Research Report
KTC-01-21/KSP1-01-2F

KENTUCKY TRANSPORTATION CENTER

College of Engineering

2001 SAFETY BELT USAGE SURVEY IN KENTUCKY

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2001 SAFETY BELT USAGE SURVEY IN KENTUCKY

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in cooperation with
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EXECUTIVE SUMMARY

The objective of this study was to establish 2001 safety belt and child safety seat usage rates in Kentucky. The 2001 survey continues to document the results after enactment of a statewide mandatory safety belt law in 1994. It also documented the long term results of the Click It or Ticket enforcement campaign which was conducted around Memorial Day. Data were collected at 200 randomly selected sites spread across Kentucky. Data from the individual sites were combined into a statewide percentage considering function classification, geographic region, and vehicle miles traveled.

The data show that the usage rate increase found in 1999, after a few years where the rate had remained at a stable level, continued in 2001. The usage rate for front seat occupants was 62 percent in 2001, compared to 60 percent in 2000, 59 percent in 1999, 54 percent in 1998, 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 usage rate at a mini-sample of 21 locations was 63 percent compared to a high of 70 percent which was found during the enforcement period of the Click It or Ticket campaign.

The 2001 statewide usage rate for children under the age of four was determined to be 89 percent. This continues the high rate found for this age category and equals the previous high of 89 percent in 1999.

The statewide law, except for children, involves secondary enforcement. The higher rate for children could partially be related to primary enforcement. To obtain the maximum possible increase in usage, the current law should be modified to allow primary, rather than secondary, enforcement for all vehicle occupants. The potential increase which can result from an emphasis on enforcement was shown by the results of the Click It or Ticket campaign. As a minimum, primary enforcement should apply to drivers while they are in the permit and intermediate phase of the graduated license program.

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 crash. 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 Kentucky in this area was statewide legislation requiring the use of safety belts for all vehicle occupants. This law, which involves secondary enforcement, was passed in 1994 with an effective date of 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 by adding a fine. 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. 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 and have been conducted annually to document safety belt and safety seat usage in Kentucky. The safety belt usage rate for drivers increased each survey year from only 4 percent 1982 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 54 to 55 percent for 1996 through 1998. The rate then increased to 59 percent in 1999 and 60 percent in 2000.

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 30 percent for 1984 through 1986. After a financial penalty was added to the law, this percentage increased to almost 50 percent in 1988. There has been a continued increase in usage with rates such as 72 percent in 1994, 82 percent in 1997, and 87 percent in 2000.

The objective of the survey summarized in this report was to establish statewide safety belt and child safety seat usage rates in Kentucky for 2001. These rates can be compared to those determined from previous surveys.

The 2001 statewide survey also determined how much of the increase obtained as a result of the Click It or Ticket campaign conducted during the Memorial Day period of 2001 was retained. Data collected at a selected number of

sites found a peak usage rate of 70 percent (compared to a baseline of 60 percent) during the enforcement portion of the campaign. Data collected for the statewide survey summarized in this report were taken in the summer months after completion of this campaign.

2.0 PROCEDURE

2.1 DATA COLLECTION PROCEDURE

The original data collection procedure used in the surveys, which started in 1982, was first modified in the 1990 survey. The site selection procedure used for the first several surveys was changed 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 procedure and data collection form remained the same for the 1990 through 1998 surveys. A modification in the 1999 survey was that the age and sex of the driver and front seat occupants were not classified. The type of vehicle was coded instead of the age and sex information.

The data collection form first used in the 1999 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 rear seats.

The type of vehicle was coded for drivers and front seat passengers. Four categories of vehicles were used. These were: passenger car (PC), pickup (PU), van, and sports utility vehicle (SUV).

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.

Two additional types of information were obtained. Starting with the 1993 survey, the use of motorcycle helmets was noted. 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 beginning data

collection. As part of the training, 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. Include the driver so the number of vehicles included in the sample will be known.

2. Data are typically collected at intersections with each observer collecting data on only one approach at the intersection.

3. 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.

4. If traffic volume is too high to obtain data for all vehicles, record data for the next vehicle in view after recording the previous data.

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 slowly or from an observation point such that the 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 vehicles 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 two "observer hours" of data at each site. This could be two hours for one approach or one hour for two approaches if the route has two approaches at the intersection.

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

13. Collect data for specified types of passenger motor vehicles (cars, pickup trucks, vans, and sport utility vehicles). Data are not collected for combination trucks.

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 in which data are collected at specific sites are randomly assigned to the data collectors by the project manager. Data are typically collected during weekdays with occasional data collected on a weekend.

Data collection was started in June of 2001, after the enforcement portion of the Click It or Ticket campaign concluded on June 3 and continued into through July. As noted, data were collected for two hours at each location. This consisted of either two hours for one observer or one hour 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.

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 were distributed across the state. These cities were also selected to represent a range of population categories to account for social and economic factors. In order to be able to relate the survey results to data taken in other states and to include all types of roadways, it was necessary to expand the number of sites to include data in rural locations and for interstates. An initial change was made in 1990 and resulted in 100 sites. The distribution of the sites was based on vehicle miles traveled statewide for various

categories of roads in counties with varying populations. The variables considered in the 1990 stratification process were the rural or urban designation of the road, the functional classification of the road, vehicle miles traveled, and the county population. However, a new sampling design plan was implemented in 1999 as part of a nationwide effort by the National Highway Traffic Safety Administration (NHTSA) to use a common methodology to select observational sites.

As part of the sampling design plan started in 1999, the decision was made to collect data at 200 sites. It was also decided that data would typically be obtained at intersections. For interstates and parkways, data were generally taken at the intersection of a ramp with a cross road. The basis for the decision to collect data at intersections was that it would increase accuracy since data would be collected for vehicles either stopped or moving slowly. A computer file was used to select the locations. The file is the Highway Performance Monitoring System (HPMS). Characteristics of road segments for all state maintained roads are contained in this file. In order to assure that the sampling design used an acceptable methodology, the various decisions made in the process were made along with NHTSA with the roadway segments containing the data collection sites selected by NHTSA.

Kentucky has 120 counties ranging in population from slightly over 2,000 to almost 700,000. The NHTSA guidelines allow exclusion from the survey coverage of the least populated units (counties in Kentucky) which represent 15 percent of the state's population. This exclusion reduced the number of counties in the sample from 120 to 65. All the road segments contained in the HPMS file in the counties representing 85 percent of the population were eligible for inclusion in the survey.

Road segments were stratified into three geographical regions based on highway district. There are 12 highway districts in the state. Roadways in each of the three regions were divided into seven roadway functional classification groups. This resulted in 21 stratum from which the sample was selected. The geographical regions were:

Region 1: Highway Districts 1 through 4 (represents the western portion of the state),
Region 2: Highway Districts 5 through 7 (covers the north central area of the state which includes the major population centers of Louisville, Lexington, and northern Kentucky), and
Region 3: Highway Districts 8 through 12 (includes the eastern and south central portion of the state)

There are 44 counties in Region 1, 31 in Region 2, and 45 in Region 3. The state's population is divided into 29 percent in Region 1, 46 percent in Region 2, and 25 percent in Region 3. For reporting purposes, Region 1 is referred to as the West,

Region 2 as the North, and Region 3 as the East. The location of these regions are shown in Figure 2.

The following seven functional classification categories were used:

1. rural interstate,
2. rural principal arterial,
3. rural minor arterial/major collector,
4. rural minor collector/local,
5. urban interstate/freeway,
6. urban principal arterial, and
7. urban minor arterial/collector/local.

Selections were made from roadway segments which contained either an interchange, an intersection with a stop sign, an intersection with a traffic signal, or a combination of these. A segment could contain more than one intersection or interchange. If a segment had more than one intersection with a stop sign or signal or interchange, one intersection was randomly selected. For example, if a segment had three intersections with signals, a separate number of one, two, or three was randomly selected. The random number assigned the intersection to be selected for data collection (along the route as it was driven in its cardinal direction).

An equal probability selection (simple random sample) of the road segments was made within each of the 21 strata using the HPMS file as the source of the necessary road segment information. Following is the number of segments selected in each strata.

	Region 1	Region 2	Region 3	All
Rural Interstate	8	12	6	26
Rural Principal Arteria	11	26	12	30
Rural Minor Arterial/ Major Collector	12	10	12	34
Rural Minor Collector/Local	8	6	8	22
Urban Interstate/Freeway	6	20	2	28
Urban Principal Arterial	10	14	6	30
Urban Minor Arterial/ Collector/Local	10	14	6	30
All	66	82	52	200

For each selected road segment, information was printed from the HPMS file to be used to select a specific location for data collection. This information included the county, route, beginning and ending milepoint, the number of intersections or interchanges within the segment, and a counter showing which intersection or interchange to select if there was more than one within the segment.

A list of the 120 counties in Kentucky along with their population, the number of sites in each county, and their region in the state is given in Appendix A. A road segment was selected in 58 counties. The largest number of segments was 20 in Jefferson County. A list of the intersections or interchanges where data was collected within each of these segments is given in Table 1. For each site, the county, route, and intersecting route (or exit number for an interstate or parkway) is given. The nearest town to the data collection site is also listed along with the geographical region and functional classification. Data were typically collected at the intersection of the ramps and intersecting road at interchanges. The exception was at rural interchanges where there were very few exiting vehicles where data were collected on the mainline.

The observation sites were randomly ordered to assist in the sequence of sites at which data were collected. Some of the sites were grouped based on geographical region to aid the efficiency of the data collection process.

2.3 SURVEY DATA ANALYSIS

As part of the summary of information from the HPMS file for each randomly selected roadway segment, the functional classification, region, and vehicle miles traveled were listed. The total vehicle miles for the road segments in each of the 21 stratum were also summarized to be used in the estimation process.

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

Safety belt usage rates were determined for the driver and for all front-seat occupants. Rates were also obtained by vehicle type for both the driver and all front-seat occupants. 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. Statewide rates were obtained, using an EXCEL spreadsheet analysis, by weighting the usage determined for each location by the vehicle miles traveled in the road segment.

Various usage rates were determined for each location. The rates were for all front seat passengers, drivers, front-seat occupants, and all children under four years of age (front and rear). The rate for each of the 21 stratum (based on region and functional classification categories) were determined by weighting the usage rate for each location by the proportion of the vehicle miles traveled at that location of the vehicle miles at all observational sites in the stratum.

A statewide rate was then determined using the usage rate determined for each stratum and the total vehicle miles traveled in that stratum (statewide for the counties representing 85 percent of the population). The statewide rate was the sum of the products of the usage rate for each stratum and the proportion of the vehicle miles traveled in that stratum of the total statewide vehicle miles.

A consultant was initially used to review the procedures necessary to conduct the various statistical tests. The variance, bound on the error of estimation (which is half of the 95 percent confidence interval), and relative error were calculated for the statewide usage rate for all front seat passengers. These data were also determined for each of the 21 strata, the three regions, and the seven functional classes. The software used in this analysis was Statistical Analysis Software (SAS) for Windows, version 8. The relative error and confidence interval was also determined at each location for the usage rate found for all front seat occupants.

3.0 SURVEY RESULTS

Usage rates for all front seat occupants (drivers and passengers) for the various types of highways and regions of the state are summarized in Table 2. The overall statewide rate in 2001, using the data collected at 200 sites and the described weighting procedure, was 61.9 percent. The 95 percent confidence interval was 0.3 percent. The sample size of all front seat occupants was 110,819. The usage rate by region varied from 65.3 percent in Region 2 (north) to 53.5 percent in Region 3 (east) with 62.3 percent in Region 1 (west). The highest rate by the functional classification of the highway was 71.8 percent for rural interstates with the lowest 52.3 percent for rural minor collector/local roads. The relative error and confidence interval for the usage rates found for all front seat occupants (by region and highway functional classification) are given in Appendix B.

Usage rates for drivers for the various types of highways and regions of the state are summarized in Table 3. The overall statewide rate for drivers in 2001 was 62.4 percent. Drivers accounted for 76 percent of front seat occupants so they dominated the percentage determined for all front seat occupants. Usage rates for front seat passengers was 60.0 percent (Table 4).

Usage rates for children under four years of age are given in Table 5. These rates are for children in both the front and the rear seats. The usage rate for children under one year of age (97.4 percent) was higher than that for children one to three years of age (87.6 percent). The usage rate for the combination of these categories, or children under four years of age, was 88.8 percent.

The sample size for children under four years of age was 1,525. This age category corresponds to the children for which the mandatory child restraint law would apply. The 2001 usage rate of 88.8 percent compares to a range in the previous ten years of 57 percent in 1991 to 89 percent in 1999. 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 92 percent for the rear seat compared to 58 percent for the front seat. For children under one year old, the usage rate was 99 percent for the rear seat compared to 82 percent for the front seat. The large majority of children were sitting in the rear seat for both age groups (about 86 percent for one to three years of age and 82 percent for under one). The overall percentage of children in the rear seat of 85 percent in 2001 compares to 83 percent in 2000, 79 percent in 1999, 80 percent in 1998, 75 percent in 1997, and 57 percent in 1996.

A summary of the data collected is given in Appendix C. For each of the 200 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. Usage rates for front seat occupants ranged from 33 percent to 85 percent. There were eight sites which had a usage rate of under 40 percent with all in a rural area and six of the eight in the rural minor collector/local category. There were 41 sites which had a usage rate of 70 percent or above with 36 of these an interstate or parkway location. The highest rate found on a non-interstate or parkway was 73 percent on an urban principal arterial road (Harrodsburg Road) in Lexington.

While the data collection procedure changed in 1990 and 1999, the usage rate may still be compared to the statewide rates from past years (Table 6). The previous studies showed that statewide driver usage rates had steadily increased from 4 percent in 1982 to 42 percent in 1993. However, the amount of the yearly 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 1994 rate immediately after enactment of the law. This level continued through 1998 before an increase to 59 percent in 1999. The increase in usage has continued with 60 percent in 2000 and 62 percent in 2001.

A series of mini-surveys were conducted as part of the evaluation of the Click It or Ticket campaign conducted around Memorial Day. The baseline data found a usage rate of 60 percent which agreed with the statewide rate in 2000. The rate remained the same during the media portion of the campaign but increased up to 70 percent during enforcement portion. All of the data collected as part of the statewide survey was taken after the enforcement portion of the campaign ended on June 3. The statewide data show that the 70 percent usage rate was not maintained. The rate at the mini-survey locations taken as part of the statewide survey was 63 percent which is very close to the overall rate of 62 percent.

A substantial difference in usage rate (for all front seat occupants) was noted when vehicle type is considered (Table 7). The rate varied from substantially from 68.6 percent for sport utility vehicles down to 47.8 percent for pickup trucks. The rate for passenger cars was 67.1 percent with 65.1 percent for vans. It can be seen that use of safety belts is much lower in pickup trucks than any other vehicle type, and pickup trucks made up about 26 percent of the sample. The largest sample was for passenger cars with 53 percent followed by 11 percent for sport utility vehicles and 10 percent for vans.

Helmet use by motorcyclists was also observed. Kentucky had a statewide law requiring the use of a helmet by a motorcyclist until it was repealed starting July 15, 1998. The results of surveys taken during the mandatory usage period had found a usage rate of over 95 percent. Data were taken in 1998 both before and after the effective date of the repeal. Prior to July 15, 1998 only 10 of the 240 observed motorcyclists were not wearing a helmet, giving a usage rate of 96 percent. After this date, 29 of 148 motorcyclists were observed not wearing a helmet giving a usage rate of 76 percent. In 1999, 164 of 452 motorcyclists were observed not wearing a helmet with a weighted usage rate was 65 percent. The weighted rate for 2000 was 70 percent with a sample size of 427. The weighted rate decreased to 56 percent in 2001 with a sample size of 395. The usage rate did not vary much across the state with 58 percent in the west region, 56 percent in the north region, and 53 percent in the east region.

Bicycle helmet use was only observed for 74 bicyclists. Only 13 of these bicyclists were wearing a helmet. This low rate (18 percent) shows the need for

additional public information about this subject. This rate is lower than the 24 percent in 2000 but higher than that found in previous years (12 percent in 1999, 9 percent in 1998, and 8 percent in 1997).

4.0 SUMMARY

Observations were taken at 200 sites across Kentucky to obtain safety belt usage rates. The 2001 survey resulted in a sample of 110,819 front seat occupants was obtained (including 83,825 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 to 55 percent in 1995 through 1998. The usage rate of 58.6 percent in 1999 showed that the rate had increased to a level similar to that found immediately after enactment of the statewide law. There was a small increase in usage to 59.8 percent in 2000 with a larger increase rate in 2001 to 61.9 percent. The trend in usage rates from 1982 through 2000 is given in Table 6.

The usage rate was highest in the region of the state which included the largest population centers (Louisville, Lexington, and northern Kentucky). Usage was highest on interstates and lowest on local roads. When type of vehicle was considered, usage was highest for sport utility vehicles and lowest for pickup trucks.

The statewide usage rate for children under the age of four (including both the front and rear seat) was determined to be 88.8 percent in 2001. This compares to 87 percent in 2000, 89 percent in 1999 and 80 percent in 1998 and continues to show the high usage for this age group. One reason for the very high usage for small children is that primary, rather than secondary, enforcement applies.

The motorcycle helmet law was repealed in 1998. There had been a very high compliance of the requirement to wear a helmet (over 95 percent), but the helmet usage percentage decreased to 56 percent in 2000. This shows the large decrease in usage related to the repeal of the mandatory usage law. The percentage of a small sample of bicyclists observed wearing a safety helmet was very low (18 percent).

While the statewide usage rate of approximately 62 percent represents a two percentage point increase from 2000, the rate dropped from a peak of about 70 percent found for a mini-survey taken during the enforcement phase of the Click It or Ticket campaign (which was conducted around Memorial Day). The mini-survey locations are part of the statewide survey and a rate of 63 percent was determined at these locations during the time period of the statewide survey.

5.0 RECOMMENDATIONS

The data show that the level of safety belt usage in 2001 has continued the increase found in 1999 and is the highest since the start of the surveys in 1982. The increase in 2001 can be related to efforts in the areas of both education and enforcement (specifically the Click It or Ticket campaign). 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 continued to be increased.

However, the benefits which can be gained through education and enforcement of a secondary law is somewhat limited. The reduction in usage since the end of the enforcement phase of the Click It or Ticket campaign supports this conclusion. The very high usage for small children can be partially attributed to primary enforcement. To obtain the maximum possible usage for all vehicle occupants, the current law should be modified to allow primary, rather than secondary, enforcement. As a minimum, primary enforcement should be effective for drivers while they are in the permit and intermediate phase of the graduated license program.

The survey data can be used to identify areas in need of additional enforcement and education. Specifically, usage was lowest in the east region of the state. Also, usage was substantially lower for occupants of pickup trucks compared to other vehicle types.

Figure 1. Data Collection Form

SAFETY BELT DATA COLLECTION FORM

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

Location:_____ Sheet #:_____

Observer:_____ Comment:_____

DRIVER USAGE

Vehicle	Harness or Belt	None
PC		
PU		
VAN		
SUV		

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

Vehicle	Harness or Belt	None
PC		
PU		
VAN		
SUV		

USAGE FOR CHILDREN (1-3 YEARS OF AGE)

Position	Safety Seat	Booster Seat	Harness or Belt	None
FRONT				
REAR				

USAGE FOR INFANTS (UNDER 1 YEAR OF AGE)

Position	Safety Seat	None
FRONT		
REAR		

USAGE OF MOTORCYCLE HELMET

YES	No

USAGE OF BICYCLE HELMET

YES	No

4/1998

Figure 2. Data Collection Location Regions

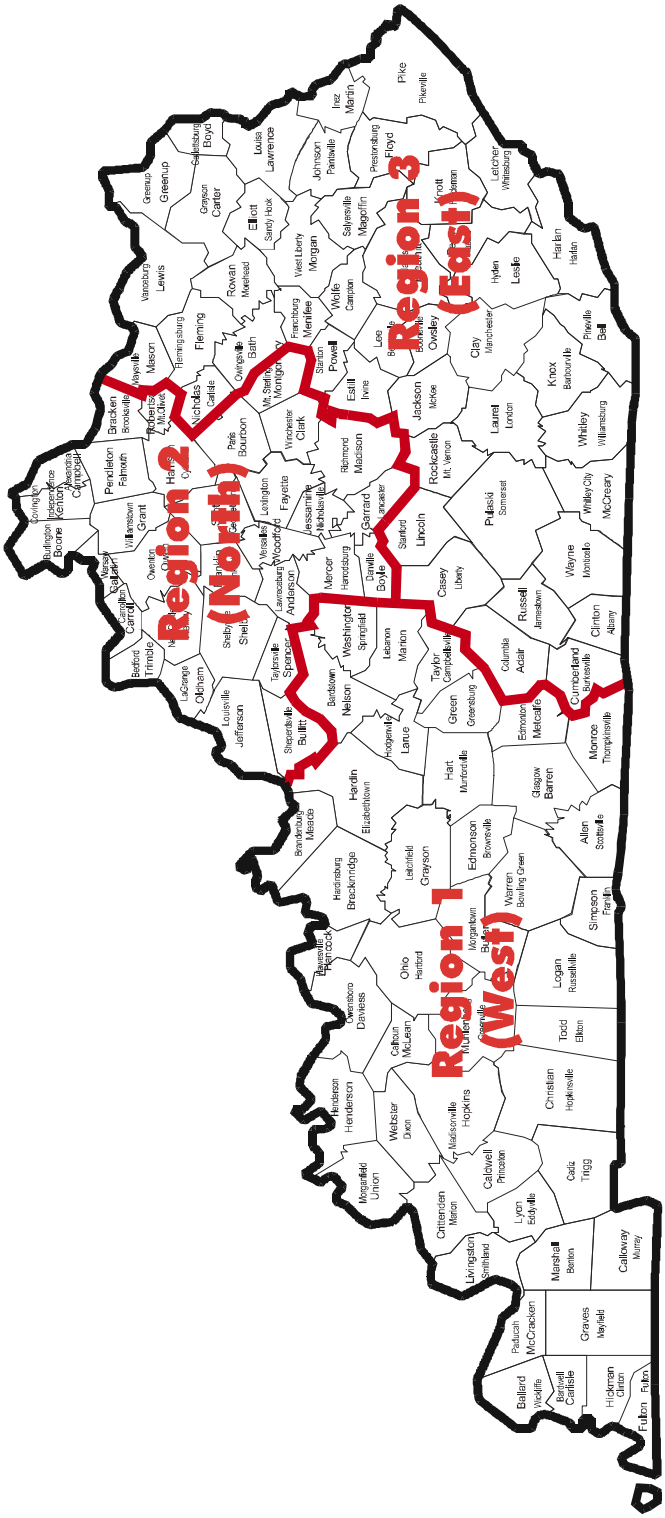

Table 1. SURVEY LOCATIONS

Site Number	Region	Functional Classification	County	Intersection Description	Nearest Town
1	West	Rural Interstate	Simpson	I-65 at Exit 6	Franklin
2	West	Rural Interstate	Christian	I-24 at Exit 73	Newstead
3	West	Rural Interstate	Barren	I-65 at Exit 48	Cave City
4	West	Rural Interstate	Hardin	I-65 at Exit 81	White Mills
5	West	Rural Interstate	Barren	I-65 at Exit 53	Cave City
6	West	Rural Interstate	Hardin	I-65 at Exit 102	Lebanon Junction
7	West	Rural Interstate	Marshall	I-24 at Exit 27	Lake City
8	West	Rural Interstate	Simpson	I-65 at Exit 2	Franklin
9	West	Rural Principal Arterial	Hardin	Bluegrass Parkway at Exit 10	Boston
10	West	Rural Principal Arterial	Marion	US 68 at KY 208	Lebanon
11	West	Rural Principal Arterial	Meade	US 31W at KY 1638	Muldraugh
12	West	Rural Principal Arterial	Warren	US 231 at KY 622	Plano
13	West	Rural Principal Arterial	Hopkins	Western Kentucky Parkway at Exit 24	Dawson Springs
14	West	Rural Principal Arterial	Hopkins	Pennyrile Parkway at Exit 33	Nortonville
15	West	Rural Principal Arterial	Grayson	Western Kentucky Parkway at Exit 107	Leitchfield
16	West	Rural Principal Arterial	Marshall	Purchase Parkway at Exit 47	Draffenville
17	West	Rural Principal Arterial	Marshall	US 641 at KY 58	Benton
18	West	Rural Principal Arterial	Marshall	US 68 at US 641	Draffenville
19	West	Rural Principal Arterial	Graves	US 45 at KY 1276	Mayfield
20	West	Rural Principal Arterial	Marshall	US 641 at US 68	Draffenville
21	West	Rural Minor Arterial/Major Collector	Barren	US 31W at KY 70	Cave City
22	West	Rural Minor Arterial/Major Collector	Marion	KY 426 at US 68/KY 55	Lebanon
23	West	Rural Minor Arterial/Major Collector	Barren	US 31W at KY 90	Cave City
24	West	Rural Minor Arterial/Major Collector	McCracken	KY 286 at US 62	Bardwell
25	West	Rural Minor Arterial/Major Collector	McCracken	KY 305 at KY 358	Paducah
26	West	Rural Minor Arterial/Major Collector	Muhlenburg	KY 189 at US 62	Greenville
27	West	Rural Minor Arterial/Major Collector	Grayson	KY 259 at US 62	Leitchfield
28	West	Rural Minor Arterial/Major Collector	Muhlenburg	US 431 at KY 189	Central City
29	West	Rural Minor Arterial/Major Collector	Grayson	KY 259 at W. Lake	Leitchfield
30	West	Rural Minor Arterial/Major Collector	Breckinridge	KY 79 at KY 259	Harned
31	West	Rural Minor Arterial/Major Collector	Grayson	KY 79 at US 62	Caneyville
32	West	Rural Minor Arterial/Major Collector	Logan	US 431 at KY 663	Adairville
33	West	Rural Minor Collector/Local	Taylor	KY 3183 at KY 55	Campbellsville
34	West	Rural Minor Collector/Local	Logan	KY 1038 at KY 103	Auburn
35	West	Rural Minor Collector/Local	Henderson	KY 1217 at KY 1299	Cairo
36	West	Rural Minor Collector/Local	Taylor	KY 527 at KY 3212	Campbellsville
37	West	Rural Minor Collector/Local	Logan	US 68 at US 79	Russellville
38	West	Rural Minor Collector/Local	Muhlenburg	US 62 at KY 181	Greenville
39	West	Rural Minor Collector/Local	Barren	KY 677 at KY 740	Three Springs
40	West	Rural Minor Collector/Local	Meade	KY 144 at KY 259	Rhodelia
41	West	Urban Interstate/Freeway	Hardin	Western Kentucky Parkway at Exit 136	Elizabethtown
42	West	Urban Interstate/Freeway	Hardin	I-65 at Exit 94	Elizabethtown
43	West	Urban Interstate/Freeway	Christian	Pennyrile Parkway at Exit 8	Hopkinsville
44	West	Urban Interstate/Freeway	Hopkins	Pennyrile Parkway at Exit 44	Madisonville
45	West	Urban Interstate/Freeway	Daviess	US 60B at US 431	Owensboro
46	West	Urban Interstate/Freeway	Daviess	William Natcher Parkway at Exit 70	Owensboro
47	West	Urban Principal Arterial	McCracken	US 60 at I-24	Paducah
48	West	Urban Principal Arterial	Daviess	US 431 at 2nd Street	Owensboro
49	West	Urban Principal Arterial	Nelson	US 31E at KY 1430	Bardstown
50	West	Urban Principal Arterial	Barren	US 31E at US 68	Glasgow

Table 1. SURVEY LOCATIONS (continued)

Site Number	Region	Functional Classification	County	Intersection Description	Nearest Town
51	West	Urban Principal Arterial	McCracken	US 60/62 at Bridge Street	Paducah
52	West	Urban Principal Arterial	Warren	US 68/80 at KY 880	Bowling Green
53	West	Urban Principal Arterial	Warren	US 68/80 at Main Avenue	BowlingGreen
54	West	Urban Principal Arterial	Henderson	US 41A at 5th St.	Henderson
55	West	Urban Principal Arterial	Barren	US 31E at KY 90	Glasgow
56	West	Urban Principal Arterial	Hardin	US 31W at KY 1600	Elizabethtown
57	West	Urban Minor Arterial/Collector/Local	Hardin	KY 3005 at KY 1357	Elizabethtown
58	West	Urban Minor Arterial/Collector/Local	Barren	KY 63 at US 31EX	Glasgow
59	West	Urban Minor Arterial/Collector/Local	McCracken	KY 787 at US 62	Paducah
60	West	Urban Minor Arterial/Collector/Local	McCracken	KY 994 at Schneidman Road	Paducah
61	West	Urban Minor Arterial/Collector/Local	Logan	KY 3233 at US 79 & US 431 Truck Rte.	Russellville
62	West	Urban Minor Arterial/Collector/Local	Henderson	KY 136 at US 41	Henderson
63	West	Urban Minor Arterial/Collector/Local	Calloway	KY 1327 at 16th Street	Murray
64	West	Urban Minor Arterial/Collector/Local	McCracken	US 45X (Broadway) at N.13th Street	Paducah
65	West	Urban Minor Arterial/Collector/Local	McCracken	US 45 at Clay Avenue (6th Street)	Paducah
66	West	Urban Minor Arterial/Collector/Local	McCracken	KY 994 at US 60/62	Paducah
67	North	Rural Interstate	Clark	I-64 at Exit 98	Winchester
68	North	Rural Interstate	Boone	I-75 at Exit 175	Richwood
69	North	Rural Interstate	Oldham	I-71 at Exit 22	LaGrange
70	North	Rural Interstate	Montgomery	I-64 at Exit 113	Mt. Sterling
71	North	Rural Interstate	Boone	I-75 at Exit 171	Walton
72	North	Rural Interstate	Boone	I-275 at Exit 11	Covington
73	North	Rural Interstate	Shelby	I-64 at Exit 43	Waddy
74	North	Rural Interstate	Franklin	I-64 at Exit 53	Frankfort
75	North	Rural Interstate	Bullitt	I-65 at Exit 116	Shepardsville
76	North	Rural Interstate	Shelby	I-64 at Exit 28	Simpsonville
77	North	Rural Interstate	Scott	I-64 at Exit 69	Georgetown
78	North	Rural Interstate	Oldham	I-71 at Exit 14	Brownsboro
79	North	Rural Principal Arterial	Boyle	US 150 at US 127 Bypass	Danville
80	North	Rural Principal Arterial	Woodford	US 60 at US 62	Versailles
81	North	Rural Principal Arterial	Scott	US 460 at US 62	Georgetown
82	North	Rural Principal Arterial	Woodford	Bluegrass Parkway at Exit 68	Versailles
83	North	Rural Principal Arterial	Jessamine	US 27 at US 27X	Nicholasville
84	North	Rural Principal Arterial	Bullitt	US 31E at KY 44	Mt.Washington
85	North	Rural Minor Arterial/Major Collector	Mercer	KY 33 at US 68	Pleasant Hill
86	North	Rural Minor Arterial/Major Collector	Oldham	KY 22 at KY 53	Ballardsville
87	North	Rural Minor Arterial/Major Collector	Boone	KY 14 at KY 16	Verona
88	North	Rural Minor Arterial/Major Collector	Oldham	KY 146 at KY 1817	Buckner
89	North	Rural Minor Arterial/Major Collector	Clark	KY 418 at KY 3371	Winchester
90	North	Rural Minor Arterial/Major Collector	Kenton	KY 536 at KY 177	Visalia
91	North	Rural Minor Arterial/Major Collector	Shelby	KY 44 at KY 53	Shelbyville
92	North	Rural Minor Arterial/Major Collector	Grant	KY 467 at KY 22	Dry Ridge
93	North	Rural Minor Arterial/Major Collector	Scott	KY 32 at US 25	Sadieville
94	North	Rural Minor Arterial/Major Collector	Jefferson	US 60 at Beckley Station Road	Louisville
95	North	Rural Minor Collector/Local	Montgomery	KY 646 at KY 11	Camargo
96	North	Rural Minor Collector/Local	Montgomery	KY 1991 at KY 537	Mt. Sterling
97	North	Rural Minor Collector/Local	Boyle	KY 1273 at US 150	Danville
98	North	Rural Minor Collector/Local	Franklin	KY 2820 at US 127	Frankfort
99	North	Rural Minor Collector/Local	Campbell	KY 735 at KY 9	Mentor
100	North	Rural Minor Collector/Local	Jessamine	KY 3433 at KY 29	Wilmore

Table 1. SURVEY LOCATIONS (continued)

Site Number	Region	Functional Classification	County	Intersection Description	Nearest Town
101	North	Urban Interstate/Freeway	Jefferson	I-264 at Exit 2	Louisville
102	North	Urban Interstate/Freeway	Jefferson	I-264 at Exit 16	Louisville
103	North	Urban Interstate/Freeway	Jefferson	I-64 at Exit 5B	Louisville
104	North	Urban Interstate/Freeway	Fayette	I-64 at Exit 87	Lexington
105	North	Urban Interstate/Freeway	Jefferson	I-265 at Exit 12	Louisville
106	North	Urban Interstate/Freeway	Campbell	I-275 at Exit 77	Wilder
107	North	Urban Interstate/Freeway	Fayette	I-75 at Exit 104	Lexington
108	North	Urban Interstate/Freeway	Jefferson	I-265 at Exit 27	Louisville
109	North	Urban Interstate/Freeway	Boone	I-75 at Exit 180	Erlanger
110	North	Urban Interstate/Freeway	Kenton	I-75 at Exit 186	Crescent Springs
111	North	Urban Interstate/Freeway	Jefferson	I-64 at Exit 17	Louisville
112	North	Urban Interstate/Freeway	Clark	I-64 at Exit 96	Winchester
113	North	Urban Interstate/Freeway	Fayette	I-75 at Exit 108	Lexington
114	North	Urban Interstate/Freeway	Campbell	I-471 at Exit 2	Ft. Thomas
115	North	Urban Interstate/Freeway	Jefferson	I-264 at Exit 22	Louisville
116	North	Urban Interstate/Freeway	Kenton	I-275 at Exit 83	Erlanger
117	North	Urban Interstate/Freeway	Jefferson	I-65 at Exit 127	Louisville
118	North	Urban Interstate/Freeway	Kenton	I-75 at Exit 184	Erlanger
119	North	Urban Interstate/Freeway	Boone	I-275 at Exit 7	Hebron
120	North	Urban Interstate/Freeway	Jefferson	I-264 at Exit 5	Louisville
121	North	Urban Principal Arterial	Jefferson	US 31W at KY 841	Louisville
122	North	Urban Principal Arterial	Jefferson	US 31E at First Street	Louisville
123	North	Urban Principal Arterial	Fayette	Euclid Ave. at Upper Street (US 27)	Lexington
124	North	Urban Principal Arterial	Campbell	US 27 at KY 8 (4th Street)	Newport
125	North	Urban Principal Arterial	Scott	US 460 B at US 460	Georgetown
126	North	Urban Principal Arterial	Fayette	US 68 at Ft. Harrod Drive	Lexington
127	North	Urban Principal Arterial	Jefferson	US 150 at 18th Street	Louisville
128	North	Urban Principal Arterial	Jefferson	KY 1934 at KY 1230	Louisville
129	North	Urban Principal Arterial	Jefferson	US 31E at Tyler Lane	Louisville
130	North	Urban Principal Arterial	Jefferson	US 31W at Garrs Lane	Louisville
131	North	Urban Principal Arterial	Jefferson	US 31W at Ashby Lane	Louisville
132	North	Urban Principal Arterial	Jefferson	US 150 at Clay Avenue	Louisville
133	North	Urban Principal Arterial	Kenton	KY 16 at West 34th Street	Covington
134	North	Urban Principal Arterial	Campbell	KY 1120 at US 27	Ft. Mitchell
135	North	Urban Minor Arterial/Collector/Local	Woodford	US 60X at US 60	Versailles
136	North	Urban Minor Arterial/Collector/Local	Jefferson	KY 1020 at I-264	Louisville
137	North	Urban Minor Arterial/Collector/Local	Boone	KY 237 at KY 18	Burlington
138	North	Urban Minor Arterial/Collector/Local	Scott	US 62 at US 460	Georgetown
139	North	Urban Minor Arterial/Collector/Local	Bullitt	US 31EX at KY 44	Mt. Washington
140	North	Urban Minor Arterial/Collector/Local	Kenton	KY 17 at KY 16	Latonia
141	North	Urban Minor Arterial/Collector/Local	Jessamine	US 27X at Orchard Drive	Nicholasville
142	North	Urban Minor Arterial/Collector/Local	Jefferson	KY 864 at Breckinridge Street	Louisville
143	North	Urban Minor Arterial/Collector/Local	Boone	KY 3076 at Minola Pike	Florence
144	North	Urban Minor Arterial/Collector/Local	Boone	US 42 at US 25	Florence
145	North	Urban Minor Arterial/Collector/Local	Scott	KY 620 at US 25	Georgetown
146	North	Urban Minor Arterial/Collector/Local	Scott	KY 2906 at US 460	Georgetown
147	North	Urban Minor Arterial/Collector/Local	Kenton	KY 3070 at KY 16	Independence
148	North	Urban Minor Arterial/Collector/Local	Clark	US 60 at KY 89	Winchester
149	East	Rural Interstate	Whitley	I-75 at Exit 25	Williamsburg
150	East	Rural Interstate	Laurel	I-75 at Exit 49	Livingston

Table 1. SURVEY LOCATIONS (continued)

Site Number	Region	Functional Classification	County	Intersection Description	Nearest Town
151	East	Rural Interstate	Carter	I-64 at Exit 156	Olive Hill
152	East	Rural Interstate	Carter	I-64 at Exit 172	Grayson
153	East	Rural Interstate	Boyd	I-64 at Exit 181	Ashland
154	East	Rural Interstate	Boyd	I-64 at Exit 185	Ashland
155	East	Rural Principal Arterial	Letcher	US 119 at KY 15	Whitesburg
156	East	Rural Principal Arterial	Bell	US 25E at KY 66	Pineville
157	East	Rural Principal Arterial	Greenup	KY 8 at US 23 Truck Route	South Portsmouth
158	East	Rural Principal Arterial	Breathitt	KY 15 at KY 30	Jackson
159	East	Rural Principal Arterial	Harlan	US 421 at KY 72	Harlan
160	East	Rural Principal Arterial	Martin	KY 645 at KY 40	Inez
161	East	Rural Principal Arterial	Pike	US 460 at KY 1460	Pikeville
162	East	Rural Principal Arterial	Letcher	KY 15 at KY 15X	Whitesburg
163	East	Rural Principal Arterial	Harlan	US 119 at US 421	Harlan
164	East	Rural Principal Arterial	Knox	US 25E at KY 225/3439	Barbourville
165	East	Rural Principal Arterial	Harlan	US 119 at KY 2179	Cumberland
166	East	Rural Principal Arterial	Lincoln	US 27 at US 150	Stanford
167	East	Rural Minor Arterial/Major Collector	Greenup	KY 2 at US 23	Greenup
168	East	Rural Minor Arterial/Major Collector	Johnson	KY 172 at KY 40	Staffordsville
169	East	Rural Minor Arterial/Major Collector	Carter	KY 174 at US 60	Olive Hill
170	East	Rural Minor Arterial/Major Collector	Bell	KY 190 at US 25E	Pineville
171	East	Rural Minor Arterial/Major Collector	Letcher	KY 7 at KY 931	Isom
172	East	Rural Minor Arterial/Major Collector	Letcher	KY 317 at KY 7	Whitesburg
173	East	Rural Minor Arterial/Major Collector	Breathitt	KY 476 at KY 15	Jackson
174	East	Rural Minor Arterial/Major Collector	Carter	US 60 at KY 7	Grayson
175	East	Rural Minor Arterial/Major Collector	Lincoln	KY 618 at KY 39	Dog Walk
176	East	Rural Minor Arterial/Major Collector	Pulaski	KY 80 at KY 837	Nancy
177	East	Rural Minor Arterial/Major Collector	Floyd	KY 1426 at KY 979	Harold
178	East	Rural Minor Arterial/Major Collector	Laurel	KY 1193 at KY 192	Baldrock
179	East	Rural Minor Collector/Local	Johnson	KY 3214 at KY 172	Paintsville
180	East	Rural Minor Collector/Local	Floyd	KY 680 at KY 122	McDowell
181	East	Rural Minor Collector/Local	Whitley	KY 1481 at 204	Williamsburg
182	East	Rural Minor Collector/Local	Johnson	KY 1107 at KY 302	West Van Lear
183	East	Rural Minor Collector/Local	Whitley	KY 1595 at KY 92	Siler
184	East	Rural Minor Collector/Local	Adair	KY 531 at KY 80	Columbia
185	East	Rural Minor Collector/Local	Clay	KY 638 at US 421	Manchester
186	East	Rural Minor Collector/Local	Laurel	KY 1006 at KY 192	Sublimity City
187	East	Urban Interstate/Freeway	Laurel	I-75 at Exit 38	London
188	East	Urban Interstate/Freeway	Rowan	I-64 at Exit 137	Morehead
189	East	Urban Principal Arterial	Perry	KY 15 at KY 15X	Hazard
190	East	Urban Principal Arterial	Greenup	US 23 at KY 693	Flatwoods
191	East	Urban Principal Arterial	Laurel	US 25E at I-75	Corbin
192	East	Urban Principal Arterial	Boyd	US 23 at Mall Road	Ashland
193	East	Urban Principal Arterial	Boyd	US 23 at US 60	Ashland
194	East	Urban Principal Arterial	Laurel	US 25E at US 25	Corbin
195	East	Urban Minor Arterial/Collector/Local	Perry	KY 451 at KY 15X	Hazard
196	East	Urban Minor Arterial/Collector/Local	Pike	KY 1460 at KY 1426	Pikeville
197	East	Urban Minor Arterial/Collector/Local	Laurel	US 25 at KY 80	Pittsburg
198	East	Urban Minor Arterial/Collector/Local	Greenup	KY 750 at KY 207	Flatwoods
199	East	Urban Minor Arterial/Collector/Local	Whitley	US 25W at KY 296	Williamsburg
200	East	Urban Minor Arterial/Collector/Local	Pulaski	KY 80 at KY 2296	Somerset

TABLE 2. USAGE RATE FOR ALL FRONT SEAT OCCUPANTS

	PERCENT USAGE			
	REGION			
FUNCTIONAL CLASSIFICATION	WEST	NORTH	EAST	ALL
Rural Interstate	73.8	71.9	69.0	71.8
Rural Principal Arterial	68.6	65.7	54.0	61.6
Rural Minor Arterial/Major Collector	54.9	64.7	44.8	53.6
Rural Minor Collector/Local	49.6	59.0	52.1	52.3
Urban Interstate/Freeway	70.8	69.0	65.3	69.1
Urban Principal Arterial	62.1	58.7	56.9	59.3
Urban Minor Arterial/Collector/Local	61.2	58.9	55.2	59.1
All	62.3	65.3	53.5	61.9

TABLE 3. USAGE RATE FOR DRIVERS

	PERCENT USAGE			
	REGION			
FUNCTIONAL CLASSIFICATION	WEST	NORTH	EAST	ALL
Rural Interstate	72.9	72.4	67.3	71.6
Rural Principal Arterial	69.1	65.5	54.6	62.1
Rural Minor Arterial/Major Collector	54.7	63.6	45.3	53.5
Rural Minor Collector/Local	50.7	60.6	52.7	53.4
Urban Interstate/Freeway	71.5	70.6	67.6	70.6
Urban Principal Arterial	62.2	58.7	55.8	59.2
Urban Minor Arterial/Collector/Local	63.4	59.3	56.3	60.1
All	62.7	66.0	53.7	62.4

TABLE 4. USAGE RATE FOR ALL FRONT SEAT PASSENGERS

	PERCENT USAGE			
	REGION			
FUNCTIONAL CLASSIFICATION	WEST	NORTH	EAST	ALL
Rural Interstate	75.7	69.7	73.0	71.7
Rural Principal Arterial	67.1	65.8	52.1	60.1
Rural Minor Arterial/Major Collector	55.7	69.3	43.4	54.6
Rural Minor Collector/Local	44.6	55.4	49.8	48.7
Urban Interstate/Freeway	67.8	63.1	59.9	63.5
Urban Principal Arterial	62.1	59.0	59.1	59.8
Urban Minor Arterial/Collector/Local	53.6	57.0	52.1	55.5
All	60.8	62.9	52.5	60.0

TABLE 5. USAGE RATE FOR CHILDREN UNDER FOUR YEARS OF AGE (FRONT AND REAR)

	PERCENT USAGE			
	REGION			
FUNCTIONAL CLASSIFICATION	WEST	NORTH	EAST	ALL
Rural Interstate	86.9	93.5	96.3	92.4
Rural Principal Arterial	93.5	99.9	84.5	90.3
Rural Minor Arterial/Major Collector	99.0	95.0	61.1	84.7
Rural Minor Collector/Local	78.4	84.6	74.9	78.1
Urban Interstate/Freeway	98.9	93.9	86.6	94.3
Urban Principal Arterial	82.8	91.9	86.3	88.9
Urban Minor Arterial/Collector/Local	92.6	83.1	84.2	85.8
All	91.4	91.9	78.3	88.8

TABLE 6. 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
1999	59	59	89
2000	60	60	87
2001	62	62	89

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

** Data not available.

TABLE 7. USAGE RATE BY TYPE OF VEHICLE (ALL FRONT SEAT OCCUPANTS)

FUNCTIONAL CLASSIFICATION	REGION			
	WEST	NORTH	EAST	ALL
	Passengers Cars			
Rural Interstate	78.3	76.6	72.4	76.3
Rural Principal Arterial	74.3	72.1	58.3	66.8
Rural Minor Arterial/Major Collector	62.3	70.6	54.2	61.4
Rural Minor Collector/Local	53.6	65.8	61.8	59.2
Urban Interstate/Freeway	73.9	74.1	65.9	73.9
Urban Principal Arterial	67.1	62.2	59.7	63.1
Urban Minor Arterial/Collector/Local	65.0	62.5	59.9	62.9
All	67.6	70.1	59.7	67.1
	Pickup Trucks			
Rural Interstate	57.9	61.6	57.2	60.0
Rural Principal Arterial	51.6	54.9	41.1	47.3
Rural Minor Arterial/Major Collector	40.1	51.0	28.9	38.7
Rural Minor Collector/Local	32.1	48.2	32.6	35.3
Urban Interstate/Freeway	54.9	52.8	54.4	53.0
Urban Principal Arterial	48.1	48.1	42.6	47.4
Urban Minor Arterial/Collector/Local	49.7	46.3	41.6	46.7
All	47.0	52.3	38.8	47.8
	Vans			
Rural Interstate	80.8	69.5	69.7	72.3
Rural Principal Arterial	72.0	61.5	63.3	66.7
Rural Minor Arterial/Major Collector	58.5	65.1	48.2	56.4
Rural Minor Collector/Local	68.8	63.9	53.1	61.4
Urban Interstate/Freeway	78.1	68.9	74.2	69.9
Urban Principal Arterial	64.8	61.6	65.8	63.0
Urban Minor Arterial/Collector/Local	61.5	65.3	56.7	63.3
All	67.8	66.4	58.4	65.1
	Sport Utility Vehicles			
Rural Interstate	76.7	77.6	80.1	77.8
Rural Principal Arterial	79.3	65.4	58.5	68.1
Rural Minor Arterial/Major Collector	65.4	74.9	57.7	64.9
Rural Minor Collector/Local	65.8	60.3	53.8	59.9
Urban Interstate/Freeway	79.7	73.3	76.2	74.0
Urban Principal Arterial	67.1	63.3	57.5	63.5
Urban Minor Arterial/Collector/Local	69.7	65.0	63.0	66.0
All	71.5	70.4	60.6	68.6

APPENDIX A

COUNTY POPULATIONS AND NUMBER OF DATA COLLECTION SITES

COUNTY	POPULATION*	NUMBER OF SITES	REGION**
Adair	15,360	1	3
Allen	14,628	0	1
Anderson	14,571	0	2
Ballard	7,902	0	1
Barren	34,001	8	1
Bath	9,692	0	3
Bell	31,506	2	3
Boone	57,589	9	2
Bourbon	19,236	0	2
Boyd	51,150	4	3
Boyle	25,641	2	2
Bracken	7,766	0	2
Breathitt	15,703	2	3
Breckinridge	16,312	1	1
Bullitt	47,567	3	2
Butler	11,245	0	1
Caldwell	13,232	0	1
Calloway	30,735	1	1
Campbell	83,866	5	2
Carlisle	5,238	0	1
Carroll	9,292	0	2
Carter	24,340	4	3
Casey	14,211	0	3
Christian	68,941	2	1
Clark	29,496	4	2
Clay	21,746	1	3
Clinton	9,135	0	3
Crittenden	9,196	0	1
Cumberland	6,784	0	3
Daviess	87,189	3	1
Edmonson	10,357	0	1
Elliott	6,455	0	3
Estill	14,614	0	3
Fayette	225,366	5	2
Fleming	12,292	0	3
Floyd	43,586	1	3
Franklin	43,781	2	2
Fulton	8,271	0	1
Gallatin	5,393	0	2
Garrard	11,579	0	2
Grant	15,737	1	2

COUNTY	POPULATION*	NUMBER OF SITES	REGION**
Graves	33,550	1	1
Grayson	21,050	4	1
Green	10,371	0	1
Greenup	36,742	4	3
Hancock	7,864	0	1
Hardin	89,240	7	1
Harlan	36,574	3	3
Harrison	16,248	0	2
Hart	14,890	0	1
Henderson	43,044	3	1
Henry	12,823	0	2
Hickman	5,566	0	1
Hopkins	46,126	3	1
Jackson	11,955	0	3
Jefferson	664,937	20	2
Jessamine	30,508	3	2
Johnson	23,248	3	3
Kenton	142,031	7	2
Knott	17,906	0	3
Knox	29,676	1	3
Larue	11,679	0	1
Laurel	43,438	7	3
Lawrence	13,998	0	3
Lee	7,422	0	3
Leslie	13,642	0	3
Letcher	27,000	4	3
Lewis	13,029	0	3
Lincoln	20,045	2	3
Livingston	9,062	0	1
Logan	24,416	4	1
Lyon	6,624	0	1
McCracken	62,879	9	1
McCreary	15,603	0	3
McLean	9,628	0	1
Madison	57,508	0	2
Magoffin	13,077	0	3
Marion	16,499	2	1
Marshall	27,205	5	1
Martin	12,526	1	3
Mason	16,666	0	3
Meade	24,170	2	1

COUNTY	POPULATION*	NUMBER OF SITES	REGION**
Menifee	5,092	0	3
Mercer	19,148	1	2
Metcalfe	8,963	0	1
Monroe	11,401	0	1
Montgomery	19,561	3	2
Morgan	11,648	0	3
Muhlenberg	31,318	3	1
Nelson	29,710	1	1
Nicholas	6,725	0	3
Ohio	21,105	0	1
Oldham	33,263	4	2
Owen	9,035	0	2
Owsley	5,036	0	3
Pendelton	12,036	0	2
Perry	30,283	2	3
Pike	72,583	2	3
Powell	11,686	0	3
Pulaski	49,489	2	3
Robertson	2,124	0	2
Rockcastle	14,803	1	3
Rowan	20,353	1	3
Russell	14,716	0	3
Scott	23,867	7	2
Shelby	24,824	3	2
Simpson	15,145	2	1
Spencer	6,801	0	2
Taylor	21,146	2	1
Todd	10,940	0	1
Trigg	10,361	0	1
Trimble	6,090	0	2
Union	16,557	0	1
Warren	76,673	3	1
Washington	10,441	0	1
Wayne	17,468	0	3
Webster	13,955	0	1
Whitley	33,326	4	3
Wolfe	6,503	0	3
Woodford	19,955	3	2
TOTALS	3,685,278	200	

* Based on 1990 census.
** Region 1 - West; Region 2 - North; Region 3 - East

APPENDIX B

RELATIVE ERROR AND CONFIDENCE INTERVAL FOR USAGE FOR ALL FRONT SEAT PASSENGERS

TABLE B-1. RELATIVE ERROR FOR DATA FOR ALL FRONT SEAT OCCUPANTS

	RELATIVE ERROR*			
	REGION			
FUNCTIONAL CLASSIFICATION	WEST	NORTH	EAST	ALL
Rural Interstate	3.9	2.4	4.3	1.2
Rural Principal Arterial	2.7	6.4	2.9	1.2
Rural Minor Arterial/Major Collector	4.2	3.8	5.9	1.4
Rural Minor Collector/Local	5.0	6.7	5.2	1.7
Urban Interstate/Freeway	2.5	1.7	6.5	1.0
Urban Principal Arterial	2.9	2.1	4.3	0.9
Urban Minor Arterial/Collector/Local	3.9	2.8	3.5	1.2
All	0.9	0.7	1.3	0.5

* Percent (0.95 probability)

TABLE B-2. CONFIDENCE INTERVAL FOR DATA FOR ALL FRONT SEAT OCCUPANTS

	CONFIDENCE INTERVAL*			
	REGION			
FUNCTIONAL CLASSIFICATION	WEST	NORTH	EAST	ALL
Rural Interstate	2.7	1.7	2.7	0.8
Rural Principal Arterial	1.9	4.2	1.5	0.7
Rural Minor Arterial/Major Collector	2.2	2.2	2.5	0.9
Rural Minor Collector/Local	2.3	3.5	2.7	1.4
Urban Interstate/Freeway	1.7	1.2	4.0	0.7
Urban Principal Arterial	1.6	1.2	2.2	0.7
Urban Minor Arterial/Collector/Local	2.2	1.6	1.7	0.8
All	0.5	0.4	0.7	0.3

* Percentage with 0.95 probability.

APPENDIX C

SUMMARY OF DATA

TABLE C-1. SUMMARY OF DATA

Location Number	ALL FRONT SEAT OCCUPANTS Sample	Percent Usage	Relative Error*	Confidence Interval*	CATEGORY DRIVERS Sample	Percent Usage	FRONT SEAT PASSENGERS Sample	Percent Usage	UNDER FOUR (FRONT AND REAR) Sample	Percent Usage
1	290	72	7.2	5.2	189	72	101	71	2	100
2	255	81	5.9	4.8	170	82	85	80	1	100
3	144	73	10.0	7.3	89	73	55	73	0	N/A
4	223	70	8.5	6.0	155	68	68	75	12	75
5	862	76	3.7	2.8	560	74	302	80	17	94
6	1,183	82	2.7	2.2	806	80	377	84	0	N/A
7	486	79	4.5	3.6	333	80	153	77	3	100
8	315	70	7.1	5.0	211	70	104	71	1	100
9	101	72	12.1	8.7	68	74	33	70	3	100
10	689	52	7.2	3.7	533	50	156	57	13	100
11	1,006	69	4.1	2.9	750	70	256	66	7	86
12	817	64	5.2	3.3	628	63	189	64	20	100
13	322	75	6.4	4.8	282	76	40	68	0	N/A
14	425	65	6.9	4.5	335	66	90	63	2	100
15	322	72	6.9	4.9	223	71	99	73	2	100
16	500	77	4.8	3.7	357	78	143	74	2	100
17	531	57	7.3	4.2	427	58	104	54	5	80
18	674	61	6.1	3.7	521	61	153	58	10	90
19	709	67	5.2	3.5	514	67	195	66	5	80
20	449	63	7.0	4.5	348	66	101	56	10	70
21	557	59	6.9	4.1	412	58	145	63	3	100
22	228	54	12.0	6.5	180	53	48	58	2	100
23	673	61	6.1	3.7	508	59	165	67	24	83
24	226	73	8.0	5.8	190	73	36	72	1	100
25	310	55	10.0	5.5	233	56	77	55	2	100
26	620	53	7.5	3.9	492	52	128	55	3	100
27	1,104	55	5.3	2.9	846	54	258	57	26	88
28	317	57	9.6	5.5	239	58	78	54	3	100
29	938	51	6.2	3.2	716	51	222	51	20	100
30	214	51	13.0	6.7	157	51	57	53	5	100
31	397	46	10.6	4.9	300	46	97	47	5	100
32	191	51	13.8	7.1	139	52	52	50	2	100
33	631	39	9.8	3.8	492	39	139	39	12	92
34	72	38	29.8	11.2	56	38	16	38	0	N/A
35	55	58	22.4	13.0	45	60	10	50	2	100
36	334	53	10.1	5.4	265	52	69	55	0	N/A
37	749	50	7.1	3.6	562	51	187	48	8	88
38	622	51	7.7	3.9	507	53	115	41	7	71
39	51	47	29.1	13.7	35	43	16	56	0	N/A
40	50	46	30.0	13.8	35	51	15	33	3	67
41	375	74	6.1	4.5	264	73	111	74	1	100
42	618	85	3.4	2.8	455	85	163	82	7	86
43	236	56	11.2	6.3	182	55	54	61	2	100
44	670	67	5.3	3.6	537	69	133	56	4	100
45	751	73	4.4	3.2	580	72	171	73	3	100
46	456	73	5.6	4.1	332	74	124	69	0	N/A
47	1,442	69	3.5	2.4	1,086	69	356	70	12	83
48	482	58	7.6	4.4	372	61	110	48	3	67
49	1,046	62	4.8	2.9	849	61	197	63	48	85
50	1,249	61	4.4	2.7	923	62	326	59	26	96

TABLE C-1. SUMMARY OF DATA (continued)

	ALL FRONT SEAT OCCUPANTS				CATEGORY					
					DRIVERS		FRONT SEAT PASSENGERS		UNDER FOUR (FRONT AND REAR)	
Location Number	Sample	Percent Usage	Relative Error*	Confidence Interval*	Sample	Percent Usage	Sample	Percent Usage	Sample	Percent Usage
51	803	66	5.0	3.3	645	66	158	65	17	88
52	1,120	61	4.6	2.9	856	63	264	55	12	100
53	636	58	6.7	3.8	488	60	148	49	17	71
54	1,243	61	4.4	2.7	1,030	61	213	62	15	80
55	1,609	54	4.5	2.4	1,224	56	385	49	19	84
56	1,502	69	3.4	2.3	1,165	70	337	66	29	86
57	632	69	5.2	3.6	507	70	125	66	16	100
58	424	54	8.7	4.7	318	54	106	56	19	95
59	100	64	14.7	9.4	87	66	13	54	0	N/A
60	456	53	8.6	4.6	363	55	93	45	5	100
61	271	49	12.2	5.9	209	50	62	44	3	100
62	116	51	17.9	9.1	89	58	27	26	3	67
63	475	60	7.3	4.4	406	60	69	59	3	100
64	431	64	7.1	4.5	336	66	95	58	8	100
65	391	59	8.2	4.9	303	59	88	58	11	91
66	438	56	8.3	4.6	358	58	80	49	4	75
67	448	71	5.9	4.2	349	70	99	75	0	N/A
68	599	72	4.9	3.6	448	72	151	74	16	88
69	793	73	4.3	3.1	611	73	182	71	12	67
70	420	64	7.2	4.6	321	66	99	58	8	100
71	428	66	6.8	4.5	359	67	69	61	4	100
72	394	75	5.7	4.3	280	73	114	80	2	100
73	277	77	6.5	5.0	200	76	77	79	7	86
74	421	75	5.5	4.1	283	71	138	83	3	100
75	308	60	9.0	5.5	239	60	69	62	3	100
76	383	69	6.7	4.6	292	71	91	63	10	90
77	1,179	81	2.7	2.2	852	80	327	84	0	N/A
78	326	78	5.7	4.5	240	80	86	72	4	100
79	923	57	5.6	3.2	686	57	237	57	3	100
80	463	62	7.1	4.4	327	61	136	65	9	100
81	412	56	8.6	4.8	329	55	83	58	6	100
82	130	70	11.3	7.9	111	70	19	68	4	100
83	704	60	6.0	3.6	472	63	232	55	12	92
84	660	65	5.6	3.6	510	66	150	63	8	100
85	54	63	20.5	12.9	42	60	12	75	0	N/A
86	221	71	8.3	6.0	167	71	54	74	3	100
87	366	48	10.6	5.1	279	48	87	49	8	88
88	578	71	5.2	3.7	479	71	99	72	8	100
89	127	60	14.2	8.5	95	67	32	38	0	N/A
90	212	50	13.3	6.7	156	51	56	48	0	N/A
91	184	47	15.4	7.2	161	45	23	61	0	N/A
92	800	52	6.7	3.5	577	52	223	52	12	83
93	87	55	18.9	10.4	72	50	15	80	1	100
94	680	73	4.5	3.3	532	71	148	82	0	N/A
95	121	47	18.9	8.9	87	45	34	53	0	N/A
96	18	33	65.3	21.8	14	29	4	50	0	N/A
97	157	55	14.0	7.8	110	57	47	51	3	67
98	202	56	12.1	6.8	162	56	40	60	4	100
99	77	56	19.9	11.1	52	60	25	48	4	75
100	282	66	8.3	5.5	203	70	79	57	0	N/A

TABLE C-1. SUMMARY OF DATA (continued)

Location Number	ALL FRONT SEAT OCCUPANTS Sample	Percent Usage	Relative Error*	Confidence Interval*	CATEGORY DRIVERS Sample	Percent Usage	FRONT SEAT PASSENGERS Sample	Percent Usage	UNDER FOUR (FRONT AND REAR) Sample	Percent Usage
101	608	51	7.8	4.0	470	51	138	52	14	79
102	856	65	4.9	3.2	658	67	198	56	12	83
103	1,080	77	3.3	2.5	914	77	166	73	28	93
104	175	77	8.1	6.2	134	80	41	68	1	100
105	815	62	5.4	3.3	667	63	148	56	6	100
106	841	70	4.4	3.1	667	70	174	71	4	50
107	724	76	4.1	3.1	506	78	218	71	8	88
108	594	68	5.5	3.7	520	69	74	66	8	100
109	565	71	5.2	3.7	444	73	121	67	11	100
110	737	74	4.3	3.2	520	77	217	67	10	100
111	605	69	5.4	3.7	499	71	106	59	12	100
112	433	60	7.8	4.6	337	61	96	53	8	75
113	842	79	3.5	2.8	662	79	180	77	4	75
114	569	65	6.0	3.9	468	67	101	55	12	100
115	1,078	70	3.9	2.7	774	72	304	66	11	91
116	941	69	4.2	2.9	738	70	203	67	32	97
117	615	61	6.4	3.9	462	58	153	68	10	90
118	500	73	5.3	3.9	370	76	130	67	9	67
119	581	69	5.4	3.8	449	69	132	69	2	100
120	690	58	6.4	3.7	564	59	126	53	7	100
121	1,072	55	5.4	3.0	735	56	337	52	5	100
122	424	58	8.1	4.7	345	56	79	66	14	100
123	457	63	7.1	4.4	384	66	73	42	5	100
124	1,009	56	5.5	3.1	789	56	220	54	18	67
125	517	59	7.2	4.2	389	58	128	63	0	N/A
126	1,044	73	3.6	2.7	908	74	136	71	14	100
127	645	51	7.6	3.9	477	51	168	51	11	64
128	375	53	9.6	5.1	300	53	75	53	1	100
129	816	64	5.1	3.3	579	65	237	63	24	88
130	1,203	51	5.5	2.8	882	52	321	49	16	81
131	821	55	6.2	3.4	616	54	205	57	8	100
132	973	66	4.5	3.0	716	67	257	62	8	88
133	792	51	6.8	3.5	515	52	277	48	11	82
134	553	64	6.2	4.0	428	65	125	61	33	97
135	652	60	6.2	3.8	531	59	121	64	4	75
136	1,031	58	5.2	3.0	819	59	212	55	11	73
137	1,007	61	5.0	3.0	858	61	149	58	6	83
138	611	63	6.0	3.8	433	64	178	62	13	92
139	399	58	8.3	4.8	336	57	63	63	8	100
140	500	55	8.0	4.4	392	56	108	50	13	77
141	1,023	57	5.3	3.0	866	58	157	55	7	100
142	510	57	7.6	4.3	342	56	168	59	12	92
143	621	68	5.4	3.7	441	67	180	71	1	100
144	1,304	65	4.0	2.6	1,048	64	256	70	22	95
145	118	59	14.9	8.9	90	61	28	54	1	100
146	317	60	9.0	5.4	233	59	84	63	13	77
147	430	59	7.9	4.6	330	61	100	53	16	100
148	790	53	6.5	3.5	623	54	167	51	15	73
149	394	71	6.3	4.5	274	68	120	78	2	100
150	78	71	14.3	10.1	57	68	21	76	1	100

TABLE C-1. SUMMARY OF DATA

Location Number	ALL FRONT SEAT OCCUPANTS Sample	Percent Usage	Relative Error*	Confidence Interval*	CATEGORY DRIVERS Sample	Percent Usage	FRONT SEAT PASSENGERS Sample	Percent Usage	UNDER FOUR (FRONT AND REAR) Sample	Percent Usage
1	290	72	7.2	5.2	189	72	101	71	2	100
2	255	81	5.9	4.8	170	82	85	80	1	100
3	144	73	10.0	7.3	89	73	55	73	0	N/A
4	223	70	8.5	6.0	155	68	68	75	12	75
5	862	76	3.7	2.8	560	74	302	80	17	94
6	1,183	82	2.7	2.2	806	80	377	84	0	N/A
7	486	79	4.5	3.6	333	80	153	77	3	100
8	315	70	7.1	5.0	211	70	104	71	1	100
9	101	72	12.1	8.7	68	74	33	70	3	100
10	689	52	7.2	3.7	533	50	156	57	13	100
11	1,006	69	4.1	2.9	750	70	256	66	7	86
12	817	64	5.2	3.3	628	63	189	64	20	100
13	322	75	6.4	4.8	282	76	40	68	0	N/A
14	425	65	6.9	4.5	335	66	90	63	2	100
15	322	72	6.9	4.9	223	71	99	73	2	100
16	500	77	4.8	3.7	357	78	143	74	2	100
17	531	57	7.3	4.2	427	58	104	54	5	80
18	674	61	6.1	3.7	521	61	153	58	10	90
19	709	67	5.2	3.5	514	67	195	66	5	80
20	449	63	7.0	4.5	348	66	101	56	10	70
21	557	59	6.9	4.1	412	58	145	63	3	100
22	228	54	12.0	6.5	180	53	48	58	2	100
23	673	61	6.1	3.7	508	59	165	67	24	83
24	226	73	8.0	5.8	190	73	36	72	1	100
25	310	55	10.0	5.5	233	56	77	55	2	100
26	620	53	7.5	3.9	492	52	128	55	3	100
27	1,104	55	5.3	2.9	846	54	258	57	26	88
28	317	57	9.6	5.5	239	58	78	54	3	100
29	938	51	6.2	3.2	716	51	222	51	20	100
30	214	51	13.0	6.7	157	51	57	53	5	100
31	397	46	10.6	4.9	300	46	97	47	5	100
32	191	51	13.8	7.1	139	52	52	50	2	100
33	631	39	9.8	3.8	492	39	139	39	12	92
34	72	38	29.8	11.2	56	38	16	38	0	N/A
35	55	58	22.4	13.0	45	60	10	50	2	100
36	334	53	10.1	5.4	265	52	69	55	0	N/A
37	749	50	7.1	3.6	562	51	187	48	8	88
38	622	51	7.7	3.9	507	53	115	41	7	71
39	51	47	29.1	13.7	35	43	16	56	0	N/A
40	50	46	30.0	13.8	35	51	15	33	3	67
41	375	74	6.1	4.5	264	73	111	74	1	100
42	618	85	3.4	2.8	455	85	163	82	7	86
43	236	56	11.2	6.3	182	55	54	61	2	100
44	670	67	5.3	3.6	537	69	133	56	4	100
45	751	73	4.4	3.2	580	72	171	73	3	100
46	456	73	5.6	4.1	332	74	124	69	0	N/A
47	1,442	69	3.5	2.4	1,086	69	356	70	12	83
48	482	58	7.6	4.4	372	61	110	48	3	67
49	1,046	62	4.8	2.9	849	61	197	63	48	85
50	1,249	61	4.4	2.7	923	62	326	59	26	96