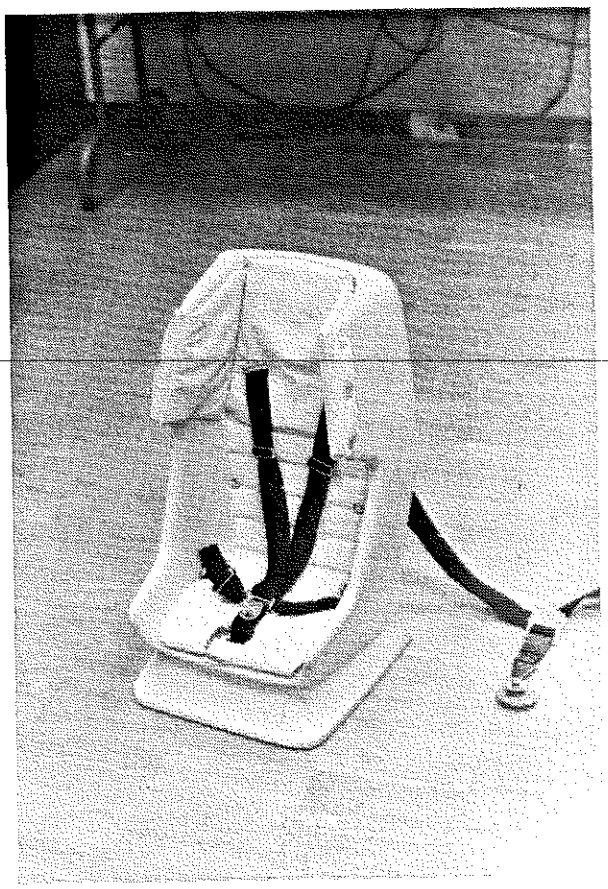

Figure B-12. Child Love Seat

Figure B-13. Infant Love Seat.

Figure B-14. Questor Dyn-O-Mite.

Figure B-15. Kolcraft Hi-Rider.

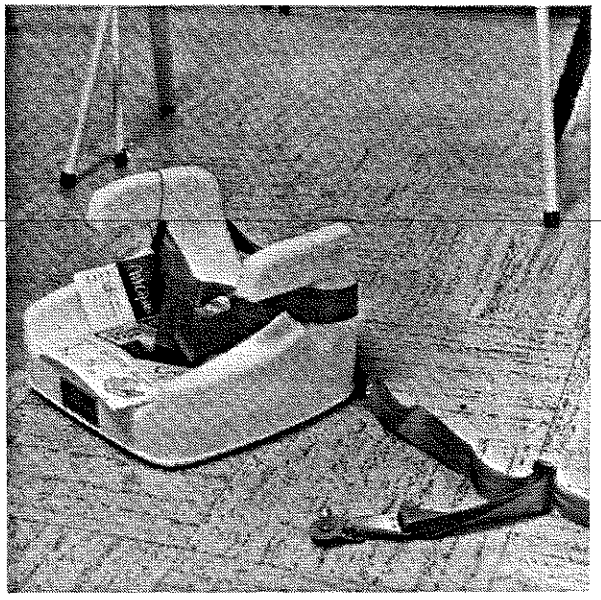

Figure B-l6. Child Booster Seat.