OHIO DEPARTMENT OF PUBLIC SAFETY

EDUCATION • SERVICE • PROTECTION

TED STRICKLAND, GOVERNOR

CATHY COLLINS-TAYLOR, DIRECTOR

OBSERVATIONAL SURVEY OF SEAT BELT USE IN OHIO

2009

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Robert L. Seufert
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All correspondence regarding this report should be directed to the Ohio Traffic Safety Office, by mail at: P.O. Box 182081, Columbus, Ohio 43218-2081, or by phone at: (614) 466-3250.

EXECUTIVE SUMMARY

Overview: Based on the Final Survey Results, Ohio's overall 2009 seat belt use rate is **83.6%**, surpassing the 2008 belt usage rate of 82.7%. The 2009 estimate, which has an overall minimum margin of error of ± 1%, was derived from the second observational survey, which occurred after the combined *Click It or Ticket* media campaign and enforcement initiatives had been fully implemented. The above seat belt use rate for Ohio was formally reported to the National Highway Traffic Safety Administration (NHTSA).

Retired officers of the Ohio State Highway Patrol (OSHP) conducted observation surveys of seat belt use at 244 sites in 48 of Ohio's 88 counties. The 2009 observations included 22,867 occupants (18,958 drivers and 3,909 passengers) of non-commercial passenger cars, vans and minivans, sport utility vehicles (SUVs), and pickup trucks. Additional findings, which remain generally consistent with previous surveys, include the following:

- As in the past five years, the seat belt usage rate of pickup truck occupants (just over 76%) is significantly lower than that of occupants of passenger cars (84%), minivans (88%), or SUVs (85%), but is still an improvement over the 2008 rate of 75%.
- The Northwest region of the state has the highest seat belt usage rate (86%) while the Southeast region continues to have the lowest (78%).
- The usage rate for drivers (84%) continued to be slightly higher than that of passengers (82.5%).
- Female vehicle occupants again have a significantly higher rate of seat belt use (87%) than male occupants (80%), although there was a slight increase in seat belt use by males since 2008, when the rate was 79%.
- Caucasian vehicle occupants have a significantly higher rate of seat belt use (84%) than African-American occupants (76%).
- For vehicle occupants ages 15 and above, there was a steady increase in seat belt use as age increased. Seat belt use is lowest for vehicle occupants ages 15-25 (76%) and highest for occupants ages 65 and above (89%).

Although some groups surveyed during 2009 have relatively low seat belt use rates, individual rates for most subsets of the sample have improved with the exception of the 15-25 age group and African-Americans.

The following Ohio trends in seat belt use have occurred in sub-populations since the 2000 campaign:

- Between 2000 and 2009, the overall seat belt use rates have increased significantly in Ohio (i.e., from 65.3% in 2000 to 83.6% in 2009). Since 2000, increases in seat belt use also occurred in Ohio's five regions, as follows:
  - Central region rates of seat belt use increased from 65% in 2000 to a peak of 83% in 2006, and remained at approximately 82% between 2007 and 2009.
  - Northeast region belt use rates increased from 61% to a regional high of 83% in 2009.
  - Northwest region rates increased from 65% to a regional high of nearly 86% in 2009.
  - Southeast region seat belt use rates increased from 67% to a high of 80% in 2006, and then declined to 78% in 2009.
  - Southwest region seat belt use rates increased from 62% to a regional high of 86% in 2009.

- Usage rates for occupants of all vehicle types have increased. Most notably, the seat belt use rate of pickup truck occupants has increased from 49% in 2000 to 76% in 2009, the highest rate yet observed for this vehicle type. Nevertheless, in order to raise the statewide seat belt use rate, it is imperative that rates be improved among this occupant group and other subpopulations that fall well below the statewide average.
- Seat belt use rates for both drivers and passengers have increased (from 66% in 2000 to 84% in 2009 for drivers and from 62% in 2000 to 83% in 2009 for passengers, the highest rates observed for both groups).
- Male seat belt use has increased from 55% in 2000 to 80% in 2009, the highest rate yet for this group since 2000.
- Between 2000 and 2009, seat belt use rates for the following age groups increased: from 54% to 76% for ages 15-25; from 66% to 84% for ages 26-64; and from 71% to 90% for ages 65 and older.

Recommendations: This 2009 survey has identified the following populations that continue to warrant special attention because their relatively lower rates of seat belt use hamper progress on increasing the overall belt use rate. Due to the absence of a **primary** seat belt law in Ohio, to increase overall seat belt use, greater compliance must occur among populations with relatively low rates of seat belt use. Hence, ongoing media and enforcement initiatives, which promote greater seat belt use must be strengthened and directed disproportionately at the following populations:

- Southeast Region Vehicle Occupants
- Vehicle Occupants Age 15-25
- Vehicle Occupants Age 5-14
- Male Vehicle Occupants
- Pickup Truck Occupants
- African-American Vehicle Occupants

BACKGROUND

Since 1991, Ohio has conducted an annual observational survey to determine seat belt use following guidelines set by the National Highway Traffic Safety Administration (NHTSA). These guidelines have traditionally given individual states much discretion in survey design and implementation, with the stipulation that each state must generate a probability-based estimate for seat belt usage of front outboard occupants of passenger vehicles. This seat belt use estimate must have a required level of precision of less than 5% relative error and a 95% confidence coefficient. Individual states have been permitted to decide how much additional information to collect based on the resources available.

In 1998, NHTSA requested that states collect vehicle-specific information as part of the survey process. Specifically, all states were asked to collect information that would permit them to generate usage rates for occupants of four types of vehicles: passenger cars, vans/minivans, sport utility vehicles (SUVs), and pickup trucks. Since 1991, and prior to 1998, Ohio's seat belt surveys only collected data from occupants of passenger cars, minivans and SUVs, and results from each site were pooled so that observers did not record seat belt use for specific types of vehicles. That is, prior to 1998, the only data available were aggregate data from each site that provided overall counts of driver and passenger seat belt use. Thus, in 1998, Ohio's survey required some modifications in the way that seat belt use data were collected, in order to provide the vehicle-specific information requested by NHTSA. Also, data on license plate origins (i.e., from which state the plate was issued) have not been collected since 1999, because out-of-state vehicles were only a very small proportion of vehicles observed during previous years. In 2009, with the exception of the addition of driver's cell phone use on the observation form, the survey methodology was identical to that used during the 2008 observation surveys.[1]

Data were collected from vehicles stopped at randomly selected intersections and freeway off-ramps, so observers had ample opportunity to collect data from each individual vehicle observed. Traffic control devices such as traffic signals or stop signs were present at all observation site locations. This method gives observers not only the opportunity to collect general use data, but to collect additional demographic information on seat belt use in addition to vehicle type. Ohio and other states have found differences in seat belt use as a function of vehicle type, sex, and age. Research also indicates that seat belt use varies as a function of race and ethnicity. Consequently, the race of vehicle occupants was added to the survey in 2004 and has been retained in subsequent surveys. Additionally, as noted previously, the cell phone use of the driver was added to the 2009 survey. Modifying the survey to collect vehicle-specific information (i.e., data on usage in various vehicle types) and demographic data vastly increases our knowledge about the Ohioans who are likely to wear (or not wear) their seat belts.

[1] Information on driver cell phone use will be included in a separate document.

Also, to provide geographical information about regional trends in seat belt use, the survey is structured to estimate seat belt use on a regional level. That is, the sample is stratified by geographic region to allow for the estimation of seat belt use in various parts of the state.

This narrative contains the following sections: [2]

- **Methodology**: The methodology, approved by NHTSA, outlines the manner in which observation sites were chosen and data were collected and analyzed.
- **Results**: Descriptive results of seat belt use (e.g., percent of observations by sex, age, vehicle type, race, and region) are presented first in the same manner as in past *Observational Surveys of Seat Belt Use in Ohio*.
- **Recommendations**: Recommendations are based on the data derived from both the descriptive statistics and the multivariate analysis.
- **References** and **Appendices** containing observation sites and forms are also included.

The following section contains a full description of the methodological procedures approved by NHTSA to estimate seat belt use in 2009.

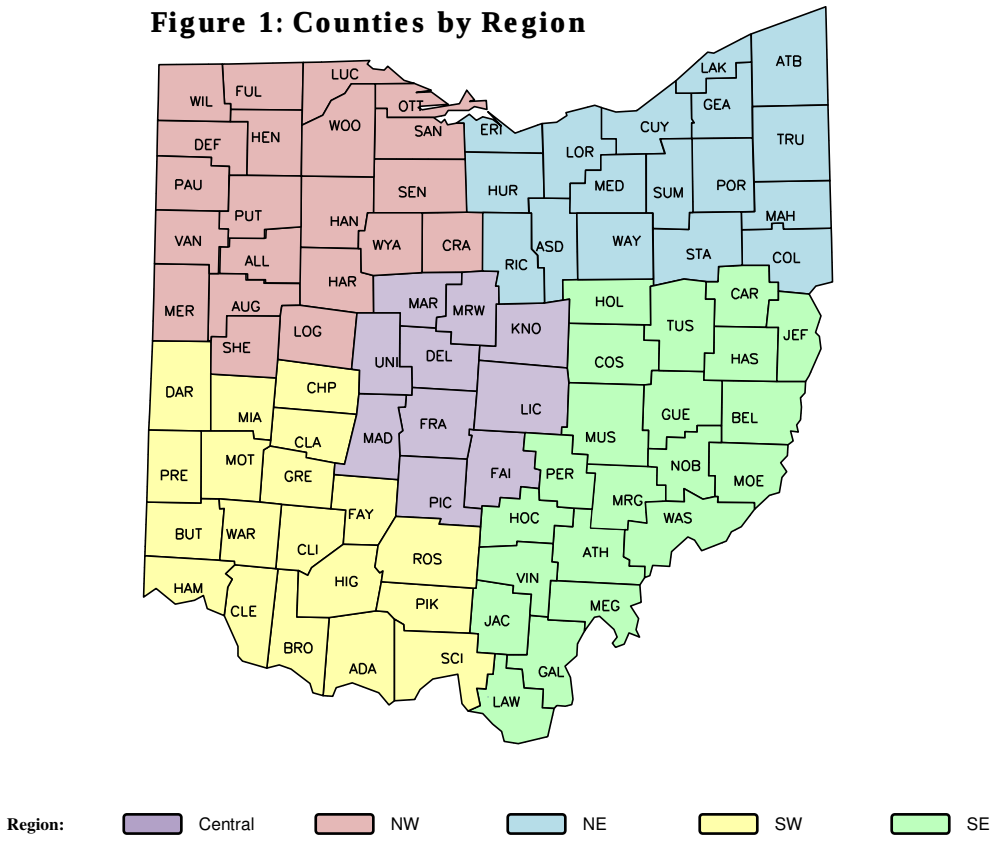
[2] In 2005, extensive statistical analysis was performed on the data to further explore the relationship between the variables in the observational surveys (e.g., driver, passenger, vehicle, and site characteristics) and driver and passenger seat belt use. This included correlation coefficients and logistic regression that showed relationships between variables, helping to further define populations that could benefit from media and/or enforcement initiatives. Comparable statistical analysis of the 2009 data will be included in a separate report.

METHODOLOGY

Sample Stratification

As in previous years, the 2009 sample was stratified by region. Observation sites were randomly selected intersections and off-ramps from each of the five geographic regions of the state (Figure 1). The method of selection described later in this section was used to ensure that all intersections and off-ramps in the sample of counties had *an equal probability of selection*. That is, all intersections and off-ramps, regardless of their location or traffic volumes, had equal likelihoods of selection as survey sites.

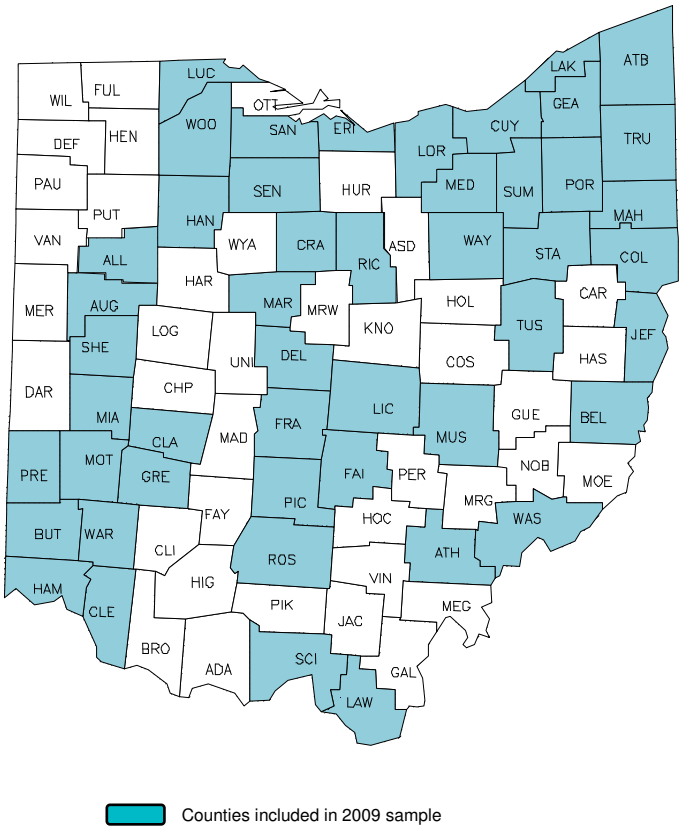
Figure 1: Counties by Region



As a preliminary measure to eliminate many low-volume sites, counties with low populations (and low rates of vehicle-miles of travel [VMT]) were excluded from the sample space. Federal guidelines permit the exclusion of low-population counties (cumulatively accounting for 15% or less of the state's population) from the sample space so that the costs of sampling in these areas may be constrained. The present survey methodology excluded 40 low-population counties that cumulatively account for approximately 13% of the state's population,[3] reducing the sample of Ohio counties from 88 to 48 (see Figure 2 for counties).

[3] Some low-population counties were included to ensure that all regions would be adequately represented in the sample space.

Figure 2: Counties in 2009 Sample



Sample Size and Allocation to Strata

Observation sites within this sample of Ohio counties were randomly selected signalized intersections (i.e., with a traffic signal or stop sign) and freeway off-ramps. These signalized locations allow for more detailed vehicle, driver, and occupant information to be recorded by observers while vehicles are stopped. Studies have shown that there is no discernible difference in the accuracy and reliability of seat belt use estimates obtained through stopped-vehicle direct observation (SVDO) compared to moving-vehicle direct observation (MVDO) (Eby, Streff, & Christoff, 1996). Although Ohio's survey previously employed the MVDO method, the change to an SVDO method enables the collection of more detailed information without any loss in accuracy. Collected information includes vehicle type, driver and passenger belt use, sex, age, and race; and, beginning in 2009, driver cell phone use. Cell phone use data are not included in the current report but will be presented in another document.

The necessary number of intersection and off-ramp sites was determined based on two factors. Of primary consideration was the number of observations necessary to estimate seat belt use with 5% relative error and 95% confidence. Second, the number of sites had to be large enough to ensure a fairly equitable distribution of sites across days of the week and times of the day. First, the number of observations needed to estimate seat belt use at the alpha = .05 (95% confidence) level was determined. A power analysis was performed using data from Ohio's past observational surveys. Based on this analysis, a minimum of 7,600 observations were required to estimate overall seat belt use with the desired amount of precision.

The next step in determining the necessary number of sites was to estimate the average number of observations that could be made at each site. Pilot tests of Ohio's data collection form, and the results of similar surveys in other states, indicated that a conservative estimate would be an average of 50 observations per site per hour. To achieve the desired minimum of 7,600 observations, at least 152 sites would be required for data collection. For the 2009 survey, with formal approval from NHTSA in 2008 and considering VMT and the distribution of freeway exit ramps and signaled intersections, 244 sites were observed to ensure a more representative sample of signaled intersection and freeway off-ramp sites, while still maintaining their equitable distribution across strata, days of the week, and times of day. Also, all of the 2009 sites were physically reviewed prior to the official observation to ensure site integrity; these sites were either reviewed by ODPS's Law Enforcement Liaisons, Ohio State Highway Patrol (OSHP) observers, or by an employee of the Ohio Traffic Safety Office (OTSO) in 1999, 2000, and 2002 through 2009. Additional reviews of specific sites were undertaken by the ARC Director and staff. Appendix A contains the **Site Locations**.

The number of sites allocated to each stratum was generally proportional to the statewide VMT in each region. Table 1 lists the VMT and number of sites in each stratum. This method of site distribution allocated more sites to more heavily traveled regions of the state. Thus, in the overall state estimate, more statistical weight based on VMT was given to more heavily traveled regions. The reported rates represent seat belt use per VMT travel.

Table 1: Number of Sites Allocated to Strata

Strata	Region	VMT	% of Total	Number of Sites
1	Central	18,972,762,050	17.08%	40
2	Northeast	38,741,070,800	34.88%	89
3	Northwest	15,870,422,650	14.29%	31
4	Southeast	9,441,465,950	8.50%	18
5	Southwest	28,038,069,950	25.25%	66
	TOTAL	111,063,791,400	100.00%	244

Finally, the number of intersections and freeway off-ramps to be observed in each stratum was determined. As a first step in determining the number of intersections and off-ramps that would be selected as observation sites, the percentage of annual traffic on these types of roadways was computed. Based on estimates from the Ohio Department of Transportation, about 33% of all travel occurs on limited access roadways (i.e., interstates and expressways/freeways). Accordingly, about 33% of the sites in each stratum should be randomly selected freeway exit ramps, and the remaining 67% of the sites should be randomly selected intersections. Table 2 lists the final number of intersections and off-ramps selected from each stratum.

Table 2: Number of Intersection and Off-Ramp Sites in Strata				
Strata	**Region**	**Off-Ramp Sites**	**Intersection Sites**	**Number of Sites**
1	Central	16	24	40
2	Northeast	28	61	89
3	Northwest	10	21	31
4	Southeast	7	11	18
5	Southwest	22	44	66
	TOTAL	79	165	244

Site Selection Procedures

Sites selected during the planning of the 1998 survey were used again in the years that followed, with the exception of those sites described as problematic by the observer (for safety, observation clarity, or other reasons) and those considered to be low volume.[4] Such sites were replaced using the same procedures described below. They were then observed for traffic flow. In addition, when an alternate site was observed in 2008, it became a primary site in 2009, and a new alternate site was selected using the procedures described below.

Two different methods were used to randomly select intersections versus off-ramps. These methods follow those described in Eby and Streff (1994) and Eby and Hopp (1997). In selecting intersection sites, detailed, equal-scale county maps were used. A grid pattern was overlaid on each county map, with each square in the grid identified by a number on the abscissa (X-axis) and the ordinal (Y-axis). The grid lines were spaced 1/4 inch apart.

The following intersection site selection procedure was used for each stratum. First, all eligible counties in each stratum were assigned a number. Using a statistical program to generate random numbers, a number representing a county was selected. Thus, each eligible county had an equal probability of selection at this point. Once a county was selected, X- and Y-coordinates on the grid were selected, again using the random number generator. As in the first step, all intersections within that county had an equal probability of selection at this stage. If a single intersection fell within the square, that intersection was chosen as an observation site. If the square did not fall within county boundaries, if the square did not contain an intersection, or if the intersection was located one road link from an intersection already selected, the entire selection was discarded and a new county selection was made (i.e., the process started over from the first step). If more than one intersection fell within the grid square, one of the intersections was selected at random and the appropriate weights were applied.

To determine the observer's location at a chosen site, the following procedure was applied: For each intersection, all possible combinations of street and traffic flow were determined. In this set of potential observer locations, one location was selected with probability equal to 1 divided by the number of locations. If the intersection was a four-legged intersection, the probability of selection for observer location was 1/4. In the case of "T" or "Y"

[4] Low-volume sites are defined as sites having 10 or fewer observations in the years 2000 through 2007.

intersections, there are only three possible observer locations, so the probability of selecting an observer location was 1/3. The effect of this difference in the probability of selection is negligible (see Eby & Hopp, 1997).

For each primary site chosen using the procedure described above, an alternate site was selected within an estimated 15-square mile radius of the primary site. These sites were also selected using a grid and randomly selected coordinates.

Freeway exit ramps within each stratum were also selected as randomly as possible. All eligible exit ramps in each of the five strata were numbered. The required number of ramps in each stratum was randomly sampled without replacement. Once ramps were selected, all possible combinations of traffic flow and observer locations were determined. These possible locations were then sampled with equal probability. For each site, a direction of travel was randomly selected. Alternate sites were the next interchange on the freeway along this direction. If the exit ramp had no traffic control device (i.e., stop sign or traffic signal) on the selected direction, the observer randomly picked a travel direction and lane with a traffic control device by flipping a coin.

Once all sites were selected, each site was assigned a number between one and 244; this number represents the total number of sites actually observed. Sites were randomly assigned to days of the week (Monday through Sunday) and time of day (7:00 AM to 7:00 PM). All days and eligible times had equal probability of selection. If circumstances arose that rendered a site unobservable at a predetermined day and time (e.g., heavy rain, construction, etc.), an administrative decision was made to determine site rescheduling.

Following Eby and Hopp, each observation site was self-weighted by traffic volumes within each stratum. That is, all sites had an equal observation interval (50 minutes). Traffic counts were recorded by observers at each site for the lane of traffic under observation. Only vehicle types eligible for inclusion in the survey were counted (i.e., passenger cars, vans or minivans, SUVs, and pickup trucks). Seat belt use in each region (stratum) was then weighted by traffic volumes at the site. Consequently, more heavily-traveled sites (compared to those sites with lighter traffic) carried a greater weight in the regional estimates and overall state estimate.

Data Collection and Observer Training

Retired officers of the Ohio State Highway Patrol (OSHP) conducted field observations. Observers were instructed to dress in plain clothes[5] so that their presence would not unduly influence motorists' behavior. Observers were provided with survey forms (see Appendices B and C), a list of survey sites, alternate sites, observation locations, and a schedule for data collection days and times.

[5] Recommended attire for observers in the field was dark pants or shorts and a white or light-colored shirt.

Eligible vehicles were all passenger cars, vans or minivans, SUVs, and pickup trucks. Historic vehicles were not included in the survey; observers were instructed to disregard all vehicles of this type.[6] Observations during 2009 focused on non-commercial vehicles.[7] Therefore, commercial vehicle data were excluded from the 2009 analysis, as recommended by NHTSA. For all eligible vehicles, seat belt use information and demographic information were recorded for front outboard occupants (drivers and front-seat passengers).

Those conducting the observation surveys attended an Applied Research Center (ARC) training session at a central location. This training provided detailed information on procedures to be followed at each site. Each observer received a manual outlining all field procedures and a site schedule specifying the date and time each site was to be observed. Observers also received specific instructions as to which lane of traffic they should observe at the site and an instrument with which to perform traffic counts. This location was pre-determined and randomly selected. Training consisted of a review of the documentation and a discussion centering on how to handle unexpected issues in the field. If an observer was unable to attend the training, he or she was sent the training manual and all materials, and was required to discuss the observations with either the OTSO survey coordinator or the observer coordinator. Also, ARC personnel provided ongoing technical assistance throughout the survey period.

Of primary consideration in the training session was how to decide when a site would be unobservable. Observations were to be made in all weather conditions, unless the weather obscured observers' views into the vehicles in the designated lane of traffic they were observing or presented a safety hazard to the observer in the field. If unexpected conditions made observations difficult or impossible (e.g., construction, damaged power lines, etc.) observers were instructed to document the problem on the site description forms and to move to the alternate site for data collection. If problems arose at the alternate site, observers were instructed to proceed to the closest observable site.

Observers were informed that for quality control purposes, several sites were to be randomly selected for unannounced visits in order to ensure that the study procedures were followed. Fourteen sites (5% of the total) were monitored by the observer coordinator (through both visits to observers at observation sites and through phone contact) and all monitoring visits or calls indicated that observers were fully complying with field procedures. Regular contact with observers was maintained during the survey period to ensure that survey protocols were followed.

Upon arriving at a site, observers completed the **Site Description Form** (see Appendix B) for each site observed. This form provides information on the nature of the site (intersection or off-ramp), location of the site, time and day observed, start and end times of data collection, and information regarding conditions at the site (e.g, weather,

[6] Historic vehicles are defined as any vehicle bearing a state-issued historic vehicle license plate.
[7] Commercial vehicles are defined as any vehicle bearing the name of a business or any unmarked vehicle transporting commercial equipment.

visibility, etc.). Following Eby & Hopp (1997), usage rate estimates are weighted by site-specific VMT. Observers recorded traffic counts for five minutes before the observation period began and for another five minutes following the end of the observation period. Weights were applied in the same manner as described in Eby & Hopp.[8]

Observers collected data at each assigned site for 50 minutes, recording as many observations as possible during that time. Observers recorded seat belt usage information and demographic information, both while vehicles were stopped in the designated lane at the traffic control device, and while traffic was moving through the intersection. When traffic was moving, observers were asked to record data for as many vehicles as possible.

Observers recorded the following information *for each noncommercial vehicle observed* by checking the appropriate category or categories on the **Data Collection Form** (see Appendix C):

- Vehicle type (passenger car, van/minivan, SUV, pickup truck,)
- Driver and front outboard passenger seat belt usage (belted, unbelted)
- Driver and front outboard passenger sex (Male, Female)
- Driver and front outboard passenger age (0-4, 5-14, 15-25, 26-64, 65+)
- Driver and front outboard passenger race (Caucasian, African-American, Other)
- Cell phone use of driver, to be included in a separate report

Statistical Analysis

The **Site Description Forms** and **Data Collection Forms** were returned directly to the Miami University Applied Research Center and a cursory review of the forms and data from each observer and site was performed. Site and vehicle-specific information were linked in the final dataset used for statistical analysis. All analyses were performed using a combination of Microsoft Excel, Access, and SPSS.

Estimates from each site were weighted by VMT in corresponding regional estimates, and each regional estimate was weighted by VMT in the overall statewide estimate. To accomplish this, the two five-minute traffic counts from each site were summed and multiplied by five. The resulting value represented the *estimated* total number (N_e) of vehicles that passed through the site during the fifty-minute observation interval (Eby & Hopp, 1997). To compute seat belt usage rates, this estimated count (N_e) was divided by the actual vehicle counts from each site, yielding a weighting factor. Weights were then multiplied by the number of belted front seat occupants and total occupants. This process is summarized in Formula 1.

[8] "The weighting was done by first adding each of the two five-minute counts of eligible vehicles and then multiplying this number by five so that it would represent a 50-minute duration. The resulting number was the estimated number of vehicles passing the site if all eligible vehicles had been included in the survey during the observation period at the site. The estimated count then was divided by the actual vehicle counts at the site, yielding a weighted N for the number of total drivers and passengers and total number of belted drivers and belted passengers for each vehicle type" (Eby & Hopp 1997, p.14).

$$r_h = \frac{\sum \frac{N_e}{N_a}(N_b)}{\sum \frac{N_e}{N_a}(N_o)} = \frac{\text{Total number of belted occupants, weighted}}{\text{Total number of occupants, weighted}}$$

Formula 1

where:

r_h = Seat belt usage rate in stratum h
N_e = Estimated traffic count (at site i in stratum h)
N_a = Actual traffic count (at site i in stratum h)
N_b = Number of belted occupants (at site i in stratum h)
N_o = Number of occupants observed (at site i in stratum h)

This formula was used in computing the overall estimate. The formula was modified in estimating usage rates for specific subgroups. For example, N_a in the formula above was changed to reflect the actual number of vehicles in the subset by drivers, passengers, passenger cars, SUVs, vans/minivans, pickup trucks, males, and females (etc.) observed at a site during the 50-minute observation period. Thus, seat belt usage estimates for subgroups were also weighted by VMT at the sites.

Overall seat belt usage rates were computed from regional estimates using the following formula:

$$r_{total} = \sum_{i=1}^{h} \frac{V_h r_h}{V_{total}}$$

Formula 2

where:

r_{total} = Overall seat belt usage rate
r_h = Seat belt usage rate in stratum h
h = Total number of strata in sample
V_h = Estimated VMT in stratum h
V_{total} = Total statewide estimated VMT

Variance for usage rate estimates was computed using the following formula (Eby & Hopp, 1997). First, variance estimates were computed for each stratum using Formula 3.

$$\sigma_h^{\,2} = \frac{V_h}{V_h - 1} \sum \left(\frac{g_i}{g_{total}} \right)^2 (r_i - r_h)^2$$

Formula 3

where:

σ_h^2 = Variance for stratum h
V_h = Estimated VMT in Stratum h
g_i = Weighted number of vehicle occupants at site i
g_{total} = Total weighted number of occupants in stratum h
r_i = Seat belt usage rate at site i
r_h = Seat belt usage rate in stratum h

Overall variance estimates were computed from stratum variance estimates using Formula 4[9], again following Eby and Hopp (1997).

$$\sigma_{total}^{\ 2} = \sum \left(\frac{N_h}{N} \right)^2 \sigma_h^{\ 2} \qquad \textbf{Formula 4}$$

where:

σ_{total}^2 = Overall variance
N_h = Number of sites in stratum *h*
N = Total number of observed sites
σ_h^2 = Variance for stratum *h*

Standard deviations were computed by taking the square root of the variance. Confidence intervals were computed using the standard formula:

$$\mu = r_{total} \pm 1.96\ \sigma_{total} \qquad \textbf{Formula 5}$$

Other usage rate and corresponding standard deviation may be substituted for r_{total} and σ_{total}.

During 2005, data from the observation surveys and site description forms were combined and analyzed using correlation coefficients and multivariate analysis (i.e., logistic regression). Results of a similar analysis of the 2009 data will be included in a separate report. This multivariate analysis further clarifies the relationship between driver and passenger seat belt use and other driver, passenger, vehicle, and site characteristics. Since the dependent variable is binary (correctly wearing a seat belt = 1, while incorrectly wearing a seat belt or not wearing a seat belt = 0), logistic regression was used to conduct the analysis.

For more than a single independent variable, the logistic regression model can be written as follows:

$$\text{Probability (event)} = \frac{e^z}{1+e^z}$$

or, when Z is due to the linear combination of variables:

$$Z = B_0 + B_1 X_1 + B_2 X_2 + \ldots + B_p X_p$$

In the above regression equation, each B value (i.e., B_1 through B_p) represents the odds of an event, such as correctly wearing a seat belt, controlling for other variables in the logistic regression model or equation (Norusis, 1999; Hosmer and Lemeshow, 2000). As previously reported, results of a multivariate analysis of the 2009 data will be included in a separate report.

[9] This formula may also be expressed as $(V_h/V)^2\ s^2_h$ [where V_h = est. VMT in stratum h and V = total est. VMT], if so desired.

RESULTS

Statewide Seat Belt Use

The 2009 overall seat belt use rate for vehicle occupants from Ohio is 83.6% (Table 3). This rate is an improvement over the 2008 rate of 82.7%. Due to the large 2009 sample size, the survey has a confidence interval of approximately plus or minus 1%.

Alone, the 2009 rate is a point estimate of seat belt use. Applying a confidence interval determines a range of values that allows seat belt use to be estimated with a desired amount of confidence. NHTSA guidelines specify a 95% confidence level and a confidence interval of plus or minus 5%. By applying Formula 5, we can be **95% certain** that Ohio's seat belt usage for all vehicle occupants is within **± 1% of 83.6%,** well within NHTSA specifications.

95% Confidence Interval: **82.6% - 84.6%**

A total of 22,867 occupants were observed (18,958 drivers and 3,909 passengers) at 244 sites. This far exceeds the NHTSA minimum requirement of 7,600 observations. This means that on average, 78 vehicles and 94 occupants were observed per site.

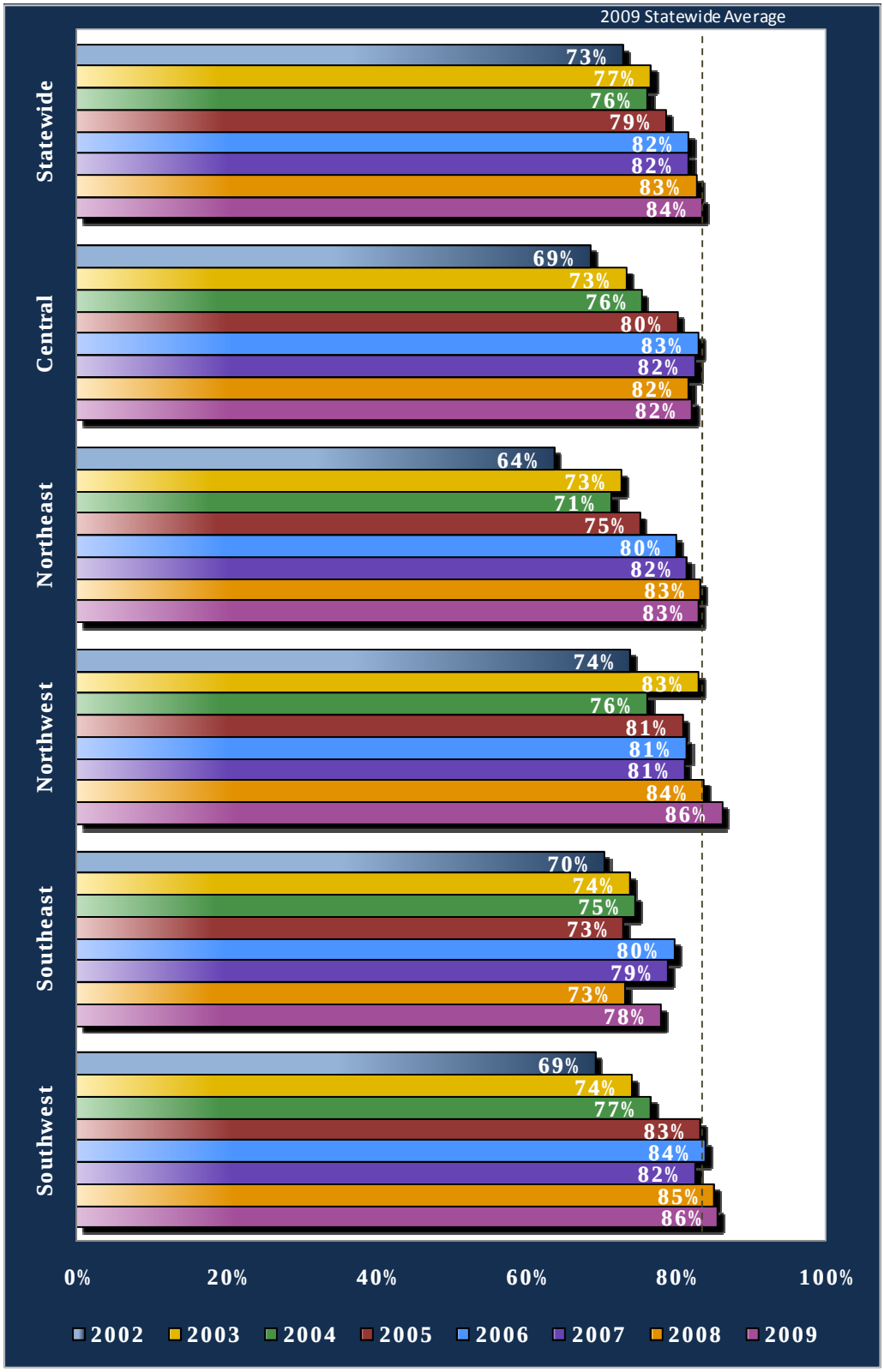
Regional Seat Belt Use

Table 3: Regional Usage Rates

Region	Usage Rate
Central	82.12%
Northeast	83.10%
Northwest	86.13%
Southeast	77.91%
Southwest	85.61%
Statewide	83.56%

As can be seen in Table 3, the Central, Northeast, and Southeast regions of the state each have a seat belt use rate below the state average. Increasing seat belt use in these regions, particularly in the heavily-populated Central region and the Southeast region, which has a significantly low belt usage rate, is imperative.

Figure 3 Seat Belt Use Statewide and By Region

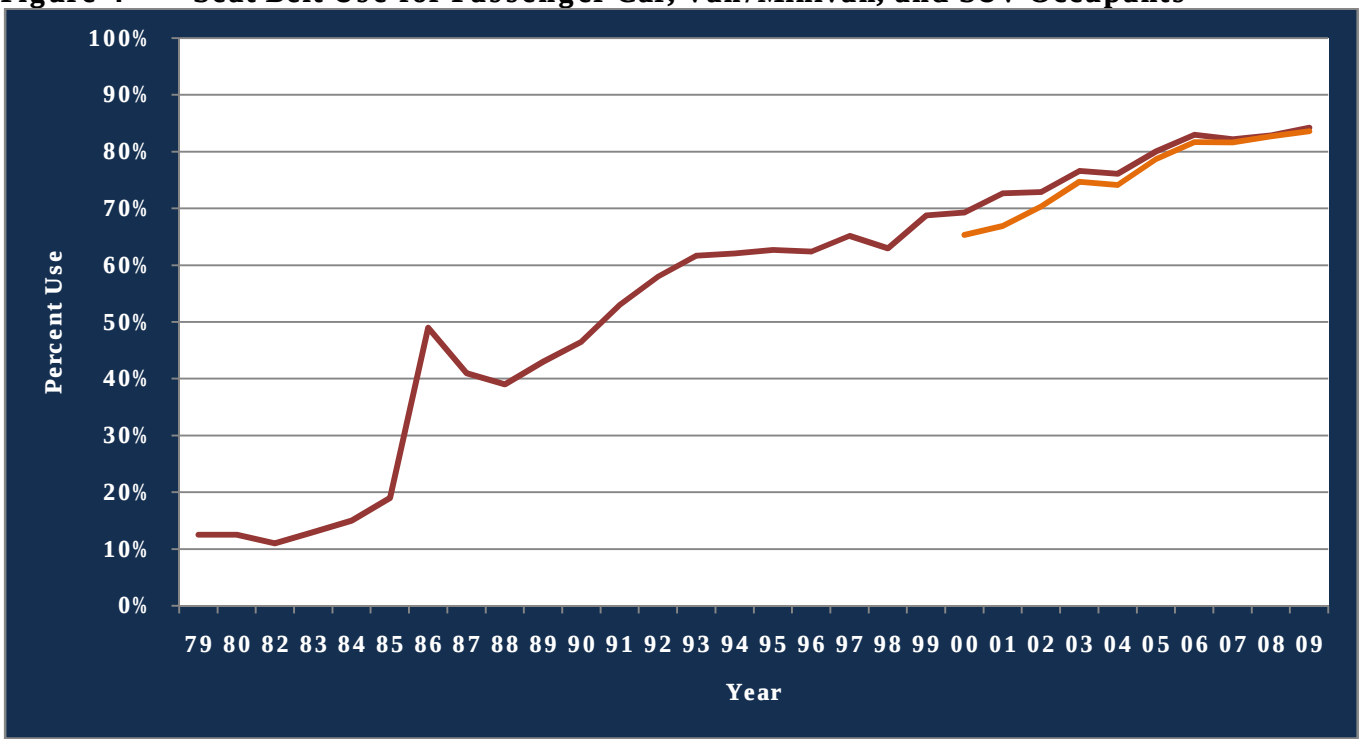


As shown in Figure 3, with some exceptions, seat belt use generally increased between 2002 and 2009 Statewide and for the Northwest and Southwest. Rates for the Central and Northeast regions were nearly unchanged from the previous year. While not quite up to 2006 levels, the Southeast region's use rate rebounded from 73% in 2008 to 78% in 2009.

It is important to note that the overall estimate is based on all front outboard occupants observed in all four vehicles types.[10] Because pickup trucks were excluded from the survey until 1998, this year's rate is only comparable to rates since 1998. Calculating the 2009 rate without pickup trucks indicates a usage rate of approximately 84%. Figure 4 represents unweighted seat belt usage rates including only passenger cars, vans/minivans, and SUVs (in red). The weighted rate including pickup trucks (in orange) shows that while the rate without pickup trucks is higher than when pickups are included, the rates have been converging over the years, probably because pickup trucks drivers have increased seat belt use more than other vehicle types since 2000. Also, pickup trucks represent only 14.8% of all vehicles and 14.5% of occupants observed during the 2009 observational survey, down from 17.9% of vehicles and 17.4% of occupants in 2004 (the earliest year for which appropriate data were accessible). This slight decline may contribute to the convergence of the rates.

Commercial vehicles were excluded from these historically comparable rates as specified by NHTSA.

Figure 4 Seat Belt Use for Passenger Car, Van/Minivan, and SUV Occupants



[10] Data on the four vehicle types—passenger cars, vans/minivans, sport utility vehicles, and pickup trucks—have been collected since the 1998 survey.

Vehicle Type and Seat Belt Use

As in previous surveys, pickup truck occupants had a significantly lower seat belt use rate than occupants of other vehicles types during 2009, presenting an opportunity to increase overall seat belt use in the future (see Table 4).

Table 4: Usage Rate by Vehicle Type

Vehicle Type	Usage Rate
Passenger Car	84.12%
Van/Minivan	88.43%
SUV	85.33%
Pickup Truck	76.01%

The results for each vehicle type by region are presented in Table 5.[11] As shown, occupants of pickup trucks had a significantly lower rate of seat belt use than occupants in all other vehicle types, regardless of region. Seat belt use was lowest among pickup truck occupants in the Southeast region; the Southeast also had the lowest rates for two of the three other vehicle types (car and SUV).

Table 5: Vehicle Type Regional Usage Rates

Region	Passenger Car	Unweighted N	Van / Minivan	Unweighted N	SUV	Unweighted N	Pickup Truck	Unweighted N
Central	82.71%	2,341	82.92%	585	84.45%	1,000	74.22%	584
Northeast	83.98%	5,295	87.37%	1,116	85.52%	2,271	74.39%	1,464
Northwest	85.96%	980	94.32%	238	86.43%	366	80.61%	292
Southeast	78.71%	684	88.26%	128	80.92%	284	72.36%	283
Southwest	86.00%	2,691	90.34%	611	86.54%	944	78.05%	705
Statewide	84.12%	11,991	88.43%	2,768	85.33%	4,865	76.01%	3,328

[11] "Unweighted N" indicates the total number in observations of that category.

Figure 5 Seat Belt Use Statewide and by Vehicle Type

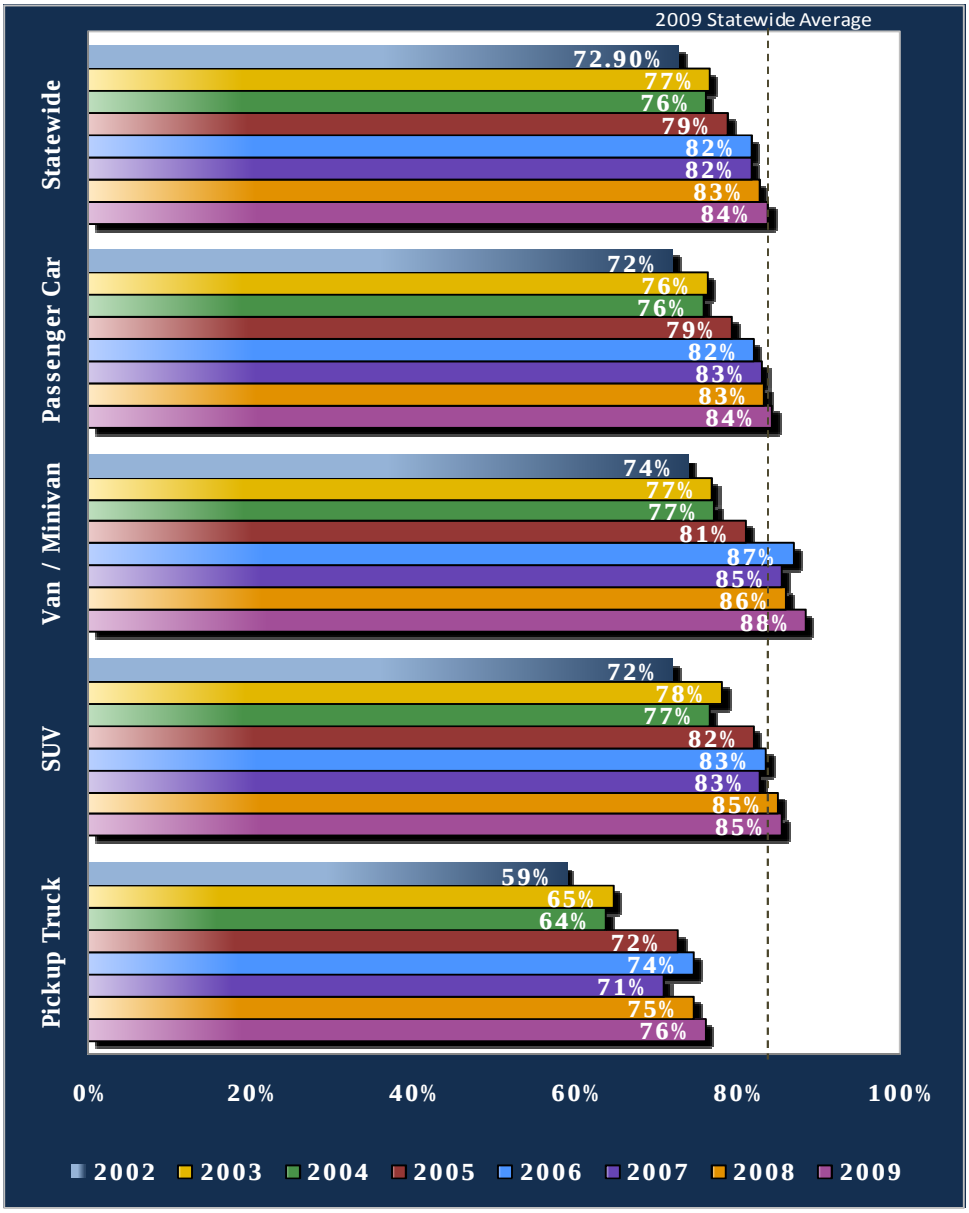


Figure 5 shows that seat belt use increased substantially between 2002 and 2009 for each vehicle type, with occupants in each vehicle type wearing seat belts more often in 2009 than in any other year.

Driver and Passenger Seat Belt Use

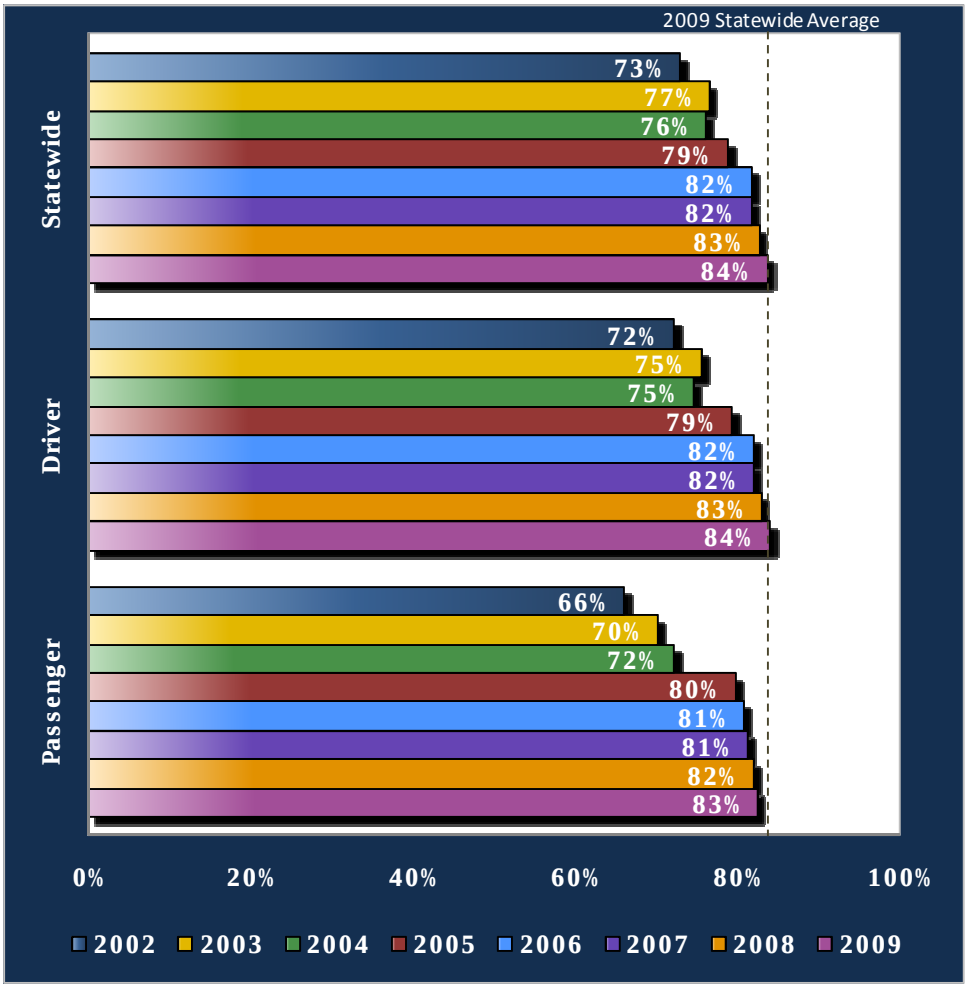
Ohio's seat belt observation survey has traditionally found differences between drivers and passengers in their rates of seat belt use. Table 6 summarizes the results for drivers and passengers, respectively, by region. 1.) As in previous years, the overall seat belt use rate for drivers is slightly higher than that of passengers, although it is interesting to note that passenger use rates are higher than driver use rates in the Southeast region. The seat belt use disparity between driver and passenger rates was greatest in the Northwest region. 2.) Driver seat belt use was highest in the Northwest, and it was again lowest in the Southeast region. 3.) Passenger seat belt use was highest in the Southwest by a very small margin; it was lowest in the Southeast.

Also of interest again this year, a direct relationship was found between driver and passenger seat belt use. The correlation between driver use and passenger use was $r = .65$, $p \leq .001$. Although causality cannot be inferred from a correlation, the strength of the association between driver and passenger seat belt use suggests that passengers were more likely to be belted when drivers were belted and vice versa.

Table 6: Driver and Passenger Usage Rates by Region				
Region	**Drivers**	**Unweighted N**	**Passengers**	**Unweighted N**
Central	82.54%	3,552	81.30%	960
Northeast	83.48%	8,698	82.60%	1,459
Northwest	86.84%	1,516	83.32%	360
Southeast	77.41%	1,091	79.19%	288
Southwest	86.12%	4,101	83.99%	851
Statewide	83.95%	18,958	82.54%	3,909

Passenger seat belt use has increased since 2002, although the gains have been smaller in recent years (Figure 6).

Figure 6 Seat Belt Use Statewide and by Occupant Type



Sex of Vehicle Occupants and Seat Belt Use

Detailed information was collected on occupants' sex, and separate estimates were generated for male and female front outboard occupants. Consistent with past Ohio survey results, *female occupants had significantly higher rates of seat belt usage than did male occupants*. The disparity varied between approximately 5 and 11 percentage points for each region (Table 7).

Table 7: Male and Female Occupants Usage Rates by Region

Region	Males	Unweighted N	Females	Unweighted N
Central	78.44%	2,309	85.54%	2,203
Northeast	79.61%	5,243	87.35%	4,901
Northwest	82.02%	989	90.05%	885
Southeast	72.51%	716	83.00%	663
Southwest	83.18%	2,534	88.68%	2,417
Statewide	80.06%	11,791	87.39%	11,069

A comparison of male and female driver and passenger seat belt use rates depicted in Tables 8 and 9 reveals the following: although male drivers are less likely than female drivers to wear seat belts, this gap becomes even more pronounced when male and female passengers' rates are compared. When riding as passengers, only 76% of males were observed to be buckled up in 2009, compared to nearly 86% of female passengers. These rates are nearly unchanged from 2008. For both males and females, drivers were somewhat more likely to wear seat belts than passengers.

The results for male and female drivers and passengers are summarized by region in Table 8 and Table 9.

Table 8: Male Driver and Passenger Usage Rates

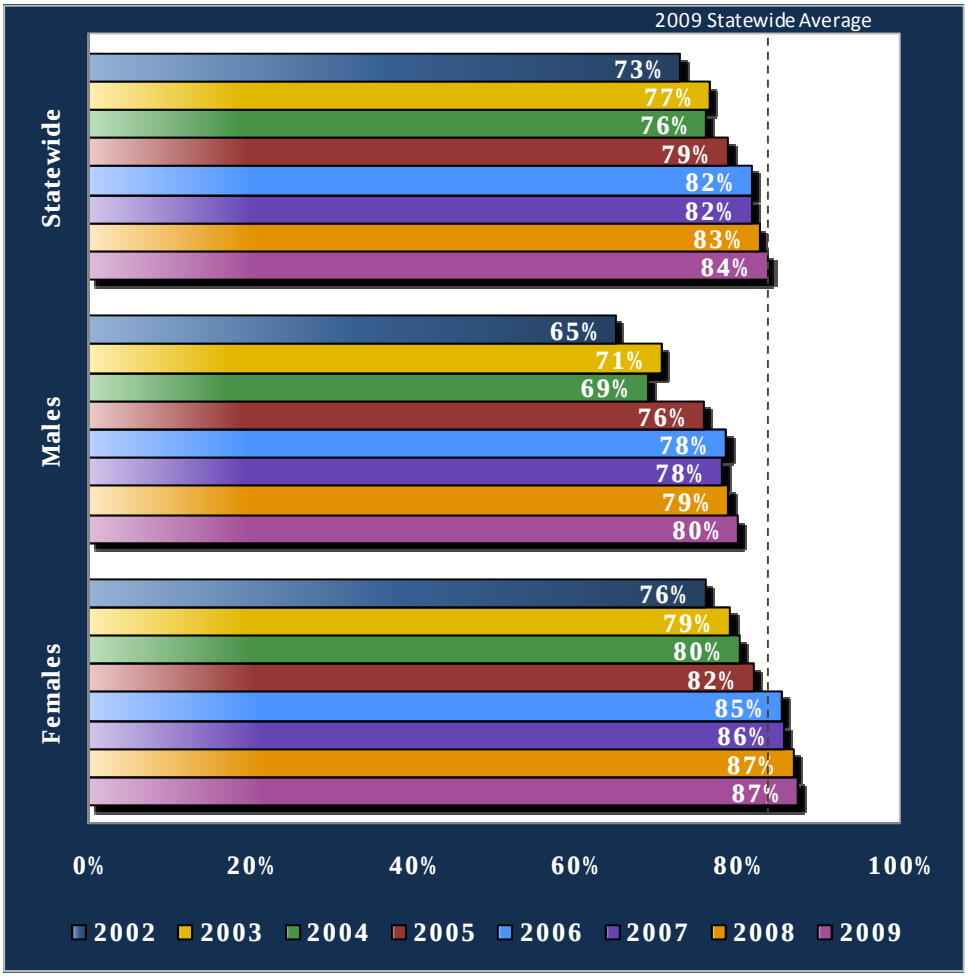
Region	Male Driver	Unweighted N	Male Passenger	Unweighted N
Central	78.78%	1,991	76.27%	318
Northeast	80.09%	4,804	76.79%	439
Northwest	83.53%	888	74.74%	101
Southeast	72.53%	611	67.67%	105
Southwest	83.56%	2,262	76.91%	272
Statewide	80.59%	10,556	75.66%	1,235

Table 9: Female Driver and Passenger Usage Rates

Region	Female Driver	Unweighted N	Female Passenger	Unweighted N
Central	86.47%	1,561	83.55%	642
Northeast	87.42%	3,893	85.16%	1,008
Northwest	91.02%	627	88.01%	258
Southeast	82.66%	480	84.88%	183
Southwest	89.10%	1,838	87.30%	579
Statewide	87.79%	8,399	85.81%	2,670

Figure 7 demonstrates that male occupants, a high-risk group, improved their seat belt use by 15 percentage points between 2002 and 2009. While female seat belt use increased 11 percentage points, their overall rate of seat belt use was, as expected, much greater than that of males.

Figure 7 Seat Belt Use Statewide and by Sex



Age of Vehicle Occupants and Seat Belt Use

Table 10 and Figure 8 illustrate the following relationships between age and seat belt use: 1.) Seat belt use for vehicle occupants age 5-14 remained 83%--unchanged from 2008. However, it is important to note that the number of observed vehicle occupants who were age 5-14 years is relatively low, especially when cross-tabulated by region. 2.) Compared to other age groups, seat belt use was lowest (76%) among vehicle occupants age 15-25. 3.) However, seat belt use increases among older occupants, reaching 84% among occupants age 26-64 and 89% among those who are age 65 and older. The small sample of very young occupants made it impossible to generate a reliable estimate for the 0-4 age group.[12]

[12] In one sense, the low number of observations for the 0-4 age group is encouraging, as there are many risks associated with children in this age group riding as front-seat passengers. The small number observed may reflect the fact that parents are placing their small children in safety seats in the back seat of the vehicle. However, this practice renders them unobservable in this survey, as the results only describe usage for front outboard occupants.

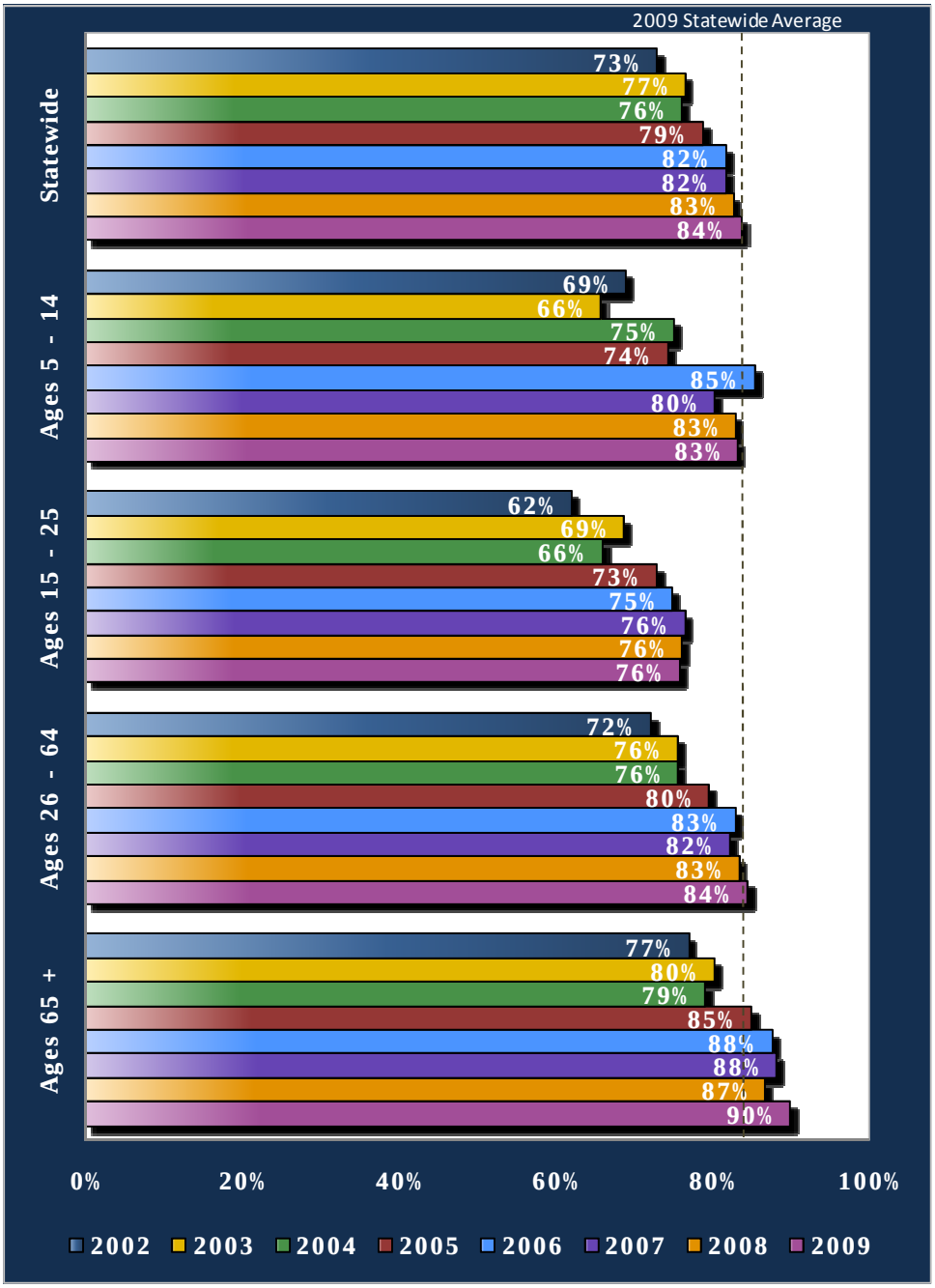
Table 10 and Figure 8 summarize the results for each age group by region. The longitudinal trends between 2002 and 2009 in seat belt use by age group are contained in Figure 8.

Table 10: Occupants restraint use by age group

	5 – 14		15 – 25		26 – 64		65 +	
Region	**Rate**	**Unweighted N**	**Rate**	**Unweighted N**	**Rate**	**Unweighted N**	**Rate**	**Unweighted N**
Central	84.88%	114	75.20%	675	82.37%	3,059	90.07%	661
Northeast	82.49%	112	73.19%	928	83.84%	7,967	85.47%	1,138
Northwest	90.10%	39	81.29%	406	87.09%	1,230	90.35%	199
Southeast	76.73%	34	70.70%	345	79.56%	843	91.53%	154
Southwest	81.70%	70	78.32%	923	86.78%	3,255	92.39%	698
Statewide	**83.31%**	**369**	**75.78%**	**3,277**	**84.43%**	**16,354**	**89.22%**	**2,850**

Figure 8 shows that since 2002, vehicle occupants age 15-25 (the highest risk group) improved their seat belt use by 22% (i.e., 14 percentage points), although the rate remained nearly unchanged (76%) between 2007 and 2009. Occupants age 5-14 increased their seat belt use by 20% (i.e., 14 percentage points) during this time interval. All age groups showed a marked increase in seat belt use since 2002; however, it is important to note that recent changes have been very small. The improvement in occupant restraint use for young children is in keeping with recent efforts by the OTSO, although the current survey methodology does not address the issue of proper booster seat use among children who have outgrown safety seats.

Figure 8 Seat Belt Use Statewide and by Age Group



Race of Vehicle Occupants and Seat Belt Use

Beginning in 2004, the observation survey assessed seat belt use by race: Caucasian, African-American, and individuals of other races ("other"). The present observation methodology precluded the collection of more detailed race information. Therefore, these surveys provide data on seat belt use primarily by Caucasians and African-Americans. Also, due to demographic characteristics of Ohio and the difficulty of clearly determining race with the current methodology, the number of vehicle occupants identified as African-American was relatively small (1,251 vehicles and 1,455 occupants) and is probably an undercount. However, data from the 2001 National Household Travel Survey indicates that approximately 95% of Caucasian households compared to only about 80% of African-American households own one or more motor vehicles. Also, Caucasian households are relatively more likely than African-American households to own multiple vehicles. Nevertheless, the number of African-Americans observed increased relative to Caucasians since 2007. Mindful of these caveats, the overall statewide data are consistent with findings from other research (Shults et. al., 2004). Overall statewide seat belt use among African-Americans (76%) is significantly lower than the 84% usage rate among Caucasians (Table 11). It is important to note that while Caucasians' seat belt use improved 12% from 2004 to 2009, African Americans' seat belt use improved nearly 27% during this same time period.

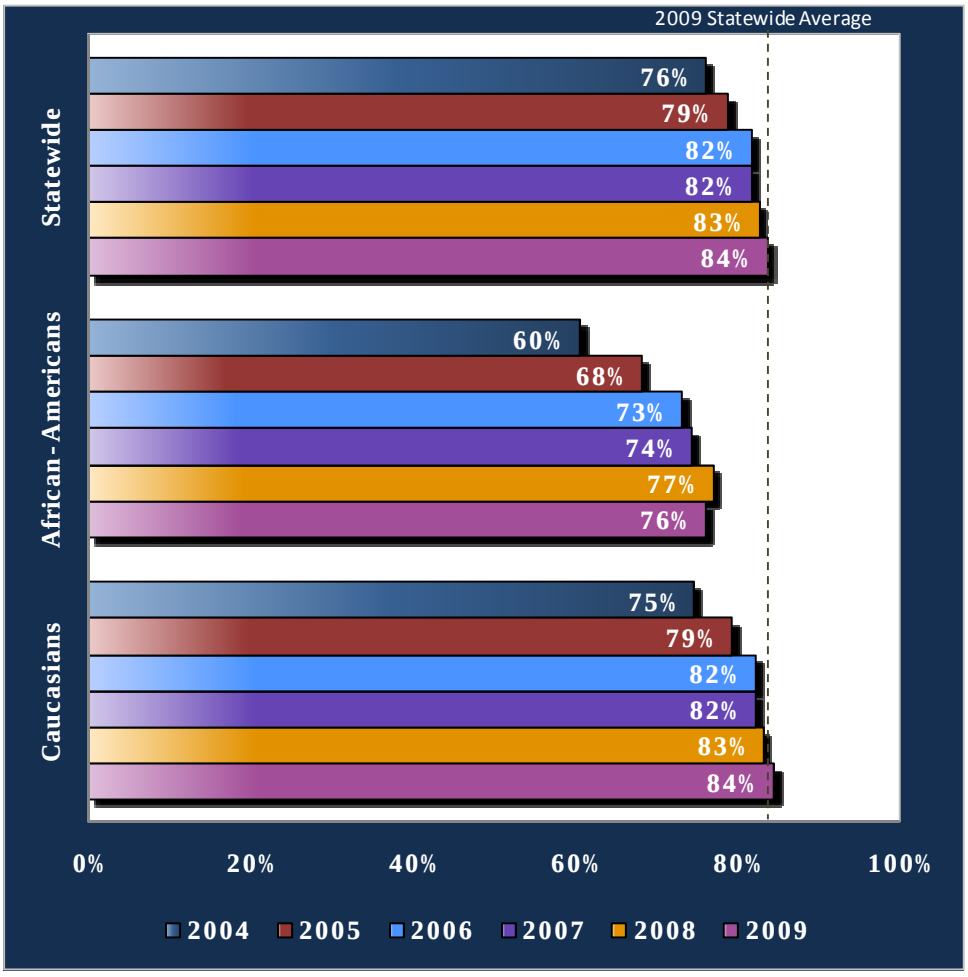
While there were too few African-American observations to generate reliable estimates for most of the other subgroup comparisons (i.e., age, sex, vehicle type, and some regions), the sizable disparity between African-American and Caucasian seat belt use persists and represents a significant highway safety issue. For instance, among occupants in Northeast Ohio, there is a 14-percentage point disparity between African-Americans' seat belt use and Caucasians' seat belt use. Consequently, while being mindful of the relatively small sample of minorities in this study, African-Americans may be at greater risk of death and serious injury from crashes that occur in this heavily-traveled region of Ohio.

Table 11: Seat Belt Use Rates by African-American and Caucasian Occupants and Region

Region	African-American	Unweighted N	Caucasian	Unweighted N
Central	75.53%	269	82.99%	4,151
Northeast	70.47%	700	84.42%	9,376
Northwest	81.35%	67	86.60%	1,790
Southeast	75.92%	14	77.91%	1,357
Southwest	81.17%	405	85.96%	4,505
Statewide	76.06%	1,455	84.32%	21,179

Figure 9 shows that seat belt use among African-Americans has increased progressively since data were first collected. However, their current use rates are comparable to Caucasian rates from 2004 and 2005, and the Caucasian use rate in 2009 is 8 percentage points higher than that of African-Americans in 2009.

Figure 9 Seat Belt Use Statewide and by Race



Observation Site Type and Seat Belt Use

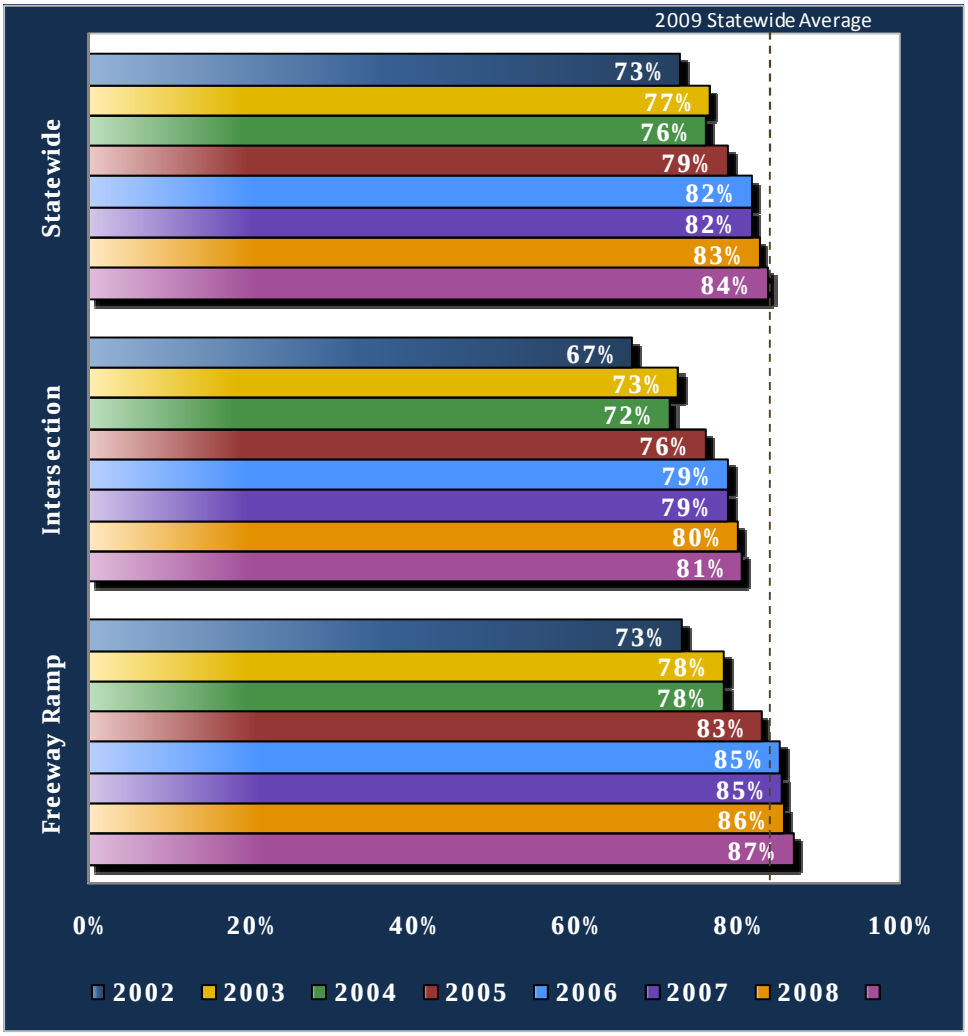
Historically and in the observation data collected since 2002, seat belt use has been higher on limited access roadways (i.e., interstates and expressways). This was again true in 2009 and is most likely due to the greater perceived risk and subsequent behavior associated with travel at higher speeds on limited access roadways and, on average, with traveling relatively longer distances on such roadways. Table 12 summarizes the results for usage by observation site type.

Table 12: Usage Rates by Road Type

Region	Usage Rate	Unweighted N
Intersection	80.59%	14,086
Freeway Ramp	86.88%	8,781

As shown in Figure 10, during the past eight years, observed seat belt use increased at a similar rate on both freeway ramps (14 percentage points) and intersections (14 percentage points). However, seat belt use on freeway exit ramps remained substantially higher than at intersections throughout all eight years.

Figure 10 Seat Belt Use Statewide and by Site Type



Cross-tabulations of Observation Characteristics and Seat Belt Use

Tables 13 through 15 illustrate seat belt use rates based on several demographic, occupant, and vehicle characteristics. As indicated and consistent with previous survey results, male pickup truck drivers age 15-25 had the lowest seat belt usage rate of all drivers, while female passenger car and van/minivan drivers aged 65 years or older had higher rates than other drivers. Many of the passenger seat belt use rates are based on relatively few observations and thus have a larger sampling error. That caveat should be kept in mind when interpreting data in those categories. However, these rates do indicate that passengers of pickup trucks had relatively low usage rates, especially those aged 15-25.

Table 13: Driver and Passenger Usage Rates by Age and Sex

		Drivers	Unweighted N	Passengers	Unweighted N
Ages 15-25	Males	56.80%	1,272	68.40%	291
	Females	83.54%	1,282	76.88%	432
Ages 26-64	Males	81.51%	7,914	73.68%	564
	Females	88.31%	6,402	86.87%	1,471
Ages 65+	Males	87.88%	1,369	87.15%	189
	Females	93.19%	714	88.51%	577

Table 14: Driver and Passenger Usage Rates by Age and Vehicle Type

		Drivers	Unweighted N	Passengers	Unweighted N
Ages 15-25	Passenger Car	77.50%	1,752	74.86%	437
	Van / Minivan	85.03%	106	85.26%	71
	SUV	76.60%	394	76.42%	117
	Pickup Truck	56.00%	302	55.97%	98
Ages 26-64	Passenger Car	85.46%	6,980	82.00%	930
	Van / Minivan	88.85%	1,787	88.20%	333
	SUV	86.66%	3,339	85.97%	499
	Pickup Truck	76.59%	2,210	78.18%	274
Ages 65+	Passenger Car	90.18%	1,273	86.42%	453
	Van / Minivan	88.80%	205	93.44%	101
	SUV	89.11%	311	93.87%	124
	Pickup Truck	84.49%	292	89.63%	88

Table 15: Driver and Passenger Usage Rates by Sex and Vehicle Type

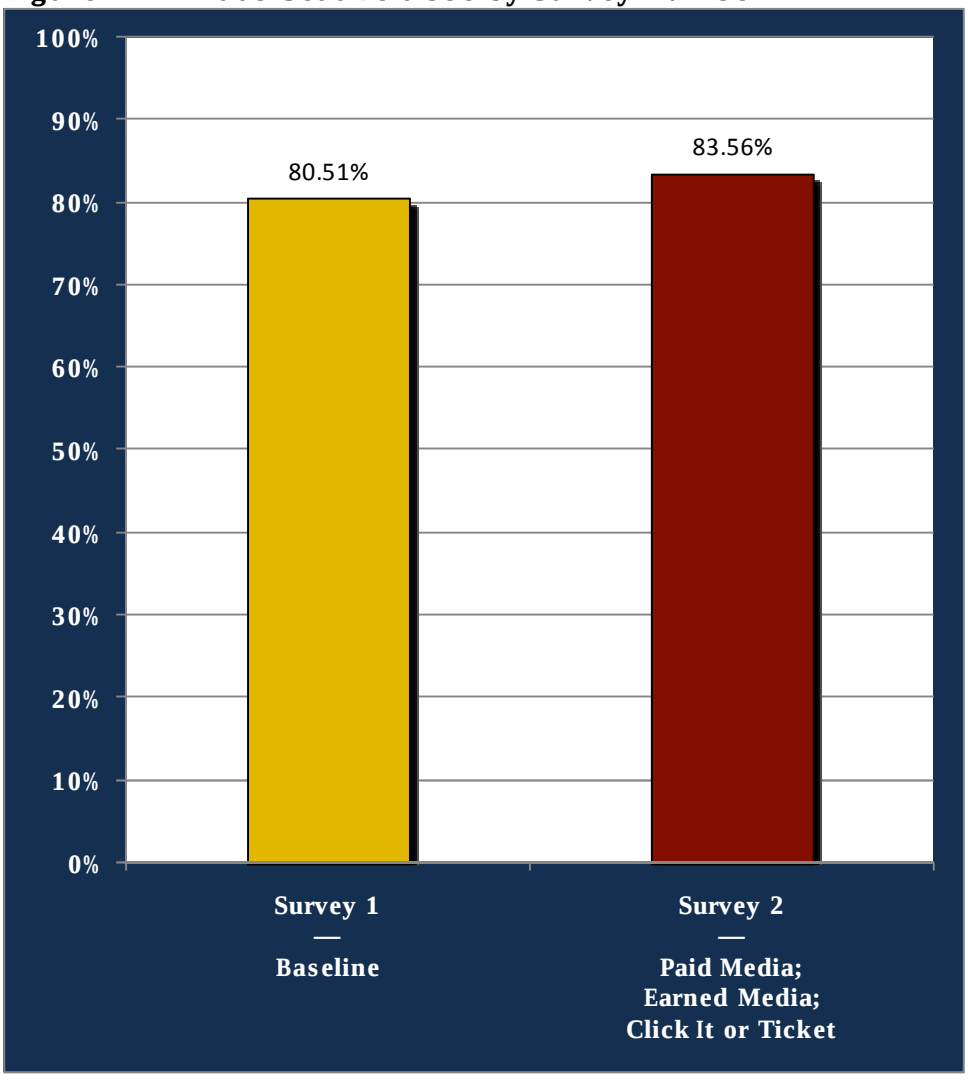
		Drivers	Unweighted N	Passengers	Unweighted N
Males	Passenger Car	81.81%	5,113	78.74%	596
	Van / Minivan	87.84%	1,029	79.03%	168
	SUV	81.61%	1,959	74.87%	235
	Pickup Truck	75.21%	2,453	63.93%	235
Females	Passenger Car	87.40%	4,892	83.28%	1,389
	Van / Minivan	90.76%	1,069	90.10%	410
	SUV	88.83%	2,085	89.46%	585
	Pickup Truck	81.93%	351	83.46%	286

Media and Enforcement Interventions

The 2009 Observational Seat Belt Study reports only results from the second observational survey which occurred after multiple interventions, including media campaigns and enforcement initiatives such as *Click It or Ticket*. Therefore it is useful to compare usage rates among Surveys 1 (Baseline) and 2, shown in Figure 11.

As shown below, statewide occupant seat belt use increased nearly 4 percentage points from Survey 1 to Survey 2, which is expected and consistent with previous years' surveys. Once again, these results illustrate the effectiveness of the *Click It or Ticket* campaigns and enforcement initiatives.

Figure 11 2009 Seat Belt Use by Survey Number



CONCLUSIONS

As reported, the 2009 overall Ohio seat belt use rate is 83.6%, an improvement over the 2008 rate of 82.7%. Also, seat belt use for specific populations has generally continued to increase. Nevertheless, consistent with previous state surveys, the 2009 survey has identified groups that warrant special attention, because of their lower rates of seat belt use. Due to the absence of a primary seat belt law in Ohio, to increase overall seat belt use, significantly greater compliance with the present secondary seat belt law must occur among those populations that consistently have relatively low rates of seat belt use. Hence, media and enforcement initiatives; which promote greater seat belt use, must be strengthened; become ongoing, rather than periodic; and be directed disproportionately at the following populations:

- Southeast Region Vehicle Occupants
- Vehicle Occupants Age 15-25
- Vehicle Passengers Age 5-14
- Male Vehicle Occupants
- Pickup Truck Occupants
- African-American Vehicle Occupants

One approach to increasing seat belt use is cited by Williams and Wells (2004: 179). They maintain that what is necessary in the United States to achieve seat belt use rates of 90% or greater is widespread, methodical, and sustained application of enforcement programs, augmented by the use of creative publicity campaigns. Another approach is the passage of a primary seat belt law, which could initially increase overall use rates by as much as 10 percentage points, such as occurred in the State of Washington. A primary law could continue to increase seat belt use in diminishing increments thereafter, until a state maximum level is reached. For instance, among states (plus the District of Columbia) that enacted a primary seat belt law between 2001 and 2008, the average initial increase was 8.6%. Of 26 states, plus the District of Columbia, that have enacted a primary law, 19 (70.4%) had rates of 85% or higher. Of those states without a primary law, only 6 (25%) of the 24 states had rates of 85% or higher (NHTSA, 2007). Furthermore, while 4 of the 26 states with a primary law, plus the District of Columbia, lost some seat belt use between 2007 and 2008, 12 of the 24 states without a primary law lost seat belt use. The national seat belt use rate in 2008 was 83%, slightly higher than Ohio's 82.7% rate that year. The passage of a primary seat belt law could give Ohioans the "push" they need to comply with seat belt laws. If the initial gain from such a law is the above average of 8.6%, Ohio's overall seat belt use would reach 89.8%. A recent policy white paper by the Applied Research Center outlined Ohioans' support for a primary law and their intent to obey it, based on statewide telephone surveys conducted yearly (Seufert, Kubilius, & Walton, 2007). Public support for a primary law is very promising. However, in absence of a primary seat belt law, Ohio can only strive to achieve a seat belt use rate of 85% or greater through widespread, methodical, and sustained enforcement programs and creative media campaigns directed disproportionately at the above groups who are least compliant with Ohio's existing seat belt law.

RECOMMENDATIONS

The 2009 Observation Survey of Seat Belt Use increases and reaffirms knowledge about Ohioans who are and are not using seat belts. While the survey results show incremental gains in seat belt use overall and in many subpopulations, the following groups have again been identified as meriting special attention due to relatively low usage rates: Southeast Ohio vehicle occupants and those from other rural areas; young drivers and their passengers; male drivers and their passengers; pickup truck occupants (i.e., both drivers and passengers); and African-American vehicle occupants. For the most part, these groups are identical to those identified during previous surveys. Furthermore, without a state primary seat belt law, increasing compliance with existing law by vehicle occupants with these characteristics is necessary to achieve a statewide seat belt use rate of 85% or greater.

1. **Southeast Region Vehicle Occupants:** During 2009, compared to other Ohio regions, the rural Southeast region of the state had the lowest usage rate (78%), though this was an increase over the Southeast region's 2008 rate of 73%. Since much of Southeast Ohio is rural, a comparatively greater proportion of its observation sites are intersections, which typically have a lower usage rate than freeway ramps. Also, a higher proportion of occupants were observed in trucks in the Southeast than in the other regions. Once again, truck drivers and their passengers are a high risk subpopulation. However, it is important to emphasize that vehicle occupants in the Southeast Region had relatively lower levels of seat belt use for every vehicle type and occupant characteristic (i.e., driver and passenger, male and female, age and race).

2. **Vehicle Occupants Age 15 -25:** Vehicle occupants age 15-25 continued to exhibit a relatively low seat belt usage rate (76%, unchanged from 2008). Although their seat belt use rate continues to remain fairly steady at around 76%, it has actually fallen a bit over the course of the last three years. The Southeast seat belt usage rate of 71% for occupants age 15-25, nearly unchanged from 2008, is especially low compared to other regions of the state. Since motor vehicle crashes are the leading cause of death among people age 15-20 (NHTSA, 2005), increasing seat belt use among young drivers and passengers is especially imperative. Therefore, increased statewide and targeted law enforcement and education initiatives should be directed toward this population. The life-saving rationale for greater seat belt use should be clearly emphasized. Also, innovative drivers' education programs and other initiatives aimed at increasing driving skill, knowledge, judgment, and personal responsibility among novice drivers would be highly beneficial.

3. **Vehicle Passengers Age 5-14:** In 2009, the seat belt use rate for occupants age 5-14 was 83%, unchanged from 2008. Due to the small number of observed occupants age 5-14, it is difficult to determine accurate regional belt use trends for this group. While a relatively small number of occupants age 5-14 were observed, this age group has among the highest rates of injury in traffic crashes compared to other age groups. In large part this is because seat belts are usually too large for the youngest members of this group. Therefore, it is important for passengers age 5-14 to fully understand the importance of buckling up on their own and of

acting in accordance with this knowledge, instead of merely because an adult requests that they do so. Establishing an inherent motivation to buckle up among this age group should logically increase seat belt usage when they reach driving age. Consequently, increasing seat belt use among youths through school-based and other program initiatives is essential in helping to reduce traffic-related fatalities and injuries in the state. Ohio's initiatives to increase booster seat use among young children will also help this endeavor.

4. **Male Vehicle Occupants:** Overall, male drivers and passengers are significantly less likely to wear seat belts in comparison with female drivers and passengers. For instance, during 2009, male driver and passenger seat belt usage rates were 81% and 76% respectively, while usage rates were 88% for female drivers and 86% for female passengers. Thus, messages designed to promote belt use should be directed specifically to males and their "significant others." By appealing to their sense of responsibility toward their families, children, and friends, as well as emphasizing the tangible safety benefits, male seat belt use should increase. Coupled with strict law enforcement, this multi-faceted effort would increase seat belt use among males both while driving and riding as passengers.

5. **Pick-up Truck Occupants:** As in previous years, pickup truck occupants are one of the most important groups on which to focus media and enforcement initiatives. These individuals, and especially male pick-up truck drivers and their passengers of all ages, generally have significantly lower seat belt usage rates than occupants of other vehicles. For example, the seat belt usage rate among male pickup truck drivers is 75% and for male pickup truck passengers it is 64%. In contrast, usage rates are 82% for female pickup truck drivers and 83% for female pickup truck passengers. The usage rate is also low for pickup truck drivers and passengers ages 15 to 25. Overall, pickup trucks accounted for 15% of the vehicles observed during the 2009 survey. Based on the percentage of all registered vehicles in Ohio that are pickup trucks, the percent that are involved in fatal crashes, and the low compliance with seat belt law among pickup truck occupants, this group is at higher risk for death or serious injury from crashes. Therefore, increasing seat belt use among pickup truck drivers and passengers, especially males, is very important to reduce Ohio's traffic-related fatalities and serious injuries.

6. **African-American Vehicle Occupants**: During the 2009 survey, the statewide seat belt use rate by African-Americans of 76% is significantly lower than the 84% usage rate by Caucasians. African-Americans comprise only 6.4% of occupants in the observational survey, but make up 12% of Ohio's population. However, according to the National Household Travel Survey (2001), 21.6% of black households do not own vehicles, compared with 5.3% of white households. Nevertheless, correcting the low seat belt use of African-Americans is extremely important since traffic accidents are the leading cause of death for black children and the second greatest cause of death among African-Americans between the ages of 15 and 24 (Wald, 2000). Therefore, culturally appropriate media and enforcement initiatives which promote greater seat belt use by members of the African-American community, especially youth, should definitely be increased.

In summary, innovative and sustained actions by the ODPS and the OTSO on the above six recommendations should be directed disproportionately at the above "high risk" groups in order to achieve significantly higher seat belt use in Ohio. In addition, concerned Ohioans should continue to pursue the passage of a primary seatbelt law. For instance, surveys of a representative sample of Ohioans with valid driver's licenses illustrate that a majority would favor a primary seat belt law for the state, would obey such a law, and believe a primary law would have a significant positive impact on highway safety in Ohio (Seufert et. al., 2003-2008). Furthermore, a state can expect to experience a marked increase in seat belt use with the passage of a primary seat belt use law, perhaps by as many as 10 percentage points. This may be particularly important in light of the fact that seat belt use has increased by only 1 percentage point during the last three Observation Surveys of Seat Belt Use in Ohio. Therefore, positive outcomes on seat belt use resulting from ODPS and OTSO actions on the six recommendations would be further enhanced and sustained by passage of a primary seatbelt law.

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APPENDIX A: SITE LOCATIONS

Site No.	County	Region	Primary Location	Municipality/ Township	Site Type
1	Delaware	C	EB Center Village Road @ SR 605	Harlem	I
2	Delaware	C	EB Home Road @ Dublin Road (SR 745)	Rathbone	I
3	Delaware	C	EB East Powell Road @ South Old State Road	Orange	I
4	Delaware	C	WB West Williams Street @ S Washington Street	Delaware	I
5	Delaware	C	NB Liberty Road @ Home Road	Liberty	I
6	Fairfield	C	WB W Sixth @ Harrison Avenue	Lancaster	I
7	Fairfield	C	SB N Broad Street @ 6th Avenue	Lancaster	I
8	Fairfield	C	NB Lancaster New Lexington Road (SR 664) @ Logan Thornville Road (SR 37)	near Bremen	I
9	Fairfield	C	NB Diley Road @ Long Road	Pickerington	I
10	Franklin	C	SB Hendron Road@ Main Street & Groveport Road	Groveport	I
11	Franklin	C	NB Demorest Road @ Clime Road	Madison	I
12	Franklin	C	EB Southwest Blvd @ Demorest Road	Grove City	I
13	Knox	C	SB South Market Street (US 62) @ Rambo Street (SR 438)	Danville	I
14	Knox	C	EB E Gambier Street & Gambier Road (SR 229) @ S Edgewood Road	Mt. Vernon	I
15	Knox	C	NB S Market Street (SR 586) @ Millersburg Road & W Liberty Street (US 62) becoming E Liberty Street & New Guliford Road (SR 541)	Martinsburg	I
16	Knox	C	EB S Clayton Street @ N Main Street & Main Street (US 36 & SR 3)	Centerburg	I
17	Licking	C	NB Jacksontown Road (SR 13) @ National Road (US 40)	Jacksontown/ Licking Township	I
18	Licking	C	SB Jacksontown Road (SR 13) @ National Road US 40	Jacksontown/ Licking Township	I
19	Licking	C	SB Country Club Drive @ Granville Road	Newark	I
20	Licking	C	WB Refugee Road @ Outville Road	Kirkersville/WLicking	I
21	Licking	C	SB North State Road (SR 661) @ Johnstown Utica Road (US 62)	near Homer Village	I
22	Marion	C	WB Owens Road W @ Gooding Road	near Owens	I
23	Marion	C	NB Delaware Ave or Marion-Waldo Road (SR 423) @ Barks Road	Marion	I
24	Marion	C	EB Water Street (SR 47) @ Main Street (SR 203)	Prospect	I
25	Pickaway	C	NB Nicholas Drive @ Northridge Road (SR 188)	Circleville	I
26	Pickaway	C	WB US 22 @ SR 104	near Circleville	I
27	Pickaway	C	EB Ashville-Fairfield Road @ Walnut Creek Pike (CR 7)	SE of Ashville	I
28	Ashland	NE	EB W Walnut Street @ Center Street (SR 60 & SR 511)	Ashland	I
29	Ashland	NE	SB SR 60 @ US 250	North of Savannah	I
30	Ashland	NE	EB CR 1600 @ Miffin Avenue (CR 1095)	Montgomery	I
31	Ashtabula	NE	SB SR 7 @ US 322 E	Williamsfield	I
32	Ashtabula	NE	SB Main Street (SR 45) @ East Water Street & Jefferson Street	Rock Creek	I
33	Ashtabula	NE	WB East Main Street (US 6) @ Main Street on the East side of Andover Square	Andover	I
34	Ashtabula	NE	SB Pymatuning Lake Road (CR 166) @ US 322	Williamsfield	I
35	Ashtabula	NE	WB Waters Street Road (TR 554) @ S Maple Street (SR 45)	S of Orwell	I
36	Ashtabula	NE	SB Centennial Street @ Eastwood Street	Geneva	I
37	Ashtabula	NE	EB Center Street @ Elm Avenue	Ashtabula	I
38	Columbiana	NE	SB Jennings Avenue & Goshen Road (SR 409) @ State Street (SR173 & SR 14)	Salem	I
39	Columbiana	NE	SB St. Clair Avenue @ McKinnon Avenue & Maine Blvd	East Liverpool	I
40	Columbiana	NE	WB North Street @ N Market Street	East Palestine	I
41	Columbiana	NE	NB Dresden Avenue (SR 447) @ Irish Ridge Road (SR 170)	near Calcutta, Glenmoor, & La Croft	I
42	Columbiana	NE	WB Cameron Road (CR 424) @ SR 45	Wellsville Area (near Glasgow)	I

Site No.	County	Region	Primary Location	Municipality/ Township	Site Type
43	Columbiana	NE	WB McKinnon Street @ St. Clair Avenue	East Liverpool	I
44	Columbiana	NE	SB Park Way @ Anderson Blvd	East Liverpool	I
45	Columbiana	NE	SB S Beaver Street @ W Washington Street (SR164)	Lisbon	I
46	Cuyahoga	NE	WB Bedford Chagrin Pkwy & Egbert Road @ Union Street	Bedford	I
47	Cuyahoga	NE	WB Drake Road @ Pearl Road	Strongsville	I
48	Cuyahoga	NE	WB McCracken Blvd @ E 98th Street	Garfield Hts.	I
49	Cuyahoga	NE	EB Emery Road @ Brainard Road	Orange Village	I
50	Erie	NE	EB Mason Road (SR 13) @ Lake Street (SR 61)	Berlin Hts.	I
51	Erie	NE	NB Ceylon Road (CR 58) & South Street (SR 61) @ SR 113	S of Berlin Hts.	I
52	Erie	NE	SB Patten Tract Road (SR 43) @ Mason Road (SR 13)	Bloomingville	I
53	Geauga	NE	WB Music Street @ Hemlock Point Road & Hemlock Road	near S Russell	I
54	Geauga	NE	WB Mayfield Road (US 322) @ Old State Road (SR 608)	Claridon Area	I
55	Geauga	NE	NB Madison Road (SR 528) @ Rock Creek Road (SR 166)	S of Thompson	I
56	Geauga	NE	WB Merritt Road @ Ravenna Road (SR 44)	NW of Burton/ Hambden Township	I
57	Huron	NE	NB Section Line 30 Street @ SR 547	Sherman	I
58	Lake	NE	EB Madison Avenue (SR 306) @ S Ridge Road & Riverside Drive (SR 84)	Painesville City	I
59	Lake	NE	WB Maplegrove Road @ Somrack Drive	N of Willoughby Hills	I
60	Lake	NE	WB Ohio Street @ Reynolds Road (SR 306)	SW of Mentor	I
61	Lake	NE	NB E 340th Street @ Jennison Street	Eastlake	
62	Lake	NE	EB Blase-Nemeth Road @ Bacon Road (CR 305)	NE of Painesville	I
63	Lake	NE	WB Oakwood Blvd @ Hardy Road	Painesville-on-the-Lake	I
64	Lorain	NE	SB Root Road (SR 24) @ Station Road (SR 61)	near Columbia Center	I
65	Lorain	NE	NB West Road (SR 38) @ Norwalk Road (SR 18)	Penfield	I
66	Lorain	NE	SB Oberlin Road (CR 39) @ East Lorain Street (SR 511)	E of Oberlin	I
67	Lorain	NE	WB Ohio Street @ Glenwood Street	Elyria	I
68	Mahoning	NE	EB Boardman Canfield Road (US 224) @ Parkside Drive	W of Boardman	I
69	Mahoning	NE	SB S Broad Street (SR 46 & US 62) @ Lisbon Street (US 62)	Canfield Twp.	I
70	Medina	NE	WB Outlet Mall Road (this is a dedicated mall road, north of Willow Road (SR 90) @ Avon Lake Road (SR 83)	SE of Lodi	I
71	Medina	NE	WB Sharon Copley Road (SR 162) @ Ridge Road (SR 94)	Sharon Center	I
72	Medina	NE	NB Pearl Road (US 42) @ Hamilton (CR 76)	Abbeyville	I
73	Portage	NE	NB N Walnut Street @ E Central Avenue	Ravenna	I
74	Portage	NE	WB Lynn Road @ Rootstown Road	W of Rootstown	I
75	Portage	NE	SB Franklin Avenue @ Cherry Street	Kent	I
76	Portage	NE	NB Sebring Johnson Road @ SR 14	SE of Deerfield	I
77	Richland	NE	SB Rock Road @ Myers Road (CR 201)	S of Taylortown	I
78	Richland	NE	EB Shelby-Ganges Road (CR 61) @ Plymouth Springmill Road	NE of Shelby	I
79	Richland	NE	WB Marion Avenue (SR 146) @ S Home Road	SW of Mansfield	I
80	Stark	NE	EB Lincoln Way NW @ 23rd Street NW	W of Massillon	I
81	Stark	NE	NB Ravenna Ave NE (SR 44) @ Edison Street NE (SR 619)	NW of Alliance	I
82	Stark	NE	EB Farber Street SE @ Cleveland Ave SE (SR 800)	East Sparta	I
83	Summit	NE	EB E Steels Corners Road @ Wyoga Lake Road	E of East Steel Corners	I
84	Summit	NE	WB Huston Street @ 5th Street NE	Barberton	I
85	Summit	NE	WB Memorial Parkway @ North Portage Path	Akron	I
86	Summit	NE	NB Brown Street @ E Thornton Street	Akron	I
87	Summit	NE	NB S Hametown Road @ Minor Road (Note: S Hametown Road "skips" to the north after Minor Road without connecting)	SW of Copley	I
88	Summit	NE	SB Arlington Road (SR 15) @ Moore Road	N of East Liberty	I
89	Summit	NE	WB Carey Avenue @ 26th Street SW	SW of Akron	I
90	Trumbull	NE	NB S High Street (SR 5) @ Main Street	Cortland	I

Site No.	County	Region	Primary Location	Municipality/ Township	Site Type
91	Trumbull	NE	EB Wilson Sharpsville Road (SR 305) @ Youngstown Kingsville Road (SR 193)	W of Fowler	I
92	Trumbull	NE	EB Youngstown Road SE (US 422) @ Central Parkway Avenue SE	Warren	I
93	Wayne	NE	EB Schrock Road @ Elm Street	Orrville	I
94	Wayne	NE	NB Fredericksburg Road @ Dover Road (US 250)	SE of Wooster	I
95	Wayne	NE	EB W Old Lincoln Way (CR 30A) @ Ashland Road (US 250)	W of Wooster	I
96	Wayne	NE	NB N Main Street @ Sunset Drive	Rittman	I
97	Wayne	NE	EB Milltown Road @ Melrose Drive	Wooster	I
98	Allen	NW	SB Yoakam Road @ Zurmehly Road	Fort Shawnee	I
99	Allen	NW	WB Grand Avenue @ N Main Street	Lima	I
100	Allen	NW	SB Bentley Road @ Augsburger Road	Bluffton	I
101	Auglaize	NW	WB Benton Street @ S Water Street	Wapakoneta	I
102	Auglaize	NW	SB Main Street (SR 65) @ Ohio Street & Waynesfield Pike (SR 67)	Uniopolis	I
103	Auglaize	NW	SB Defiance Road & Defiance Street & Dieker Pl (SR 116) @ Indiana Ave (SR 29)	St. Marys	I
104	Auglaize	NW	SB N Westmlnster Street (SR 196) @ Wapakoneta Street (SR 67)	Waynesfield	I
105	Auglaize	NW	EB Ohio Street & Waynesfield Pike (SR 67) @ Main Street (SR 65)	Uniopolis	I
106	Crawford	NW	NB S Poplar Street @ Lincoln Hwy. & Mansfield Street (US 30 & SR 330)	Bucyrus	I
107	Crawford	NW	NB SR 4 @ Chatfield Center Road (SR 103)	Chatfield	I
108	Hancock	NW	SB Township Road 234 @ CR 205	SE of Findlay	I
109	Logan	NW	NB CR 24 S @ SR 47	Logansville	I
110	Logan	NW	NB CR 5 N @ SR 273	Rushcreek	I
111	Logan	NW	NB Lima Street (SR 117 & SR 274) @ Napoleon Street	Richland	I
112	Logan	NW	EB US 33 @ E Sandusky Avenue (SR 540)	Bellefontaine	OR
113	Logan	NW	EB CR 60 @ CR 21	Bloom Center	I
114	Lucas	NW	WB Nebraska Avenue @ N Holland-Sylvania Rd	Toledo	I
115	Lucas	NW	WB Liberty Street @ Broadway Street	Toledo (E of Maumee River)	I
116	Sandusky (near Seneca)	NW	SB S Main Street (SR 510 & SR 101) @ Portland Road & continuance of S Main (CR 177 & SR 101)	S of Clyde	I
117	Sandusky	NW	NB Tiffin Road (CR 53) @ Hurdic Road (CR 201)	S of Ballville	I
118	Sandusky	NW	NB Church Street (TR 72) @ Main Street (US 6)	Helena	I
119	Sandusky	NW	EB Napoleon Road @ Brush Street	Ballville	I
120	Seneca	NW	SB CR 15 @ CR 38	NE of Tiffin	I
121	Shelby	NW	EB Ft Loramie-Swanders Road @ SR 29	W of Swanders	I
122	Shelby	NW	EB Russell Road @ 4th Avenue	Sidney	I
123	Shelby	NW	SB Main Street (SR 66) @ W Park Street (SR 705) & Elm Street (SR 362)	Ft Loramie	I
124	Wood	NW	WB Rees Road @ Lemoyne Road	near Pemberville	I
125	Athens	SE	EB US 50 @ SR 32	SW of Albany/ Lee Township	I
126	Belmont	SE	WB Maynard Road (CR 56) @ SR 9	NW of St. Clairsville	I
127	Belmont	SE	NB S Marietta Street & Maple Ave @ Main Street	St. Clairsville	I
128	Jefferson	SE	NB Standard Avenue @ McLister Avenue	Mingo Junction	I
129	Jefferson	SE	EB SR 22 @ John Scott Connector & John Scott Memorial Highway	N of Steubenville	OR
130	Jefferson	SE	NB Lovers Lane @ CR 43	NW of Steubenville	I
131	Lawrence	SE	NB SR 243 & SR 378 @ continuance of SR 243 in a westerly direction	N of Getaway	I
132	Muskingum	SE	SB/EB Pinkerton Road @ Maysville Pike (US 22 & SR 93)	Zanesville Terrace	I
133	Tuscarawas	SE	WB Main Street (CR 39) @ Walnut Street	Gnadenhutten	I
134	Tuscarawas	SE	NB Gilmore Road (CR 10) @ River Hill Road SE (CR14)	Gilmore	I
135	Washington	SE	WB Glendale Road (CR 375) @ SR 821	W of Stanleyville	I
136	Washington	SE	EB Washington Street (SR 7) @ Third Street (SR 60 & continuance of SR 7)	Marietta	I
137	Butler	SW	WB Hamilton-New London Road @ Ross Millville Road US 27	S of Millville	I

Site No.	County	Region	Primary Location	Municipality/ Township	Site Type
138	Butler	SW	SB Breiel Blvd @ Martin Luther King Way (SR 122)	Middletown	I
139	Butler	SW	WB Roosevelt Blvd @ Wicoff Street	Middletown	I
140	Butler	SW	WB Glendale Road (SR 747) @ Hamilton Middletown Road (SR 4)	Rockdale	I
141	Butler	SW	SB Brofield Drive @ Bayberry Drive	Indian Springs	I
142	Butler	SW	WB Todhunter Road @ Yankee Road	Monroe	I
143	Butler	SW	EB Minton Road @ Boyle Road	Queen Acres	I
144	Clark	SW	WB Santa Monica Drive @ Red Coach Drive	N of Springfield	I
145	Clark	SW	NB US 68 @ Fairfield Pike	SW of Springfield	I
146	Clark	SW	WB W National Road (SR 40) @ N Medway-Carlisle Road (SR 571 & CR 303)	New Carlisle	I
147	Clermont	SW	WB Light Street (SR 756) @ Market Street (SR 133 & 222)	Felicity	I
148	Clermont	SW	SB Laurel Lindale Road @ Bethel-New Richmond Road	E of New Richmond	I
149	Clermont	SW	EB SR 222 @ SR 133	S of Felicity	I
150	Clermont	SW	WB Brooklyn Avenue & Edgecombe Road @ Main Street (SR 28)	Millford	I
151	Darke	SW	SB North Broadway (SR 571 & SR 49) @ W Main Street (SR 121) Note: This location is called "Public Square"	Greenville	I
152	Darke	SW	NB Main Street (SR 118) @ Canal Street (SR 47)	Ansonia	I
153	Montgomery	SW	EB Wyoming Street @ Wayne Avenue	Dayton	I
154	Montgomery	SW	NB S Elm Street @ Center Street	Farmersville	I
155	Miami	SW	WB E Broadway & Korean War Veterans Memorial Highway (US 36) @ High Street (SR 48)	Covington	I
156	Miami	SW	EB Hayes Street (SR 571) @ Miami Street (SR 48)	West Milton	I
157	Greene	SW	NB Colonel Glen Hwy @ Ravenwood Drive & University Blvd	SW of Fairborn	I
158	Greene	SW	NB US 42 @ Main Street (US 35)	Xenia	I
159	Greene	SW	SB Colorado Drive @ Alabama Drive	Xenia	I
160	Greene	SW	WB Brown Road @ Wilmington Pike	Sugarcreek	I
161	Hamilton	SW	WB Losantville Avenue @ Wiehe Road	Golf Manor	I
162	Butler	SW	EB Woodlawn Avenue @ Madison Avenue	Lindenwald	I
163	Hamilton	SW	EB Fleming Avenue @ Grandview Avenue	NE of Cincinnati	I
164	Hamilton	SW	NB Eight Mile Road @ Batavia Road (SR 32)	SE of Shademoore	I
165	Hamilton	SW	NB Race Road @ West Fork Road	Dent	I
166	Hamilton	SW	EB Waycross Road @ Hanover Road	Forest Park	I
167	Hamilton	SW	NB Shakerdale Road @ Montgomery Road	Montgomery	I
168	Hamilton	SW	WB Hanley Road @ Sheed Road	NW of White Oak	I
169	Miami	SW	EB Troy Pike (SR 55) @ Main Street (SR 589)	Casstown	I
170	Miami	SW	WB West Main Street (SR 571) @ 4th Street	Tipp City	I
171	Miami	SW	NB Washington Avenue @ Broadway Riverside Drive & Riverside Drive (SR 66)	Piqua	I
172	Miami	SW	WB US 40 @ SR 201	Brandt	I
173	Miami	SW	SB S SR 202 @ E Main Street SR 41	Troy	I
174	Miami	SW	NB North Main Street @ W Hayes Street (SR 571)	West Milton	I
175	Montgomery	SW	EB Leo Street @ Webster Street	Dayton	I
176	Montgomery	SW	SB West Wilmington Ave @ Citation Ave	Oakwood	I
177	Preble	SW	NB Commerce Street (SR 503) @ Dayton Street	Lewisburg	I
178	Ross	SW	WB W 2nd Street @ North High Street (SR 104)	Chillicothe	I
179	Ross	SW	EB Kellenberger Road (CR 278) @ Orr Road (CR 526)	E of Yellowbird	I
180	Ross	SW	SB Biers Run Road @ CR 550	Union Twp.	I
181	Ross	SW	WB Stoney Creek Road (SR 372) @ US 23 & SR 104	Alma	I
182	Ross	SW	SB Cattail Road @ Egypt Pike	Union	I
183	Warren	SW	EB Pleasant Street @ Columbus Avenue	Lebanon	I
184	Delaware	C	SB I-71 @ US 36 (SR 37)	Berkshire	OR
185	Franklin	C	NB I-71 @ Morse Road (US 23)	Clintonville	OR
186	Franklin	C	EB New Albany Expressway (SR 161) @ New Albany Road	New Albany	OR
187	Franklin	C	EB New Albany Expressway (SR 161) @ Little Turtle Way	New Albany	OR

Site No.	County	Region	Primary Location	Municipality/ Township	Site Type
188	Franklin	C	NB I-71 @ Greenlawn Road	Columbus	OR
189	Franklin	C	SB I-270 @ Roberts Road	Hilliard Area	OR
190	Franklin	C	WB Frank Refugee Expressway (SR 104) @ Groveport Road	Columbus	OR
191	Franklin	C	NB Olentangy Frwy (SR 315) @ Ackerman Road	Upper Arlington	OR
192	Geauga	NE	WB US 422 @ SR 44	near Burton	OR
193	Greene	SW	NB I-675 @ East Dayton-Yellow Springs Road	Fairborn	OR
194	Greene	SW	SB I-675 @ North Fairfield Road	Fairborn	OR
195	Hamilton	SW	WB Ronald Reagan Cross County Hwy (SR 126) @ West Galbraith Road (CR 101)	Norwood	OR
196	Hamilton	SW	SB I-71 @ Edwards Road	Cincinnati	OR
197	Hamilton	SW	EB I-275 @ Hamilton Avenue (US 127)	Norwood	OR
198	Hamilton	SW	NB I-75 @ East Sharon Road	Reading	OR
199	Hamilton	SW	NB I-275 @ US 42	Cincinnati	OR
200	NB observer in Hamilton (borders on Warren)	SW	NB I-71 @ Mason-Montgomery Road	Mason (near Loveland)	OR
201	Hancock	NW	SB I-75 @ SR 103	Bluffton Area	OR
202	Hancock	NW	NB I-75 @ W Trenton Avenue (US 224)	Findlay	OR
203	Jefferson	SE	NB SR 7 @ SR 151	near Mingo Junction	OR
204	Lake	NE	WB Lakeland Fwy (SR 2) @ E 305th Street	Wickliffe Area	OR
205	Lake	NE	EB I-90 @ Broadmor Road & Chillicothe Road (SR 306)	Willoughby Area	OR
206	Lake	NE	EB Lakeland Fwy (SR 2) @ Reynolds Road (SR 306)	Mentor	OR
207	Licking	C	WB I-70 @ Baltimore Road & Outville Road (SR 158 & SR 40)	Kirkersville	OR
208	Licking	C	EB SR 16 @ 21st Street	Newark	OR
209	Licking	C	WB SR 16 @ O'Bannon Avenue	Newark	OR
210	Logan	NW	WB US 33 @ E Sandusky Avenue (SR 540)	Bellefontaine	OR
211	Lorain	NE	WB I-90 & SR 2 @ Center Road or Avon Belden Road (SR 83)	Avon	OR
212	Lorain	NE	EB SR 2 @ Oak Point Road & N Lake Street	near Amherst	OR
213	Lorain	NE	WB SR 10 @ Loraine Road	North Ridgeville	OR
214	Lucas	NW	SB I-75 @ Willy's Parkway	Toledo	OR
215	Lucas	NW	NB I-280 @ Manhattan Blvd	Toledo	OR
216	Lucas	NW	SB I-475 (SR 23) @ Airport Hwy (SR 2)	Holland	OR
217	Mahoning	NE	NB SR 11 @ Mahoning Avenue (CR 18)	Austintown	OR
218	Mahoning	NE	NB I-680 @ Meridian Road	Youngstown	OR
219	Mahoning	NE	NB Salem Warren Road (SR 45) @ Mahoning Avenue (CR 18)	S of North Jackson	OR
220	Marion	C	NB US 23 @ Harding Hwy E (SR 309)	Marion	OR
221	Medina	NE	NB I-71 @ Wooster Pike (SR 3)	Medina	OR
222	Miami	SW	SB I-75 @ Market Street (SR 55)	Troy	OR
223	Miami	SW	NB I-75 @ E Ash Street (US 36)	Piqua	OR
224	Montgomery	SW	SB I-75 @ Benchwood Road	Huber Heights	OR
225	Montgomery	SW	NB I-75 exiting onto Hilrose Avenue @ Leo Street	Dayton	I
226	SB observer in Greene (borders on Montgomery)	SW	SB I-675 @ Wilmington Pike & Wilmington Dayton Road	Bellbrook	OR
227	Montgomery	SW	EB W National Road (US 40) @ Peters Pike	W of Vandalia	OR
228	Montgomery	SW	SB I-75 @ E National Road (US 40)	Vandalia	OR
229	Montgomery	SW	WB I-70 @ Main Street (SR 48)	Englewood	OR
230	Muskingum	SE	WB I-70 @ Underwood Street (SR 60 & SR 146)	Zanesville	OR
231	Richland	NE	EB US 30 @ Springmill Street (SR 39)	Mansfield	OR
232	Scioto	SW	WB US 52 @ Hayport Road (SR 522)	near Allentown & Sand Hill	OR
233	Stark	NE	NB Great Lakes Blvd (SR 21) @ Manchester Avenue (SR 93)	Brimestone Corners near Canal Fulton	OR

Site No.	County	Region	Primary Location	Municipality/ Township	Site Type
234	Stark	NE	WB US 30 & US 62 @ Richville Drive (CR 627)	near Massillon	OR
235	Stark	NE	WB Atlantic Blvd (US 62) @ Ravenna Avenue (SR 44)	Louisville	OR
236	Summit	NE	EB I-76 & US 224 @ Cleveland-Massillon Road (SR 21)	NE of Norton	OR
237	Summit	NE	NB I-271 @ Main Street & W Streetsboro Road (SR 303)	Boston Twp	OR
238	Trumbull	NE	NB South Leavitt Road @ West Market Street	Leavittsburg	OR
239	Trumbull	NE	NB SR 11 @ Tibbetts Wick Road (CR 28)	W of Klines Corner	OR
240	Trumbull	NE	NB SR 11 @ Wilson Sharpsville Road (SR 305)	SE of Cortland	OR
241	Trumbull	NE	EB I-80 @ E Liberty Street turning right toward Belmont Avenue (SR 193)	Youngstown	OR
242	Tuscarawas	SE	NB I-77 @ US 36	near Glasgow	OR
243	Warren	SW	SB I-71 @ Kings Mills Road (SR 741)	near Kings Mill	OR
244	Washington	SE	NB I-77 @ SR 821	W of Macksburg	OR
245	Wayne	NE	NB Dix Expy (SR 83) @ Cleveland Road (SR 3)	Wooster	OR
246	Wood	NW	NB I-75 NB @ Grand Army of the Republic Hwy (US 6)	Bowling Green	OR
247	Wood	NW	NB I-75 @ Eagleville Road	North Baltimore	OR
248	Allen	NW	EB US 30 @ W Lincoln Highway	Delphos Area	OR
249	Allen	NW	SB Ottawa Road & W Main Street (SR 65) @ Lincoln Highway	Cairo	OR
250	Ashland	NE	WB US 30 @ N Mechanic Street (SR 60)	near Widowville and Charles Mill (Mansfield Area)	OR
251	Ashtabula	NE	NB SR 11 & SR 46 @ N Ridge Road East & E Prospect Road (US 20)	E of Edgewood	OR
252	Ashtabula	NE	SB SR 46 & S Chestnut Street @ Mulberry Street (SR 307)	S of Jefferson	I
253	Athens	SE	NB SR 682 & SR 56 @ Richland Avenue	S of Athens	OR
254	Auglaize	NW	SB I-75 @ Bellfontaine Street & Wapakoneta Fisher Road	Wapakoneta	OR
255	Belmont	SE	WB I-70 @ Main Street (SR 331)	St. Clairsville	OR
256	NB observer in Clark (borders on Champaign)	SW	NB US 68 @ E County Line Road	Springfield Area (near Bowlusville)	OR
257	Clark	SW	EB I-70 @ N Urbana Lisbon Road (SR 54)	South Vienna	OR
258	Columbiana	NE	NB SR 11 @ Fork Road (SR 344)	Columbiana	OR
259	Columbiana	NE	EB US 30 & SB SR 11 @ E Liverpool Road	St Clair	OR
260	Crawford	NW	WB US 30 @ N Sandusky Avenue (SR 4 & SR 19 & SR 100)	N of Bucyrus	OR
261	Cuyahoga	NE	EB Outerbelt S Fwy (I-480) @ State Road (SR 94)	Cleveland	OR
262	Cuyahoga	NE	SB I-71 @ Royalton Road (SR 82)	NE of Strongsville	OR
263	Cuyahoga	NE	WB Outerbelt S Fwy (I-480) @ Great Northern Blvd (SR 252)	E of North Olmstead	OR
264	Cuyahoga	NE	EB Northwest Fwy (I-90 & SR 2) @ Columbia Road (SR 252)	NE of Westlake	OR
265	Darke	SW	WB US 36 & NB US 127 @ Sweitzer Street (SR 49)	near Greenville, Jaysville, Frys Corners, and Bradford	OR
300	Delaware	C	NB US 42 @ SR 36 (US 42)	Delaware	OR
301	Licking	C	WB Worthington Road (SR 16 & SR 37) @ Lancaster Road (SR 37 & SR 661)	Granville Area	OR
302	Licking	C	EB I-70 @ Hebron Road (SR 79)	S of Hebron	OR
303	Franklin	C	WB New Albany Expy (SR161) @ E Main Street & Johnstown Road (US 62)	New Albany	OR
305	Franklin	C	EB New Albany Expy (SR161) @ N Hamilton Road	New Albany	OR
310	Butler	SW	SB I-75 @ Tylersville Road	West Chester	OR
311	Butler	SW	NB S Erie Blvd (SR 4) @ High Street (SR 129 & Butler Regional Hwy & Michael A Fox Hwy)	Hamilton	OR
312	Hamilton	SW	SB Colerain Avenue (US 27) @ Ronald Reagan Cross County Hwy (SR 126)	Norwood	OR
313	Hamilton	SW	WB I-275 @ Springfield Road & Springfield Pike (SR4)	Fairfield Area (near Springdale)	OR
314	Greene	SW	NB I-71 @ Maysville Street (SR 72)	Xenia Area (near Bowersville)	OR
322	Portage	NE	NB Painesville Ravenna Road (SR 44) @ Ohio Turnpike (I-80)	Streetsboro Area (near Shalersville)	OR
323	Summit	NE	NB MLK Jr. Blvd (SR 59) @ N Main Street & N Howard Street.	Akron	I

APPENDIX B: SITE DESCRIPTION FORM

Statewide Safety Belt Survey – Site Description Form – 2008

Site No: _____ **Site Location:** _____

Observer Name: _____

Date: _____ **County:** _____ **City:** _____

Day of Week: ○ Monday ○ Tuesday ○ Wednesday ○ Thursday ○ Friday ○ Saturday ○ Sunday

Start Time: _____ **(military)**

End Time: _____ **(military)**

Interruptions: _____ **(total number of minutes)**

Weather:
- ○ Sunny/Mostly Sunny
- ○ Cloudy/Mostly Cloudy
- ○ Light Rain
- ○ Heavy Rain
- ○ Snow
- ○ Other _____

Visibility:
- ○ Poor
- ○ Satisfactory
- ○ Excellent

Site:
- ○ Primary
- ○ Alternate
- ○ Other _____

Site Type:
- ○ Intersection
- ○ Freeway Ramp

Description of Observation Location:

_____

_____

_____

_____

_____

Draw diagram of site and indicate location and lane observed in the space below.

First Traffic Count (5 min):_____

Second Traffic Count (5 min): _____

Total number of lanes at site in direction being observed

○1 ○2 ○3 ○4 ○5 ○6 ○7 ○8

Observer Comments:

_____

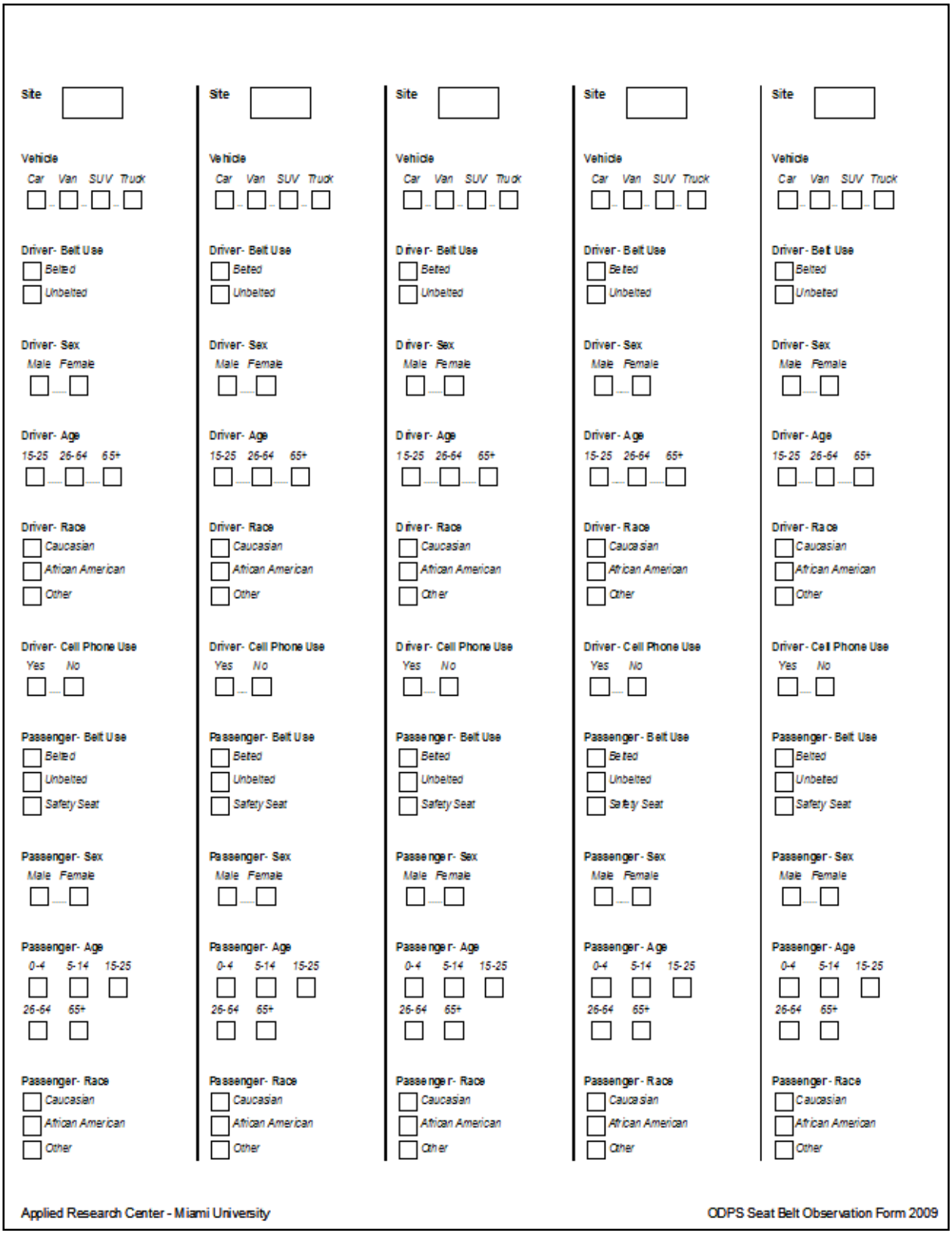
_____

_____

_____

_____

APPENDIX C: DATA COLLECTION FORM



Site

Vehicle
Car Van SUV Truck

Driver- Belt Use
Belted
Unbelted

Driver- Sex
Male Female

Driver- Age
15-25 26-64 65+

Driver- Race
Caucasian
African American
Other

Driver- Cell Phone Use
Yes No

Passenger- Belt Use
Belted
Unbelted
Safety Seat

Passenger- Sex
Male Female

Passenger- Age
0-4 5-14 15-25
26-64 65+

Passenger- Race
Caucasian
African American
Other

Applied Research Center - Miami University

ODPS Seat Belt Observation Form 2009