SEAT BELT OBSERVATION STUDY

SUMMER 2010

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EXECUTIVE SUMMARY

The 2010 statewide survey of safety belt use in Oklahoma was conducted in 19 counties at 315 observation sites during the month of June. The sampling procedures replicated the approach initially adopted in winter of 1991-1992 and followed in each statewide survey thereafter. The design is a random probability sample based on population and average daily vehicle miles traveled (DVMT). The design is a statewide, multistage, area sample of roadway segments and local roadway intersections. Beginning with the 2002 survey, a new set of sample sites was selected using 2000 Census data and 2000 DVMT data. Given that the design was a random probability sample, the data analyses used a weighted ratio of belted drivers and belted front-seat outboard passengers to the total number of drivers and front-seat outboard passengers observed.

In 2010, a total of 48,486 drivers and front-seat outboard passengers were observed. Of the total individuals observed, 19,483 were traveling in passenger cars (40.2 percent of the sample), 13,501 were observed in pickup trucks (27.8 percent), 11,780 were in SUVs/Jeeps (24.3 percent), and 3,722 were traveling in vans (7.7 percent). In previous years, survey results reported seatbelt usage for pickups compared to all other categories of vehicles combined under "automobiles." Thus, for the purpose of comparison with previous surveys, results will include an "automobile" category which simply sums the results from all vehicles that are not pickup trucks (cars, vans, and SUVs/Jeeps).

Estimated Seat Belt Use for Drivers and Front-Seat Outboard Passengers in Oklahoma: Summer 2010
Weighted Percent

	Combined	Autos[1]	Cars	Vans	SUVs	Pickups
Statewide	85.9	88.9	88.1	88.9	90.1	78.4
Regions (non-metropolitan)						
West	84.0	86.7	85.8	88.0	87.9	77.8
Northeast	87.3	91.6	90.6	90.9	93.3	78.4
Southeast	82.0	86.1	85.5	84.9	87.0	72.9
Metropolitan Counties						
Oklahoma	85.1	87.6	85.9	87.5	90.8	79.0
Tulsa	89.5	91.8	92.2	92.6	90.7	81.5

NOTE:
[1]The 'auto' category sums the results from all vehicles that are not pickup trucks (cars, vans, and SUVs/Jeeps).

A comparison of the summer 2009 and the summer 2010 survey results reveals that statewide safety belt use increased from 84.2 percent to 85.9 percent). The usage rate for summer 2010 represents the highest buckled rate for Oklahomans since the seatbelt usage studies began.

As noted by Glassbrenner (2004), improvement in belt use generally is measured by the percentage point increase in the use rate. However, the same percentage point increase for two different areas is not always equivalent. Increasing the use rate by 2 percentage points from a base of 85 percent, for example, is more difficult than increasing by the same amount if an area is starting at a 50 percent use rate. Increasing use from 85 percent requires changing the behavior of a larger fraction of nonusers. Consequently, NHTSA began calculating a measure termed the "conversion rate," the percentage of nonusers that were converted to users (the percentage reduction in nonuse). Statewide, the 1.7 percentage point increase from 2009 to 2010 is equivalent to an estimated 10.8 percent decrease in nonusers. The biggest *decreases* in those not buckled took place in the Northeast region (31.4 percentage points) followed by Oklahoma County (21.2 percentage points).

The difference in safety belt use between automobiles (cars, vans, SUVs, Jeeps) and pickup trucks continues to be substantial. Statewide safety belt use in automobiles was 88.9 percent, while only 78.4 percent of drivers and front-seat outboard passengers were belted in pickups. Because pickup observations account for 27.8 percent of all observations, the low rate of buckled drivers and passengers in pickup trucks substantially lowers the overall use rate for the state.

Differences continue to be evident when males and females are compared. Women buckled up at a rate of 89.9 percent, whereas men used seat belts at a rate of 82.7 percent. The lower overall use rate for men is due, in part, to the low buckled rate for men driving or riding in pickup trucks; 39.5 percent of male drivers and passengers were observed in pickups and only 76.8 percent of these men were buckled. On the other hand, 84.2 percent of women drivers and passengers in pickups were belted. With respect to race, the 2010 results indicate that non-whites were slightly more likely to be buckled than white drivers and passengers (86.3 percent and 85.8 percent, respectively).

OKLAHOMA SEAT BELT OBSERVATION STUDY
SUMMER 2010

INTRODUCTION

During June 2010, the Institute for Public Affairs at the University of Oklahoma (OU) undertook a statewide observation survey of safety belt use in Oklahoma. The survey has been conducted through OU since 1986 and is part of an ongoing effort to evaluate the effectiveness of the Oklahoma Mandatory Seat Belt Use Act (Title 47, Chapter 12, § 416-421).

Oklahoma's law requiring automobile drivers and front-seat passengers to buckle up became effective February 1, 1987. It was amended on February 1, 1989 to require drivers and front-seat passengers of pickup trucks and vans to wear seat belts as well. Until the enactment of House Bill 1443 in 1997, Oklahoma's law permitted only "secondary enforcement." An unbelted driver could be ticketed only after being stopped for another traffic violation. The 1997 law permits primary enforcement – a law enforcement officer can issue a citation solely for failure to buckle up. Oklahoma has joined 26 other states, the District of Columbia and Puerto Rico with primary enforcement laws (Chen and Ye, 2009).

The 2010 survey included 315 observation sites, resulting in 48,486 drivers and front-seat outboard passengers being observed for safety belt use. This report presents the results of the summer 2010 survey and compares these findings with the results of similar statewide surveys conducted during the previous four years.

STUDY METHODOLOGY

This section describes the process used to sample and allocate sites for observation and procedures for observation and data collection, weighting and data analysis, and observer selection and training. The survey findings are presented following the discussion of the study methodology.

Observation Site Selection and Allocation

Beginning with the winter 1991-92 study and for all subsequent surveys, a probability-based design was followed to ensure the potential selection of any road intersection in the state as an observation site. The sample was drawn using a statewide, multistage, area probability sample of road segments and intersections. In 1999, the sample was modified slightly by dropping three counties.[1] The new 19 county sample reflected three non-metropolitan regions and Tulsa and Oklahoma Counties. Tulsa and Oklahoma Counties were designated as "certainty" counties to be included in the sample because of their high levels of daily vehicle miles traveled (DVMT). They contain the two largest cities in the state, so together they provide a measurement of safety belt use in the largest metropolitan areas.

To increase comparability across surveys, the same site locations were used from the 1991-1992 survey through the 2001 survey. Due to road construction and population changes during that time period, a decision was made to update the original sample for the 2002 survey. The method

used to draw the sample of sites for 2002 mirrored the procedure used previously. Population data for counties was taken from the 2000 Census and daily vehicle miles traveled data for 2000 (the latest available) were provided by the Oklahoma Department of Transportation.

Counties in the non-certainty category, representing smaller communities and rural areas, were weighted by population and 17 were randomly selected. Six counties were selected for the Northeast and six for the Southeast region, while five counties were selected in the West region. Excluding Tulsa and Oklahoma Counties, the number of sample counties selected per region reflects that region's population. This resulted in one county less in the Northeast and one county more in the West compared to the previous sample.

The sample included 315 observation sites statewide (see Appendix A for a complete list). Sixty percent of the sites were allocated to major roads and 40 percent to local roads, to reflect the distribution of daily vehicle miles traveled between the two types of roadways (the actual distribution of DVMT is 38 percent local roads and 62 percent major). Therefore, in each of the 17 non-metropolitan counties sampled, 15 observation sites were selected with nine allocated to major roads and six to local roads. In the largest sample counties, the Tulsa and Oklahoma City metropolitan areas, 30 observation sites were allocated with 18 sites on major roads and 12 on local roads. The allocation by region, county and metropolitan area is summarized in Table 1.

Following the 1991 methodology, the procedure for selecting roadway sites differed according to whether they were major roadways (interstates, U.S. roads, and state roads) or local roadways (all other paved roads, excluding reservations, airports, and privately controlled areas). Major roadway sites were selected by weighting the road segment lengths by the traffic volume and then randomly selecting the road segment in each county. Data for major road segments were provided by the Oklahoma Department of Transportation. Observation sites were determined by selecting the intersection or location nearest to where each road segment began and from which safety belt use could be readily observed.

Local roadway sites were determined by first weighting the census tracts based on population, and then randomly selecting the three census tracts in each county. County and local roadway intersections, as identified on the county maps in each of the selected census tracts, were randomly selected. The only sites considered were those in which three or more road segments joined together. In towns and communities with residential streets, only the main arteries were included in the pool to be sampled.

The data collected from these randomly selected observation sites were used to calculate the confidence interval for each of the categories in the sample. The confidence interval describes the variability of the data within each category caused by sampling design and provides a value used to calculate a range or interval in which the population's actual seat belt usage can be estimated. A 95 percent confidence level is calculated by multiplying an estimate of the standard error by 1.96. The standard error is estimated using WesVar 5.1 and a balanced repeated replication technique described in Appendix B.

Table 1
Sample Sites by Region, County, Metropolitan Areas and Roadways

	Number of Sites	Major Roads	Local Roads
Statewide Totals	315	189	126
Regions (non-metropolitan)			
West	75	45	30
Canadian	15	9	6
Comanche	15	9	6
Garfield	15	9	6
Grady	15	9	6
Logan	15	9	6
Northeast	90	54	36
Delaware	15	9	6
Mayes	15	9	6
Muskogee	15	9	6
Ottawa	15	9	6
Payne	15	9	6
Rogers	15	9	6
Southeast	90	54	36
Bryan	15	9	6
Carter	15	9	6
Cleveland	15	9	6
McClain	15	9	6
Pontotoc	15	9	6
Pottawatomie	15	9	6
Metropolitan Counties	60	36	24
Oklahoma	30	18	12
Tulsa	30	18	12

Observation and Data Collection Procedures

Assignment of Observers. All daylight hours for all days of the week were eligible for inclusion in the sample. Appendix C provides a more complete description of the methodology for random assignment of observers to each location. The basic procedure for random assignment of observers by day of week and time of day was as follows:

1. With 15 sites per county, it was assumed that observers would cover one county in two days – eight locations in day 1 and seven locations in day 2.

2. The earliest start time was set at 7:00 a.m. and the last start time was determined to be 11:00 a.m. (the 11a.m. time would assure that the observer would complete all observations by no later than 7:00 p.m.; 11 + 8 = 19; 1900 hours; 7 p.m.).

3. The counties were assigned to three non-metropolitan regions (West, Northeast, Southeast) and two metropolitan counties (Tulsa and Oklahoma).

4. Observers were provided a predetermined sequence of counties in each region to minimize travel time.

5. The sequencing of sites within each county also was predetermined to form a rough circle of sites that could be covered in a single day, again to minimize travel time.

6. The beginning day of the week was decided by the roll of a die.

7. Observers were told from which corner of the intersection they would observe.

Data Collection Procedures. At all sites, observers collected the following data for drivers and front-seat outboard passengers (see Appendix D for further discussion):

- Time of day
- Date
- Type of vehicle (car/van/SUV/Jeep/pickup truck)
- Shoulder belt use (using/not using)
- Gender (male/female/unsure)
- Race (white/non-white/unsure)

Observations were limited to seat belt use requirements as established by Oklahoma law, which include drivers and front-seat passengers. Belt use was determined by the proper use of a shoulder harness. Private automobiles, sport utility vehicles, vans, and pickup trucks are covered by the law; thus these were determined as the eligible vehicles to be observed. Commercial trucks and trailers, postal and other government vehicles, buses, and ambulances were excluded.

For surveys in 1997 and 1998, the observation time per site was 25 minutes for automobiles and a separate 25 minutes for pickup trucks. Beginning in 1999, instructions to observers called for a straight forty minute period at each site, during which time observers separately counted both passenger vehicles (including cars, vans, and sport utility vehicles) and pickup trucks. If for some reason observers were unable to remain at the site for the entire forty minute time frame, the observations were considered valid if he/she observed for at least thirty minutes at that site.

Weighting and Data Analysis

The multistage sample design is intended to provide satisfactory precision for determining the overall estimate of statewide usage, while additionally producing regional usage rates for the West, Northeast, and Southeast regions of the state. The design provides for a random sample that is weighted at each of the sampling stages and clusters based on population or DVMT. Since the sites were not sampled according to an equal probability selection method, weights that are inversely proportional to the selection probabilities are needed. When deriving estimates of belt usage, these population and DVMT weights are applied to the raw data (see Appendix B). Therefore, the use of a weighted ratio for the data analyses is both statistically appropriate and defensible. The weighted ratio is the weighted number of drivers and front-seat outboard passengers who are belted, divided by the weighted number of drivers and front-seat outboard passengers observed.

After the observations were completed, the data were entered into electronic format for weighting and statistical analyses. All of the analyses were performed using the PASW Statistics 18.0.2. The standard errors (Table 2) were generated using the WesVar 5.1 statistical software designed by Westat, Inc. of Rockville, Maryland (see Appendix B for further discussion).

Observer Selection and Training

The criteria used in selecting observers required that each person be at least 21 years of age, hold a valid driver's license, and be able to maintain the assigned schedule and research protocol for the observations. Each observer was trained on the types of vehicles to count, how to record the belted/not belted occupants, and other information necessary to complete their assignment. They also were provided an observer manual with specific instructions regarding the process for collecting data as well as a troubleshooting guide. The training session provided the observers with information on: (1) identifying eligible vehicles; (2) counting procedures for limited access roads; and, (3) completing the observation record sheet (see Appendix E).

The training session also included explicit directions on counting an improperly used shoulder belt as "not using" and determining the number of lanes to be observed when traffic volume was high. During the survey period, on-site audits were conducted by the Institute for Public Affairs to ensure compliance and quality data collection by all observers.

RESULTS OF THE SURVEY

During June 2010, observers visited the 315 sites in the 19 sample counties. They collected data for 48,486 drivers and front-seat outboard passengers. Of the total individuals observed, 19,483 were traveling in passenger cars (40.2 percent of the sample), 13,501 were observed in pickup trucks (27.8 percent), 11,780 were in SUVs/Jeeps (24.3 percent), and 3,722 were traveling in vans (7.7 percent). Drivers accounted for 38,268 (78.9 percent) of the observations and 10,218 (21.1 percent) were passengers.

Table 2 shows the estimates of safety belt use and confidence intervals for the state, non-metropolitan regions, the two metropolitan counties, and roadway types (major and local). The statewide seat belt usage rate for drivers and front-seat outboard passengers was 85.9 percent. Tulsa County led all regions with 89.5 percent buckled. The Southeast region had the lowest percentage

Table 2
Estimate of Seat Belt Use in Oklahoma:
Summer 2010

	Number of Observations	Weighted Estimate (PERCENT)	Standard Error (PERCENT)	Confidence Interval* (PERCENT)
Statewide	48,486	85.9	2.1	+/- 4.1
Regions (non-metropolitan)				
West	9,274	84.0	1.7	+/- 3.3
Northeast	11,658	87.3	2.2	+/- 4.3
Southeast	12,088	82.0	1.0	+/- 2.0
Metropolitan Counties				
Oklahoma	7,289	85.1	0.6	+/- 1.2
Tulsa	8,177	89.5	4.0	+/- 7.8
Roadway Type				
Major	36,576	86.7	2.7	+/- 5.3
Local	11,910	85.0	1.6	+/- 3.1

*The confidence interval is also sometimes referred to as sampling error. Based on a 95 percent confidence level, the actual belt use for each category shown in the table is the estimated percentage use + or – the standard error (S.E.) multiplied by 1.96. For example, for the state as a whole, the actual percentage use should be between 81.8 and 90.0 percent [85.9 +/- (1.96 x 2.1)] for 95 samples out of 100. Standard errors were calculated using WesVar 5.1 software.

buckled (82.0 percent). Drivers and passengers observed traveling on major roads were somewhat more likely to be buckled (86.7 percent) than those observed on local roadways (85.0 percent).

The differences in seat belt use by the type of vehicle are presented in Table 3. For the entire state, 88.9 percent of drivers and passengers in automobiles (includes cars, vans, and sport utility vehicles/jeeps) were buckled up, while 78.4 percent were restrained in pickup trucks. Drivers and passengers in SUVs were the most likely to be buckled up (90.1 percent), followed by those in vans and cars (88.0 and 88.1, respectively).

Table 3
Estimated Seat Belt Use in Oklahoma By Type of Vehicle: Summer 2010
Weighted Percent
(number of observations)

	Combined	Autos[1]	Cars	Vans	SUVs	Pickups
Statewide	85.9 (48,486)	88.9* (34,985)	88.1 (19,483)	88.9 (3,722)	90.1 (11,780)	78.4* (13,501)
Regions (non-metropolitan)						
West	84.0 (9,274)	86.7* (6,476)	85.8 (3,807)	88.0 (684)	87.9 (1,985)	77.8* (2,798)
Northeast	87.3 (11,658)	91.6* (8,057)	90.6 (4,168)	90.9 (1,063)	93.3 (2,826)	78.4* (3,601)
Southeast	82.0 (12,088)	86.1* (8,695)	85.5 (4,883)	84.9 (706)	87.0 (3,106)	72.9* (3,393)
Metropolitan Counties						
Oklahoma	85.1 (7,289)	87.6* (5,411)	85.7 (3,048)	87.5 (603)	90.8 (1,760)	79.0* (1,878)
Tulsa	89.5 (8,177)	91.8* (6,346)	92.2 (3,577)	92.6 (666)	90.7 (2,103)	81.5* (1,831)
Roadway Type						
Major	86.7 (36,576)	89.4* (26,555)	88.4 (14,724)	89.1 (2,854)	91.1 (8,977)	80.1* (10,021)
Local	85.0 (11,910)	88.5* (8,430)	87.9 (4,759)	89.0 (868)	88.9 (2,803)	76.4* (3,480)

NOTES:
[1]The 'autos' category sums the results from all vehicles that are not pickup trucks (cars, vans, SUVs/Jeeps).

*Differences are statistically significant at the .05 level using a difference of proportions test. The tests of significance are calculated between automobiles and pickup trucks for each region and road type.

As typically is the case, use rates for drivers and outboard passengers in pickup trucks lag well behind the rates for all other vehicle types. All of the differences reported in Table 3 between safety belt use in automobiles and pickup trucks are statistically significant at the .05 level using a difference of proportions test.[2] Safety belt use in pickups in Tulsa County (81.5 percent) was somewhat higher than the statewide average for pickups (78.4 percent). As ususal, the Southeast region had the lowest seat belt usage among those observed in pickup trucks (72.9 percent).

The variation in occupant protection for automobiles and pickup trucks also was evident between the two roadway types. Seat belt use is estimated at 89.4 percent in automobiles traveling on major roadways but declined to 80.1 percent for pickup trucks on major roads. An even greater disparity exists for those traveling on local roadways. Drivers and passengers in automobiles on local roads buckled up at a rate of 88.5 percent, compared to 76.4 percent for those in pickups.

Although the breakdown by region is useful for targeting problem areas for seat belt use, an examination of the differences among sampled counties within the regions provides further insights (Table 4). Since the variation among counties within a region can be substantial, a comparison of county data provides more specific information that can be used for targeted media campaigns and enhanced enforcement in areas where seat belt usage is lowest.

The five sampled counties with the **lowest** seat belt compliance rate for 2010 include:

	2010
Carter County	72.1%
Garfield County	74.3%
Payne County	78.7%
Canadian County	80.8%
Pontotoc County	82.0%

Pottawatomie County just missed the list with a buckled rate of 82.2 percent. Three of the counties (Canadian, Garfield, and Pontotoc) had a lower buckled rate in 2010 than in 2009. Carter, Garfield, and Payne Counties also were on this list in 2009. Not surprisingly, four of the five counties with the lowest compliance rates overall also are counties with the lowest buckled rates for pickup truck drivers and passengers. Only Canadian County from the list above is *not* among the five lowest for buckled rates among those observed in pickups. However, it did have the sixth lowest rate. In Carter County, only 58.7 percent of those riding in pickup trucks were belted.

Table 4
Estimate of Seat Belt Use in Oklahoma by County: Summer 2010
Percent

	Weighted Combined	Major Roads	Local Roads
Regions (non-metropolitan)			
West	84.0	84.2	83.4
Canadian	80.8	79.4	84.3
Comanche	94.1	93.5	94.5
Garfield	74.3	76.7	72.0
Grady	87.4	88.4	83.6
Logan	83.6	84.8	76.5
Northeast	87.3	87.7	86.0
Delaware	84.0	84.6	80.1
Mayes	85.9	86.0	85.7
Muskogee	89.3	89.6	88.6
Ottawa	91.0	90.4	94.2
Payne	78.7	78.4	79.2
Rogers	91.8	92.6	87.5
Southeast	82.0	82.1	81.7
Bryan	85.7	85.0	88.7
Carter	72.1	73.5	67.7
Cleveland	89.5	88.7	90.1
McClain	83.0	83.4	77.1
Pontotoc	82.0	81.4	83.1
Pottawatomie	82.2	83.8	78.0
Metropolitan Counties	87.1	89.2	85.8
Oklahoma	85.1	85.7	84.7
Tulsa	89.5	93.5	86.8

The five sampled counties with the **highest** seat belt compliance for 2010 include:

	2010
Comanche County	94.1%
Rogers County	91.8%
Ottawa County	91.0%
Cleveland County	89.5%
Tulsa County	89.5%
Muskogee County	89.3%

Among the five counties with the highest seat belt compliance rates, Comanche, Rogers, Cleveland, and Tulsa Counties were on the list in 2009. While the West region has two of the counties with the lowest buckled rate (Canadian and Garfield), it also has the county with the highest use rate (Comanche). Interestingly, compared to the low belt use by those in pickups in the lowest overall usage counties, the opposite condition exists within the counties listed above. Seven of the ten counties with the highest overall belt usage (including the six listed above) also are among the highest usage counties for pickup riders. This reinforces the importance of increasing seat belt usage for pickup truck drivers and riders.

Comparisons to Previous Surveys

Table 5 presents safety belt usage for the surveys conducted between 2006 and 2010. The statewide rate of use has increased (+2.2 percentage points) over this time period. In general, the buckled rates for the regions have been on an upward trend, even though they all experience a down tick on occasion. Except for 2007, Oklahoma County has had a fairly consistent buckled rate (around 81 or 82 percent) but experienced a increase to 85.1 percent in 2010. Tulsa County has exhibited the most consistent and desirable performance over this five-year period. Drivers and outboard passengers have increased their buckled rates each year to a high of 92.1 percent in 2009. Tulsa dipped somewhat in 2010 (89.5 percent) but maintains the highest buckled rate among the five regions. The rates for major and local roads generally have been increasing since 2006, with those traveling on major roads exhibiting a higher buckled rate than those on local roads for four of the five years (2009 was the exception).

Comparison of the summer 2009 and summer 2010 estimates reveals statistically significant increases in safety belt use for all of the regions except Tulsa. The Northeast region experienced the greatest increase (5.8 percentage points, from 81.5 to 87.3 percent buckled). Tulsa had a statistically significant 2.6 percentage point decrease. However, as noted above, they still have the highest buckled rate of all the regions. This typically has been the case. The buckled rate for those in vehicles observed on major and local roads also increased (2.9 and 0.7 percentage point increases, respectively), but only the major road increase is statistically significant.

As noted by Glassbrenner (2004), improvement in belt use generally is measured by the percentage point increase in the use rate. However, the same percentage point increase for two different regions or counties is not always equivalent. Increasing the use rate by 2 percentage points from a base of 85 percent is more difficult than increasing by the same amount if an area is starting at a 70 percent use rate. Increasing from 85 percent requires changing the behavior of a larger

fraction of nonusers. Further, when the use rate is high, many of the nonusers are more likely to be "hard-core" and not as likely to be influenced by media or enforcement campaigns. Thus, in her analysis of the National Occupant Protection Use Survey (NOPUS) data, Glassbrenner includes a measure termed the *conversion rate*. Intuitively, it is the percentage of nonusers that were converted to users. Since the data generated by the seat belt use surveys are snapshots of use, interpreting the reduction in nonuse as the percentage of nonusers that were converted to users is not strictly correct. No data are available to document the degree of use (e.g., all the time, half the time, etc.). However, the general interpretation of the conversion rate provides an intuitive means to assess improvements in belt use.

Table 5
Comparison of Seat Belt Use in Oklahoma:
Summer 2006-2010
(Weighted Percent)

	Sum '06	Sum '07	Sum '08	Sum '09	Sum '10	Percentage Point Change '09 -'10	Conversion Rate* '09 -'10
Statewide	83.7	83.1	84.3	84.2	85.9	+1.7**	+10.8
Regions (non-metro)							
West	83.6	83.6	80.3	82.4	84.0	+1.6**	+9.1
Northeast	80.0	82.0	84.5	81.5	87.3	+5.8**	+31.4
Southeast	79.9	83.1	80.6	80.7	82.0	+1.3***	+6.7
Metropolitan Counties							
Oklahoma	81.3	76.7	82.3	81.1	85.1	+4.0**	+21.2
Tulsa	90.7	90.8	91.0	92.1	89.5	-2.6**	-32.9
Roadway Type							
Major	83.5	84.3	85.2	83.8	86.7	+2.9**	+17.9
Local	83.5	81.5	83.0	84.3	85.0	+0.7	+4.5

*A positive conversion rate is the percentage *reduction* in belt nonuse. It is the percentage point change from 2009 to 2010 divided by the percentage of nonusers in 2009. A negative number is the percentage *increase* in nonusers; that is, negative conversion rates reflect a decrease in estimated use rates.

**Differences are statistically significant at the .05 level using a difference of proportions test.

***Differences are statistically significant at the .01 level using a difference of proportions test.

Table 5 includes a column that provides the conversion rate for increases in use between the 2009 and 2010 summer surveys. Statewide, the 1.7 percentage point increase in the buckled rate from last year is equivalent to a 10.8 percent decrease in nonusers. The largest percentage reductions in nonusers occurred in the Northeast region (31.4 percentage points) and Oklahoma County (21.2 percentage points). The West and Southeast regions experienced reductions in nonusers of 9.1 percentage points and 6.7 percentage points, respectively. There was a 17.9 percentage point reduction in nonusers traveling on major roads and a 4.5 percentage point reduction for those on local roads.

Use by Gender and Race

Table 6 presents the differences in *unweighted* belt usage by gender and race. Front seat outboard (window) passengers buckle up at a higher rate (87.6 percent) than do vehicle drivers (85.4 percent). The data in Table 6 indicate that drivers and passengers combined have a use rate of 85.9 percent. **It is important to note that the data in Table 6 do not reflect the weighting procedures used to account for the effects of the sampling plan employed to select observation sites and only include riders for whom their sex was recorded.** It is not possible to generate the entries displayed in Table 6 from the weighted data. However, when the weighted data are used, the statewide buckled rate is the same as the rate displayed in Table 6.

Table 6
Estimate of Seat Belt Use in Oklahoma By Gender and Race: Summer 2010
UNWEIGHTED Percent
(n size)*

	Overall	Female	Male		Non-White	White
Drivers	85.4 (38,051)	89.2** (15,213)	82.8** (22,838)		86.4 (3,754)	85.3 (34,360)
Front Seat Outboard Passengers	87.6 (10,115)	91.6** (6,074)	81.8** (4,041)		85.8*** (1,178)	87.9*** (8,972)
Drivers and Front Seat Outboard Passengers	85.9 (48,166)	89.9** (21,287)	82.7** (26,879)		86.3 (4,944)	85.8 (43,365)

* The total number of observations for the category. For example, of the 15,213 female drivers, 89.2 percent were buckled. The number of observations by sex or race do not equal the total number of observations (48,486) because it was not possible to determine the characteristics of some drivers and passengers.

** Statistical significance is calculated within sex and race categories using Chi-square. Differences are statistically significant at the .0001 level between male and female rates for drivers, passengers, and all occupants.

*** The difference between non-white and white rates for drivers is significant at the .044 level.

Overall, females (89.9 percent) are more likely to be buckled than males (82.7 percent). As usual, the same pattern holds when considering the gender of drivers and passenger, and the difference is somewhat greater among the passengers when compared to drivers. Usage among female passengers was 9.8 percentage points higher than male passengers. Among drivers, 6.4 percent fewer males buckled up compared to females. The male/female results in Oklahoma are consistent with the national trend. The National Occupant Protection Use Survey (NOPUS) 2009 data for buckled rates by gender have not yet been published. However, the most recent data are consistent with our previous findings. Pickrell and Ye (2009) report that 86 percent of females buckled up compared to 81 percent of the males observed in 2008. The Oklahoma data for 2008 indicated females buckled up at a rate of 88 percent, while 81 percent of the observed males were buckled (James, Hall and Krimmer 2008). Further, the pattern of statistically higher use among females has been evident in the NOPUS and Oklahoma data for several years.

Overall, non-white occupants buckled up at a slightly higher rate than white occupants (86.3 percent and 85.8 percent, respectively). Non-white drivers also buckled at a higher rate than did corresponding white occupants. However, white passengers buckled at a statistically significant higher rate than did non-white passengers (87.9 percent compared to 86.4 percent).

SUMMARY AND RECOMMENDATIONS

This report provides an analysis of a statewide observation study of safety belt use among 48,486 Oklahoma drivers and front-seat outboard passengers conducted in June 2010. The research design used a statewide, multistage, area probability sample of road segments and intersections. It represents a probability sample of all roadways in the state, taking into account regional population distributions, metropolitan and non-metropolitan counties, and major and local roadway classifications. The 315 sites were chosen to produce both an accurate representation of counties based on population and satisfactory estimates by region.

The results of the summer 2010 survey can be summarized as follows:

- Statewide safety belt use increased 1.7 percentage points, from 84.2 percent in summer 2009 to 85.9 percent in summer 2010. The 2010 buckled rate is the highest usage rate ever recorded for Oklahoma and the is statistically significant.

- Every region except Tulsa County had a statistically significant higher buckled rate in 2010 compared to 2009.

- Although Tulsa County experienced a decrease in its buckled rate for 2010 (92.1 percent in 2009 and 89.5 percent in 2010), it still has the highest buckled rate among all the regions; the lowest rate occurred in the Southeast region (82.0 percent).

- Between 2009 and 2010, the largest percentage reduction in nonusers occurred in the Northeast region (31.4 percent) followed by Oklahoma County (21.2 percent).

- Statewide seat belt use in the summer 2010 for automobiles (cars, vans, and suvs/jeeps) was 88.9 percent, compared to 78.4 percent for pickup trucks.

- Those observed in Comanche County had the highest usage rate for pickup trucks (91.7 percent). As was the case in 2009, the lowest usage rate for pickup riders occurred in Carter County (58.7 percent).

- Overall, drivers and passengers observed on major roadways (86.7 percent) were somewhat more likely to be restrained than and those on local roadways (85.0 percent).

- Usage among females exceeded the belted rate for males (89.9 percent to 82.7 percent). Overall, non-whites (86.3 percent) were slightly more likely to be buckled than whites (85.8 percent).

Two factors that have been demonstrated to play key roles in determining a state's use rate are the nature of the state's seat belt law and media campaigns conducted to raise use. The 2008 NHTSA survey found that those states with stronger belt enforcement laws (primary enforcement) continue to exhibit generally higher buckled rates than states with weaker laws (secondary enforcement)or no laws (Chen and Ye, 2009). With respect to public education, the main theme of the national advertising campaign promoted by NHTSA has been *Click It or Ticket*. It conveys a message that it is illegal not to use safety belts, law enforcement officers are looking for nonuse, and offenders will be ticketed. The campaign is viewed as a success with safety belt use increases coincident with the advertising campaign (Solomon, et al., 2003). A recent study by Tison and Williams (2010) assessing *Click It or Ticket* programs confirms that primary law states had substantially higher seat belt use and higher levels of enforcement than secondary states. They also note that *Click It or Ticket* programs aimed at the general driving population and supplemented by more targeted programs directed at low use groups (e.g., occupants of pickups and rural residents) are key to increasing seat belt use. However, media programs without enforcement are not nearly as successful. As Hedlund et al. (2008) note, enforcement is important, the more seat belt laws are enforced, the higher the seat belt use rate.

Oklahoma has a positive environment with respect to both of these factors. The increase in Oklahoma's seat belt usage rate to a level that approaches the national average coincides with a change in policy, as well as recent media campaigns focusing on enforcement of the state's seat belt law. In 1997, House Bill 1443 was passed, which permitted primary enforcement of Oklahoma's safety belt use law. A second contributing factor is the aggressive media campaign launched in Oklahoma as part of NHTSA's "Click It or Ticket!" seat belt mobilization drive. Advertisements and local news coverage emphasized to the public that Oklahoma law enforcement agencies were "buckling down on seat belt violators."

In light of the data collected as part of the 2010 observation study, we offer the following recommendations:

- Continue to encourage law enforcement agencies to *vigorously* enforce the Oklahoma Mandatory Seat Belt Use Act on a consistent basis;

- Begin to collect county-level data on enforcement of the use of seat belts to document the relationship between enforcement efforts and safety restraint use;

- Continue to pursue a multimedia strategy for educating the public about the benefits of using seat belts and the consequences of non-compliance with the state seat belt law; and

- Enhanced enforcement and education efforts should be directed toward pickup truck drivers and passengers, especially men. Targeting specific counties and regions with low usage rates (i.e., the Southeast region, in general, and counties such as Carter, Garfield, Delaware, McClain, Pontotoc, and Canadian, in particular) also would likely have a positive impact on rates in those areas.

ENDNOTES

1. For the period from 1991-92 through 1998, the survey included 360 sites in 22 counties randomly chosen from the universe of all state counties, including the two certainty counties (Oklahoma and Tulsa Counties). Guidelines from the National Highway Traffic Safety Administration (NHTSA) require a design in which at least 85 percent of the state's population is eligible for inclusion in the sample. In an effort to make the Oklahoma survey as comparable as possible with similar surveys in other states, we eliminated three counties included in previous surveys – Atoka, Cotton, and Greer. These three counties had the smallest populations among the previously used group of 22. In dropping these three counties, the sample easily meets the 85 percent population criterion with the remaining total of 19 counties. In addition, a weighting procedure based on countywide observation data was developed in consultation with Dr. Dennis Utter of NHTSA. The purpose was to more accurately reflect the percentage of belted drivers and passengers and to provide for the calculation of more precise confidence intervals.

2. A difference of proportions test is used to determine whether or not the difference between two proportions from independent samples are statistically significant. If the difference between two proportions is statistically significant, there is a small probability (e.g., less than 5 in 100) that the difference is due to chance.

REFERENCES

Chen, Y. and Ye, T. 2009. *Safety Belt Use in 2008 – Use Rates in the States and Territories* (DOT HS 811 106). Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis. Washington, D.C. April.

Glassbrenner, D. 2004. *Safety Belt Use in 2004 – Use Rates in the States and Territories* (DOT HS 809 813). Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis. Washington, D.C. November.

Hedlund, J., Gilbert, S., Ledingham, K., and Preusser, D. 2008. How States Achieve High Belt Use Rates (DOT HS 810 962). Department of Transportation, National Highway Traffic Safety Administration. Washington, D.C.

James, T., Hall K., and Krimmer, M.. 2008. *Seat Belt Observation Study.* University of Oklahoma, Institute for Public Affairs. Norman, OK. July.

Pickrell, T and Ye, T. 2009. *Safety Belt Use in 2008 – Demographic Characteristics* (DOT HS 811 183). Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis. Washington, D.C. August .

Solomon, M.G., Chaudhary, N., and Cosgrove, L. 2003. *Click It or Ticket Safety Belt Mobilization Evaluation.* Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis. Washington, D.C. May.

Tison, J. and Williams, A. 2010. *Analyzing the First Years of the Click It or Ticket Mobilizations*. (DOT HS 811 232). Department of Transportation, National Highway Traffic Safety Administration. Washington, D.C. January.

APPENDIX A
Seatbelt Observation Sites – June 2010

WEST Region

Canadian County

Local

1. W. Main St. (SH66) @ S. Ranchwood Blvd. (SH 4)
2. N. Mustang Rd. @ Vandamart Ave.
3. N 63rd St. @ Banner Rd.
4. Elm St. @ Choctaw
5. Banner Rd. @ S. 29th St.
6. Country Club Rd. @ Elm St.

Major

7. I-40 B @ Country Club Rd.
8. SH 152 @ US 81
9. SH 66 @ JCT Kilpatrick Turnpike
10. SH 4 (Mustang Rd.) @ 29th St.
11. I-40 @ Morgan Rd.
12. I-40 @ JCT US 281 Spur
13. I-40 @ US 270
14. I-40 @ US 81
15. I-40 @ Banner Rd.

Comanche County

Local

1. NW Cache Rd. @ NW 97th St.
2. NW 82nd St. @ NW Gore
3. NW 82nd St. @ SW Lee Blvd.
4. NW 38th St. @ SW Lee Blvd.
5. NE Gore Blvd. @ SW 45th St.
6. 90th St. @ SE Lee (SH 7)

Major

7. SH 49 @ SH 58
8. Indian Trail Rd. (frontage to US 281) @ Mission Rd (1/4 mile S. of US 281/62 JCT)
9. US 281 Bus. (2nd St.) @ "C" St.
10. US 277 (E/W) @ US 62/US 281 (N/S)
11. US 62 @ Ft. Sill Blvd.
12. US 62/US 281 @ Pine Ave.
13. US 62 @ NW 127th St.
14. US 62 @ Post Oak Rd.
15. SH 65 @ SH 7

Garfield County

Local

1. Cheyenne St. @ SH 132
2. Imo (3 mi. E of SH 132) @ Drummond Road
3. Chestnut Road @ Cleveland Road
4. Oakwood Road @ Willow
5. 66th Street @ Breckenridge Rd (Purdue St.)
6. Market Ave. @ 66th St.

Garfield County (continued)
Major
7. US 64 Bus.(Grand Blvd.) @ Willow Road
8. SH 164 @ SH 74
9. SH 412 (SH 60) @ South Adams
10. US 81 @ Southgate Rd
11. SH 74 @ Unnamed Local Rd. (3 mi S of SH 74/164)
12. US 81 @ Drummond
13. US 60 @ Cleveland
14. US 412 (US 64 Bus.) @ Market
15. US 60 (US 412) @ Mill Run (.25 mi. E of Garland Rd.)

Grady County
Local
1. Georgia Ave @ US 277/ US 81 (4th Ave.)
2. 6th St. @ SH 92 (Grand Terrace Ave.)
3. Alex Hwy (6 mi. N of Alex) @ SH 39
4. 4th St./Main St. @ SH 92
5. South Sara Rd. @ Fox Rd.
6. Cimarron Rd. @ SH 37

Major
7. US 62 @ Locust St.
8. US 81 @ SH 37 West
9. US 81 @ Unnamed Local Rd. (2 mi. N of Chickasha city limit)
10. SH 19 @ 6th St.
11. US 81/US 277 @ SH 19 E (East Ninnekah line)
12. US 62 @ Maple (2.5 mi. W of SH 39 and SH 9/US 277 JCT)
13. US 81 @ Dutton (½ mi. N of Pocasset)
14. US 81 @ access road to Agawam
15. US 62/SH 9 @ Unnamed Local Rd. (2 ½ mi. W of Chickasha city limit or 3 ½ mi. E of Verden city limit)

Logan County
Local
1. Broadway Blvd. @ Charter Oak Rd.
2. Pine Street @ SH 33 (Noble Ave.)
3. Hale Road @ SH 33
4. Waterloo Rd. @ Douglas Blvd.
5. Monroe @ SH 74 (Grand Ave.)
6. Main St. @ SH 74 E

Major
7. US 77 @ Triplett Rd.
8. SH 33 @ Pennsylvania
9. SH 74 F @ Rockwell Ave.
10. I-35 @ Seward Rd (Exit 151)
11. I-35 @ SH 33 (Exit 157)
12. SH 33 @ US 77
13. US 77 @ Industrial Rd.
14. SH 33 @ 14th St.
15. I-35 @ Waterloo Rd.

NORTHEAST Region

Delaware County

Local

1. Broadway @ SH 85 A (Bernice, OK)
2. Unnamed Local Rd. (in Choleta; 2 mi. E of Mayes County Line) @ SH 20
3. Unnamed Local Rd. (2 mi. S of Ottawa Co.)@ SH 10
4. 13th St. @ Main St. (US 59)
5. Washbourne @ 9th St.
6. Cherokee St. @ Tulsa Ave (US 412A)

Major

7. 412 A @ Unnamed Local Rd. (approx. .25 mi. N of US 412/412A JCT)
8. US 59/SH 10 @ Unnamed Local Rd. (3 mi. S of SH 116 & SH10/US 59 JCT)
9. SH 85 A @ SH 125
10. US 412 A @ US 412 A South
11. SH 20 @ SH 28 N
12. SH 28 @ Unnamed Local Rd. (approx. 2 mi. E of county line)
13. SH 20 @ SH 10/US 59
14. US 59/SH 10 @ SH 116
15. US 59 @ New Life Ranch Rd.

Mayes County

Local

1. Unnamed Local Rd. (.25 mi. S of US 412 at JCT with US 69) @ Unnamed Local Rd. (3 ½ mi. W of US 69)
2. Chouteau Ave. (US 69) @ Main St.
3. Unnamed Local Rd. (3 mi. W of Locust Grove city limits) @ US 412A
4. Broadway @ Main (US 412A)
5. 9th St. @ Vann St.
6. Elliott @ Unnamed Local Rd. (½ mi. S of SE 17th St.)

Major

7. SH 28 @ SH 82 South
8. SH 20/SH 82 @ Tulsa Ave.
9. US 69 @ Unnamed Local Rd.(approx. 4.25 mi. S of US 412 & 2 mi. N of Wagoner County line)
10. SH 412B @ SH 69A
11. US 69A @ US 69
12. US 69 @ Unnamed Local Rd. (approx. 1.25 mi. S of US 412)
13. US 69 @ Unnamed Local Rd. (2 mi. S of SH 28)
14. US 69 @ Unnamed Local Rd. (2 mi. N of SH 20 JCT)
15. US 412 @ Vann St.

Muskogee County

Local

1. Seminole St. @ Sycamore St.
2. Border @ S. 24th St.
3. S. 24th St. @ Hancock
4. Smith Ferry Rd. @ Gulick
5. York St.@ Chandler St.
6. Gibson @ York St.

Muskogee County (continued)
Major
7. SH 80A @ SH 80
8. SH 10 @ SH 10A (after #8 is completed, take SH10 South to SH100; then, SH100 South to I-40 for site #9)
9. US 62B @ US 62/US 64
10. US 69 @ US 62 East
11. US 62 @ SH 10 South
12. I-40 @ SH 100
13. I-40 @ US 266/SH 2
14. US 64 @ Davis Field (look for Phillips 66)
15. US 69 @ Unnamed Local Rd. (1 mi. N and 2 mi. W of site #14)

Ottawa County
Local
1. 20th St. @ E St. (Miami, OK)
2. 12th St. @ E St. (Miami, OK)
3. Shawnee @ Main St. (Peoria,OK)
4. 12th St. @ College (Cardin, OK)
5. Main @ Broadway (Wyandotte, OK)
6. Unnamed Local Rd. (½ mi. S of US 60) @ SH 10

Major
7. SH 10 @ SH 137
8. SH 25 @ US 59/US 69 (Narcissa, OK)
9. US 69 A (Main St.) @ SH 137 South (Quapaw, OK)
10. US 60 @ US 60B
11. US 59 @ 20th St.
12. SH 10 @ Unnamed Local Rd. (2 mi. W of SH 137)
13. US 60 @ US 60 B (Seneca, OK)
14. US 60 (Conner Ave.) @ Cherry St. (Fairland, OK)
15. US 69 @ Veterans Blvd. (Miami, OK)

Payne County
Local
1. W 19th Ave. @ Sangre
2. Western @ W. 32nd St.
3. US 177 (Main St.) @ Thomas Ave.
4. Fairgrounds Rd. @ Mahen Rd.
5. Lakeview @ N. Country Club Rd.
6. Coyle Rd. @ SH 51

Major
7. SH 33 @ Harmony Rd.
8. SH 33 @ Logan County Line (128th)
9. SH 18 @ SH 33 (prior to fork)
10. SH 51 @ Redland Rd.
11. SH 51 @ Washington
12. SH 18/SH 33 @ Brethren Rd.
13. SH 18 (North to Little Axe) @ SH 18/SH 33 (Main St.)
14. US 177 @ SH 33
15. I-35 @ SH 51

Rogers County

Local

1. 106th St. @ 161st East Ave.
2. 145th St. @ 96th St.
3. Vera Rd. (EW 39) @ Maple St. (NS 408)
4. Unnamed Local Rd./EW 39 (approx. 3.75 mi. W of US 169) @ Unnamed Local Rd./NS 406 (1 mi. N of Vera)
5. Pine St. @ E 161st Ave.
6. Cherokee St. @ Pine St.

Major

7. SH 66 @ SH 88 (1st St.)
8. US 169 @ Tulsa County line
9. SH 66 @ SH 28 A
10. US 169 (Elm) @ Delaware St.
11. SH 266 @ SH 167
12. SH 66 @ Unnamed Local Rd./EW 45 (4 ½ mi. N of SH 20 or 6 mi. S of SH 28 A)
13. US 412 @ SH 88
14. US 412 @ Unnamed Local Rd./Crossroads NS 416 (6 mi. E of SH 167)
15. US 412/I-44 @ SH 167

SOUTHEAST Region

Bryan County

Local

1. Unnamed Local Rd. @ SH 78
2. Unnamed Local Rd. @ SH 78 (Ury)
3. Hillcrest Drive @ McLean
4. Mulberry St.@ First St.
5. Franklin @ Snider
6. Franklin @ Smiser (6 mi. N of SH 91)

Major

7. US 70 @ 7th St. NW
8. SH 78 @ SH 70 E
9. SH 78 (SE. 3rd St.) @ Georgia St. (1 mi. S of Mulberry St.)
10. US 69 Bus./US 75 Bus. @ Rodeo
11. US 70 @ Unnamed Local Rd. (2 ½ mi. W of Walnut in Mead)
12. US 70 @ Unnamed Local Rd. (½ mi. E of Walnut)
13. US 69 @ SH 91
14. US 69 @ McKinley (SE corner of Calera)
15. US 69/US 75 @ Armstrong Exit

Carter County

Local

1. W Lake Rd. @ 8th St. (SH 76)
2. Texas Road @ 1st St.
3. Prairie Valley Rd. @ Lake Ardmore Rd.
4. Hedges Rd. @ Unnamed Local Rd. (approx. 1.75 mi. S of US 70 & I-35 JCT)
5. Monroe Ave. @ Mt. Washington Rd.
6. Veterans Blvd. (SH 142) @ Refinery Road

Major

7. SH 76 @ SH 7 (E. Main St.)
8. SH 199 (Sam Noble Parkway) @ Gene Autry Rd.

Carter County (continued)

Major (continued)

9. US 70 @ SH 77 South (S. Lake Murray Dr.)
10. US 70 @ SH 77 South
11. I-35 @ 12th Ave. NW
12. SH 199 @ US 177
13. I-35 @ SH 53 E
14. I-35 @ SH 77 South
15. I-35 @ SH 53 W

Cleveland County

Local

1. Main St. @ 36th Ave.
2. 36th Ave. @ Robinson
3. 24th Ave. SE @ Rock Creek
4. Porter Ave. @ Franklin Rd.
5. Slaughterville Rd. @ 120th Ave. SE
6. 120th Ave., SE @ Spring Hill Rd. (SH 39)

Major

7. SH 74A (Lindsey St.) @ Jenkins Ave.
8. SH 37 (134th St.) @ Portland Ave.
9. SH 9 @ 48th Ave. SE
10. I-35 @ SE 89th St.
11. I-35 @ N 12th St.
12. I-35 @ Robinson St.
13. I-35 @ Indian Hills Rd.
14. SH 77 (Flood Ave) @ Tecumseh Rd.
15. I-35 @ 19th St.

McClain County

Local

1. Walnut Creek Rd. (S. 7th) @ MacArthur Ave.
2. Morehead St. @ Main St.
3. N. Main (SH 74) @ W. Center Rd.
4. Johnson Ave. @ 180th St.
5. 9th St. @ Grant St.
6. Barger (US 77) @ Seifried St.

Major

7. SH 9 @ S Santa Fe Ave.
8. US 62 @ NW 24th St.
9. I-35 @ SH 9 (Exit 106)
10. I-35 @ Purcell (Exit 91)
11. SH 9/ US 62/ US 277 @ MacArthur Ave.
12. I-35 @ Goldsby (Exit 104)
13. SH 74B @ SH 74 (270th St.)
14. I-35 @ SH 59
15. I-35 @ SH 74

Pontotoc County

Local

1. Oak @ 4th St.
2. Main St. @ Constant
3. Arlington (SH 1) @ Country Club
4. Mississippi (SH 99) @ Arlington (SH 1)
5. Homer-Francis Rd. @ Unnamed Local Rd.(County Road 150.3 at Oakman)
6. Ahloso Dr. @ Thomas Ranch Rd.

Major

7. SH 3 @ Mississippi
8. SH 48 @ SH 48/SH 1 JCT.
9. SH 1 @ Unnamed Local Rd. (approx. 2 mi. N of Happyland)
10. SH 19 @ Unnamed Local Rd. (1 mi. W of SH 3 W)
11. SH 3 @ SH 99 South
12. SH 3 East @ Unnamed Local Rd./CR 1510 (1 mi. N of Tower Rd.)
13. SH 48@ SH 3
14. SH 1 @ Johnston
15. SH 19 @ Unnamed Local Rd. (2 ½ mi. East of Garr Corner at Center)

Pottawatomie County

Local

1. Bethel Rd. @ SH 9
2. Broadway @ Washington
3. Kickapoo @ Burns
4. Independence Rd. @ Union
5. Harrison @ Main St.
6. Highland St. @ Pesotum

Major

7. US 177 @ SH 270
8. US 270 @ Seminole County line
9. US 270 @ SH 18/US 270 Bus.
10. US 177/SH 3 West @ SH 59 Bus.
11. US 270 @ McArthur
12. US 270 @ I-40/SH 3 East
13. I-40 @ SH 102 North
14. I-40 @ SH 3 East (Kickapoo Rd.)
15. I-40 @ SH 9 A

CERTAINTY/METROPOLITAN COUNTIES

Oklahoma County

Local

1. Council Rd. @ S. 15th St.
2. McArthur Blvd. @ S. 29th St.
3. Reno Ave. @ Rockwell Ave.
4. N. 10th St. @ Council Road
5. Pennsylvania Ave. @ Britton Rd.
6. Wilshire Blvd. @ Pennsylvania Ave.
7. Britton Rd. @ County Line Rd.
8. Council Rd. @ Wilshire Blvd.
9. Eastern Ave. @ Hefner Rd.
10. Memorial Rd. @ Eastern Ave.

Oklahoma County (continued)
Local (continued)
11. S. 15th St. @ Kelley Ave.
12. Kelley Ave. @ Edmond Rd.

Major
13. I-40 @ Sunnylane Rd.
14. I-240 @ SH 77
15. I-40 @ Douglas Blvd.
16. SH 3 (NW Expressway) @ Wilshire Blvd.
17. I-40 @ Agnew Rd.
18. I-44 @ Eastern/MLK Ave.
19. I-44 @ Pennsylvania Ave.
20. SH 74 (Hefner Parkway) @ Britton Rd.
21. I-35 @ Grand Blvd.
22. I-240 @ Bryant (Exit 6)
23. I-35 @ S.E. 59th St.
24. US 77 (Broadway Extension) @ Hefner Rd.
25. I-44 @ SW 29th St.
26. I-235 @ N. 50th St.
27. SH 74 (Hefner Parkway) @ Hefner Rd.
28. I-44 @ N. 23rd St.
29. I-40 @ Council Rd.
30. I-35 @ N. 10th St.

Tulsa County
Local
1. 141st St. South @ US 75
2. Peoria Ave. @ 141st St. South
3. Elwood Ave. (4th Ave.) @ West 111th St. South
4. West 91st St. South @ Union Ave.
5. 81st St. (Houston) @ Olive Ave (129th/Mayo Rd.)
6. Garnett Rd. @ West 91st St. (Washington St.)
7. 145th Ave. (Aspen Ave.) @ 11th St.
8. 21st St. @ 17th Ave. /Lynn Lane Rd.
9. 41st St. @ Lewis (25th Ave.)
10. Lewis (24th) Ave. @ 51st (Omaha)
11. 11th St. @ Pittsburgh
12. Yale (49th Ave.) @ 11th St.

Major
13. SH 266 (East 46th St. North) @ Mayo Rd. (Olive/129th)
14. US 64 (Memorial Rd/81st Ave.) @ 41st St.
15. I-244 @ Memorial Drive (81st Ave.)
16. SH 11 @ Pine (15th) St.
17. I-44 @ 21st St.
18. US 169 @ 46th St./SH 266 East
19. SH 51 (US 64) @ 65th Ave. (Sheridan Rd.)
20. US 169 @ SH 20 East (116th St.)
21. US 75 @ Pine St.
22. US 64 @ 81st West Ave.
23. US 75 @ E. 86th St. North
24. I-244 (US 412) @ Mingo Rd. (97th Ave.)
25. SH 51 (US 64) @ Harvard (33rd Ave.)

Tulsa County (continued)
Major (continued)
26. I-44 @ Harvard (33rd Ave.)
27. I-244 @ Yale (49th Ave.)
28. US 169 @ Pine St. (15th St.)
29. US 169 (Old 64) @ 61st St. (Albany St.)
30. I-244 (US 412) @ Lewis (24th Ave.)

APPENDIX B
ESTIMATION AND ANALYSIS PROCEDURES

ESTIMATION OF BELT USAGE

Safety belt usage rates were estimated separately for major and local roads within each county. All estimates were generated using SPSS statistical software. The estimates for major roads can be expressed as

$$R_{ij1} = 1/n_{ij1} * \quad (B_{ijk1}/O_{ijk1})$$

where

B_{ijk1} = number of observed belted occupants at road segment;

O_{ijk1}= number of observed occupants at road segment;

n_{ij1} = number of sample units of road segment type.

Estimates of local road usage rates can be expressed as

$$R_{ij2} = \quad B_{ijk1} / \quad O_{ijk1}$$

Estimates of county-wide usage rates can be expressed as

$$R_{ij} = \frac{V_{ijm} * R_{ijm} + V_{ij1} * R_{ij1}}{V_{ijm} + V_{ij1}}$$

where

V_{ijm} = average daily vehicle miles traveled (VMT) for major roads;

V_{ij1} = VMT for local roads.

County-wide sampling weights can be expressed as

$$W_{ij} = P_i / (P_i * ni)$$

where

P_i = total population of region; P_{ij} = population of county;

n_{ij} = number of counties sampled in region.

Regional estimates can be expressed as

$$R_i = W_{ij} * V_{ij} * R_{ij} / W_{ij} * V_{ij}$$

where

V_{ij} = county VMT; and W_{ij} = county sampling weight.

The state-wide usage rate is then estimated as

$$\frac{V_i * R_i}{V}$$

where

V_i = VMT for region; and V = state-wide VMT.

Note: The above formula was supplied by Dennis Utter, Mathematics Section, National Highway Traffic Safety Administration, Washington, D.C. (September 24, 1998). Data for average daily vehicle miles traveled came from Oklahoma Statewide Road Statistics (1997) furnished by the Oklahoma Department of Transportation Planning Division, Current Planning Branch, Road Inventory Section.

CALCULATION OF CONFIDENCE INTERVALS

The estimated usage rate is subject to sampling error because only a small fraction of the front seat occupants in the state were actually observed. Probability sampling techniques make it possible to obtain estimates of the sampling error of the survey estimates. These sampling errors can be expressed as standard errors of the estimates, which are in turn used to calculate confidence intervals. The standard errors and confidence intervals shown in Table 2 were generated using the WesVarPC statistical software system designed by Westat, Inc. of Rockville, Maryland.

A balanced repeated replication (BRR) procedure was chosen to estimate standard errors. This procedure involves partitioning the sample data into replication groups and then producing separate estimates of the overall weighted ratio (usage rate) from each replication group. The variability in the overall usage rate is then determined by measuring the variability in the estimates from the individual replicates. Using replication techniques such as BRR will help reduce the bias in variance estimation when the survey estimate is non-linear, as in the case of a ratio.

APPENDIX C
RANDOM ASSIGNMENT OF OBSERVERS

This appendix outlines the procedure for the random assignment of days, times, and traffic lanes to the 315 survey sites. Random assignment is done to eliminate observer discretion and to ensure that all days of the week, all daylight hours, and both directions of traffic flow are eligible for data gathering. We begin by pre-grouping the sites into sets – sites within one county that an observer could reasonably accomplish in a day. We then randomly assign those groups of sites to days of the week. Once each set is assigned to a day, the sites in it are randomly assigned to start times beginning on the hour. The example below illustrates how these random assignments are made.

Step 1. We divided the state into seven areas. These areas are smaller than the three regions that are used for aggregating data in the final report so that an individual observer can conduct observations at all of the sites in their respective area within a period of six days. Each region consists of two or three counties. The Northeast area, for example, consists of Ottawa, Delaware, and Mayes counties.

Step 2: We determined a sequence for the counties. In the Northeast area it makes sense, given the locations of the sites, to observe Ottawa first, then Delaware and finally Mayes.

Step 3: We determined sequences for the sites within a county. In Ottawa County, sites 4, 9, 3, 7, 12, 1, 2, and 15 form a rough circle and can be covered in one day. The remaining sites were left for the following day. Their predetermined sequence is 13, 10, 6, 5, 14, 8, and 11.

Step 4: We selected a day of the week to begin the area. Using a six-sided die and a random number chart obtained from a standard statistics text, we randomly assigned the start day for the Northeast area. This required three rolls of the die. The first two rolls determined the column and row on the random number chart where we began our search for a qualifying digit. The third roll gave us our interval of digits to skip as we searched down the column for the first eligible digit. Digits one through seven were eligible, with one standing for Sunday (the first day of the week) and seven indicating Saturday.

Step 5: We selected a starting location for Monday in Ottawa County. Rolling the die again we searched the random number chart systematically for an eligible site number as our start site for that Monday in Ottawa County. Since eight sites would be observed on this day the digits one through eight were eligible. The first eligible number we landed on was 8, site number 4 (eighth on our list) was selected as the start site. Given our predetermined sequence, sites 9, 3, 7, 12, 1, 2, and 15 (in that order) were scheduled to follow site 4 that day.

Step 6: We selected a starting time for site 4. In order to ensure that all daylight hours were eligible for observation, we randomly selected a start time for that day. Eligible start times, given an eight-site day as opposed to a seven-site day, were 7, 8, 9, and 10 a.m. (For the next day, when only seven sites would be observed, 11 a.m. also is an eligible start time.) For example, rolling the die as before, our first eligible number was 8. Therefore, the observer would be scheduled to begin in Ottawa County on Monday at site number 4 at eight o'clock in the morning. Given the predetermined sequence, the schedule for Monday in Ottawa County would become:

Site 4 at 8:00 a.m.
Site 9 at 9:00 a.m.
Site 3 at 10:00 a.m.
Site 7 at 11:00 a.m.
Site 12 at Noon
Site 1 at 1:00 p.m.
Site 2 at 2:00 p.m.
Site 15 at 3:00 p.m.

APPENDIX D
INSTRUCTIONS FOR OBSERVING SAFETY BELT USE

1. Safety Issues

Safety is of the utmost importance. Always be aware of your surroundings and traffic flow. You will be provided with an orange safety vest which is to be worn at all times when conducting observations. If for any reason you do not feel safe at a particular site, LEAVE IMMEDIATELY.

2. Vehicle Eligibility

Passenger vehicles are the only eligible vehicles for this study. Exclude commercial and emergency use cars and trucks, such as taxis, police cars, ambulances and small fire vehicles. Under "car" include 2- and 4-door sedans, hatch backs, and station wagons. Vans, sport utility vehicles/Jeeps, and pickup trucks are distinct observations.

3. Counting Procedures

To observe belt usage you stand on the right hand curb or roadside of the selected road, facing the assigned direction of traffic; DO NOT STAND IN ANY TRAFFIC LANE. If the selected road is an interstate, do not make observations on the interstate highway, but position yourself at the base of the nearest signal or sign controlled off-ramp intersection. DO NOT STAND on the interstate highway. Identify the type of vehicle (car, van, SUV/Jeep, pickup) you are observing. Record race as white, non-white, or unsure (W, N, U). Indicate sex as male, female, or unsure (M, F, U). Finally, mark seat belt usage as yes (Y) or no (N). Record the same information for any front-seat outboard passenger.

Data is collected continuously for the 40-minute observation period. If for some reason you are unable to complete the 40-minute period, you must observe and record belt use for at least 30 minutes to consider the observation complete. If an observation is conducted for less than 40 minutes, you must document in the comments section the site number and the reason why the observation was conducted for less than 40 minutes.

For most sites, you will observe vehicles only in the curb lane (the one closest to you), unless the traffic volume is so light that belt use on all lanes can be observed. If an intersection contains a turning lane, move back before the turning lane begins to conduct the observation. Never observe both directions of traffic, regardless of traffic flow.

In many situations, it will be possible to observe every vehicle in the designated lane. However, if traffic is moving too fast to observe every vehicle, locate a focal point up the road (e.g., telephone pole, sign, or building). Observe the next vehicle to pass the focal point after the last vehicle has been coded.

Observe belt use for front-seat occupants only. If there is more than one front-seat passenger, observe only the driver and outboard passenger. If a child in the front-seat is in a child restraint seat, do not record anything. However, children riding in the front-seat, regardless of age, who are not in child restraint seats should be observed as any other front-seat passenger. Also, if the vehicle is equipped with shoulder belts and the person has the belt buckled but has the shoulder strap under his/her arm, this person is not considered to be belted.

You may not be able to observe belt use in vehicles with dark tinted windows. If you cannot determine whether or not a person is wearing the shoulder belt, do not record it as an observation (skip the vehicle).

Your observations should include all eligible vehicles regardless of state of origin, i.e., count both in-state and out-of-state vehicles.

APPENDIX E
Oklahoma Safety Belt Observation Form - June 2010

Observer: _____ Location: _____

If location changed - indicate new address and explain problem with assigned location (construction, bridge out, etc.)

Observation Date: _____

County and Site ID#:_____

Start Time (40 min. duration): _____

Corner of Intersection you stood on: _____

NOTES: _____
(Please use back of sheet to continue your notes if necessary)

Direction of Traffic observed: _____

	DRIVER				PASSENGER		
	Vehicle C=Car P=Pickup S=SUV/Jeep V=Van	Race W=White N=Non-white U=Unsure	Sex M=Male F=Female U=Unsure	Use Y=Yes N=No	Race W=White N=Non-white U=Unsure	Sex M=Male F=Female U=Unsure	Use Y=Yes N=No
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							