Observational Survey of Seat Belt Use in Ohio
2016

Prepared for:
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The Ohio Traffic Safety Office
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The Ohio Department of Public Safety Office and its Ohio Traffic Safety Office administration and the Applied Research Center’s Director and staff are grateful to retired officers of the Ohio State Highway Patrol for their excellent field observation research.

This research endeavor is derived from a design that conforms to the requirements of the Uniform Criteria and was developed in consultation with and approved for Ohio under an agreement with the Statistical Consulting Center at Miami University. John Bailer, Chair and Distinguished Professor at Miami University, and Doug Noe, Associate Professor, provided additional statistical support through data analysis. We are grateful to the entire Statistical Consulting Center staff, which additionally includes Michael Hughes, Manager, and Dr. Jing Zhang, Assistant Professor, for their insights and support.

Robert L. Seufert
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# Table of Contents

**Executive Summary** .......................................................................................................................... 1  
**Background** ........................................................................................................................................... 2  
**Methodology** .......................................................................................................................................... 4  
  - Sample Stratification ................................................................................................................................. 4  
  - Sample Size and Allocation to Strata ........................................................................................................ 5  
  - Site Selection Procedures ......................................................................................................................... 6  
  - Data Collection and Observer Training .................................................................................................... 8  
  - Statistical Analysis ................................................................................................................................... 11  

**Results** .................................................................................................................................................. 16  
  - Statewide Seat Belt Use ............................................................................................................................ 16  
  - OSHP District Seat Belt Use ..................................................................................................................... 17  
  - Vehicle Type and Seat Belt Use ................................................................................................................ 19  
  - Driver and Passenger Seat Belt Use ......................................................................................................... 21  
  - Sex of Vehicle Occupants and Seat Belt Use ........................................................................................... 22  
  - Age of Vehicle Occupants and Seat Belt Use .......................................................................................... 23  
  - Race of Vehicle Occupants and Seat Belt Use ...................................................................................... 24  
  - Observation Site Type and Seat Belt Use .................................................................................................. 25  
  - Observation Road Designation and Seat Belt Use .................................................................................. 26  
  - Cross-tabulations of Observation Characteristics and Seat Belt Use .................................................... 28  
  - Media and Enforcement Interventions ....................................................................................................... 30  

**Conclusions** .......................................................................................................................................... 31  

**Recommendations** ................................................................................................................................. 32  

**References** ............................................................................................................................................. 34  

**Appendix A: Site Locations** .................................................................................................................. 36  

**Appendix B: Ohio Average Passenger Vehicle Crash-Related Fatalities by County 2006-2010** ............ 41  

**Appendix C: Ohio Regions, Counties, and DVMT** ............................................................................... 43  

**Appendix D: Population of Road Types by County and Number Selected** ....................................... 45  

**Appendix E: Sampled Road Segments** .................................................................................................. 47  

**Appendix F: Ohio Seat Belt Survey – Site Description Form** ................................................................. 53  

**Ohio Seat Belt Survey – Observation Form** .......................................................................................... 54  

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.
Overview: The 2016 baseline Click It or Ticket observation survey of seat belt use in Ohio contained 21,175 vehicle occupants – 17,956 drivers and 3,219 passengers. After the Click It or Ticket media campaign and enforcement initiatives, another random sample of 23,082 occupants was observed at the same sites with 19,083 drivers and 3,999 passengers. Results of the second survey indicate that Ohio’s 2016 weighted seat belt use rate is 83.8%, nearly identical to 2015’s seat belt use rate of 83.9%. Consequently, the 2016 survey results, with an overall margin of error of ± 1.0%, were derived from the second observational survey conducted in June after the combined Click It or Ticket media campaign and enforcement initiatives had been fully implemented. The 83.8% seat belt use rate for Ohio was formally reported to the National Highway Traffic Safety Administration (NHTSA).

In consultation with the Applied Research Center, retired officers of the Ohio State Highway Patrol (OSHP) conducted observation surveys of seat belt use at 237 randomly selected sites in 57 of Ohio’s 88 counties. The surveys were conducted on randomly selected days of the week and times of day and included occupants of passenger cars, vans and minivans, sport utility vehicles (SUVs), and light and heavy trucks. Additional findings, which remain generally consistent with previous surveys, include the following:

- The seat belt use rate of light truck (mostly pickup truck) occupants (79.4%) is significantly lower than that of occupants of passenger cars (85.0%), vans (85.4%), or SUVs (87.1%).
- The Cleveland and Jackson districts have the lowest seat belt use rates, with rates of 77.4% and 78.1%, respectively. The highest rates were observed in the Wilmington and Findlay districts (both with 90.2%).
- The statewide rate for drivers was 83.7%; passengers were slightly more likely to buckle up, at 85.5%.
- Female vehicle occupants continue to have a significantly higher rate of seat belt use (87.3%) than male occupants (81.1%).
- For vehicle occupants between 15 and 25 years of age, the seat belt use rate was 84.9% and for occupants 26-64 the rate was 83.6%; 90.0% of occupants aged 65 or older were observed to be wearing seat belts, surpassing both younger age groups. While seat belt use rates among 15-to-25-year-olds have improved, due to the high number of traffic injuries and fatalities among this age group, continued targeted intervention is recommended.

Recommendations: Several populations with low belt use rates continue to warrant targeted interventions. Similar to previous years, those populations include:

- Occupants residing in rural counties
- Male occupants
- Occupants aged 15-25
- Light truck occupants
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. Therefore, 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 through 2011, with the exception of the addition of driver’s cell phone use on the observation form, the survey methodology was identical to that used in the 2008 observation surveys. The revised methodology, implemented beginning in 2012, continues to collect the same vehicle, driver, and front-seat passenger specific data. The revised methodology is explained in greater detail in the Methodology section below.

Data were collected from vehicles stopped at randomly selected intersections and freeway off-ramps, so observers had ample opportunity to collect data from each specific vehicle observed. Traffic control devices such as traffic signals or stop signs were present at nearly all observation site locations. This method gives observers not only the opportunity to collect general seat belt use data, but to also collect demographic information pertaining to 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 and occupant 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 through 2011 surveys. 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 Ohioans who are likely to wear (or not wear) their seat belts. As previously noted, while the methodology was revised in 2012, the same types of information on vehicles, drivers, and passengers have been collected in all surveys since the revision.
Also, to provide geographical information about regional trends in seat belt use, the survey is structured to estimate seat belt use by Ohio State Highway Patrol District.

This report contains the following sections:

- **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 OSHP district) are presented in the same manner as in past *Observational Surveys of Seat Belt Use in Ohio*.
- **Recommendations:** Recommendations are based on the data derived from the descriptive statistics and a statistical weighting and analysis.
- **References and Appendices:** Observation sites, forms, and other pertinent information are also included.

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

The new methodology required a more nuanced stratification of the sample. In previous years, the sample was stratified by geographical region. Beginning in 2012, the sample was stratified by county and, within each county, by road type (primary, secondary, and municipal/rural). Observation sites were randomly selected road segments from each county depending on the road types available. For example, primary sites could only be selected in counties with at least one freeway off-ramp, while municipal roads could only be sampled in counties with a metropolitan statistical area (MSA). Appendix D details the breakdown of site types and numbers by county. The method of selection described later in this section was used to ensure that all intersections and off-ramps in a given county had *an equal probability of selection*. That is, all road segments, regardless of their location or traffic volumes, had equal likelihoods of selection as survey sites. In some cases, certain selected sites were impractical for observation, in which case a similar site (primary, secondary, or local) was selected to replace it.

As a preliminary measure to eliminate sites with relatively few consequences to policy implementation, counties with lower overall traffic-related fatalities were omitted from the sample. Federal guidelines permit the exclusion of low-fatality counties (cumulatively accounting for 15% or less of the state’s highway fatalities) from the sample space so that the costs of sampling in these areas may be constrained. The present survey methodology excluded 31 low-fatality counties that cumulatively account for approximately 15% of the state’s fatalities, reducing the sample of Ohio counties from 88 to 57 (see Figure 1 for counties). In all cases, excluded counties were rural with relatively small populations, few roads, and had relatively few crash-related fatalities.
Sample Size and Allocation to Strata

Observation sites within this sample of Ohio counties were randomly selected segments and freeway off-ramps, each vetted for safety and practicality via satellite imagery, street imagery, and direct observation. The ideal location was one which allowed 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, using the SVDO method whenever possible enables the collection of more detailed information without any loss in accuracy. Collected information includes vehicle type, driver and passenger belt use, sex, age, race, and driver cell phone use.

Aside from road type availability in each sampled county, 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. 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. See Appendix D for a breakdown of site allocation by strata (counties and road types).

**Site Selection Procedures**

Our research design conforms to the requirements of the Uniform Criteria and will generate annual estimates of occupant restraint use for adults and children using booster seats in the front seats of specified vehicles. We intend to update the sample of data collection sites every five years in order to have survey results for geographic areas in which more than 85% of crash-related fatalities occur. This sample design was developed in consultation with and approved for Ohio under an agreement with the Statistical Consulting Center at Miami University.

1. All 88 counties in Ohio were listed in descending order of the average number of motor vehicle crash-related fatalities for the period of 2006 to 2010. Ohio State Highway Patrol data, which are provided to the Fatal Accident Reporting System (FARS), were used to determine the 5-year average number of crash-related fatalities per county. It was determined that 57 counties accounted for approximately 86 percent of Ohio’s total passenger vehicle crash-related fatalities. We selected road segments from each of the 57 counties. Thus, each county is considered a stratum when generating state or regional estimates of seat belt usage. See Appendix D.

2. It is expected that an average of 75 to 80 vehicles will be observed at each of 237 observation sites and approximately 17,775 to 18,960 vehicles overall based on past experience with Ohio’s annual *Observational Survey of Seat Belt Use*. Estimates from previous surveys suggest the standard error will be well under the threshold of 2.5%. In the event there is a standard error greater than 2.5%, additional data will be collected from existing sites.

3. All 57 counties were stratified by road type (primary, secondary, and local/rural/city). Assuming that all three road types are present in a county, a random sample of road segments was selected from each county as follows: 2 primary segments, 2 secondary segments, and 1 local/rural/city segment, except for counties with 10,000,000 daily vehicle miles traveled (DVMT) or higher, in which case 2 local/rural/city segments were selected. As a result, 82 primary, 114 secondary, and 41 local/rural/city segments were selected overall. These sample sizes reflected a logistical constraint of available staffing for observation sites and the time to conduct the study. See Appendix E.

4. Additional stages of selection were used to determine the observation period, travel direction, lane, and vehicles to be observed, at random and with known probability, as appropriate under the Uniform Criteria.
Sample Size and Precision

A standard error of less than 2.5% on the seat belt use estimates is required by the Final Rule. Since 1999, Ohio has conducted the *Observational Survey of Seat Belt Use* and has historically reported standard errors below the 2.5% threshold. For instance, during the 2011 pre- and post-surveys, the standard error was .28% and .26% with 18,000-19,200 total observation surveys. These surveys have been obtained from previous sample designs using 48 counties and an average of 5 observation sites per county with an average of 75 to 80 observation surveys per site. Therefore, since the proposed design is expected to yield a minimum sample size of 17,775 observations across 57 counties and an average of approximately 4.16 segments per county, the precision objective should be achieved (i.e., 57 * 4.1578 * 75 = 17,775). In the event that the precision objective is not met, additional observations will be taken starting with sites having the fewest observations, and new data will be added to existing valid data until the desired precision is achieved. The latter step was unnecessary in the current survey.

County Selection

Of Ohio’s 88 counties, 57 counties account for nearly 86 percent of all fatalities. In consultation with Statistical Consulting Center staff, we decided to include all 57 counties in the final sample of counties. For practical purposes, the Ohio State Highway Patrol (OSHP) assigns each of Ohio’s counties to one of eight districts; although the sample of counties is not stratified by region in the analysis, seat belt use rates will be reported for districts as well as overall. See Appendix D.

Road Segment Selection

For each of the 57 counties, road segments were randomly selected within each county. Ohio employed the Census TIGER data for the selection of road segments. Also, Ohio exercised the available exclusion option and removed rural local roads in counties that are not within Metropolitan Statistical Areas (MSAs), and other non-public roads, unnamed roads, unpaved roads, vehicular trails, access ramps, cul-de-sacs, traffic circles, and service drives from the dataset. We stratified segments by road type and selected 2 primary segments, 2 secondary segments, and 1 local/rural/city segment from each county. When a county’s DVMT was 10,000,000 or more, we selected 2 local/rural/city segments. As shown in Appendix D, primary and local segments were not always available for each county.

Appendix D contains the population of segments and number of segments sampled by county. Appendix E presents the selected road segments within each county and their probabilities of selection.
Reserve Sample

In the event that an original road segment is permanently unavailable, a reserve road segment was used. The reserve road segment sample consists of one additional road segment per original road segment selected, resulting in a reserve sample of 237 road segments. After data were sorted by segment length, road type, and county, the segment immediately following each selected segment was obtained as a backup sample, thus duplicating as closely as possible the segment characteristics of the original sample. Historically, Ohio has had great success using nearly all of the original site selections and one set of reserve sites was sufficient.

Data Collection and Observer Training

Road segments were mapped according to the latitude and longitude of their midpoints. Each selected road segment was identified by an intersection or interchange that occurred within or just beyond the segment. If no intersection or interchange occurred within the segment, then any suitable point on that road could be used for observation. Data collection sites were deterministically selected such that traffic could be observed with optimum accuracy. Therefore, whenever possible, sites were assigned to locations relatively close to controlled intersections (e.g., within 50 yards). Such locations allow for safe and accurate collection of detailed vehicle, driver, and occupant information of ongoing interest to the Ohio Department of Public Safety. Such detailed information has been historically used by Ohio to successfully plan, implement, evaluate, and adjust its interventions. For interstate highways, data collection will occur on a ramp carrying traffic that is exiting the highway. The observed direction of travel was randomly assigned for each road segment. The locations of the data collection sites were described on Site Assignment Sheets for each county and maps were developed to aid the Data Collectors and Quality Control (QC) Monitors in travelling to the assigned locations.

Training

Ohio has a crew of 19 data collectors with several years’ experience observing seat belt use of front-seat vehicle occupants on its roadways. After consulting with Ohio Department of Transportation personnel, it was determined that increasing the survey coverage of counties to 57 from the historic 48 could still be managed by the current crew of observers. However, additional data collectors were hired when an observer was temporarily unable to collect data for various reasons. Also, when necessary, trained Applied Research Center personnel and Ohio Law Enforcement Liaisons from the Ohio State Highway Patrol served as QC Monitors.

Data Collector and QC Monitor training was conducted at the Ohio Department of Public Safety during the two weeks prior to the first data collection period. Data Collector and QC Monitor training included lecture, classroom, and field exercises. Previous training for Ohio observers does not differ significantly from new
stipulations in the Final Rule. The updated Ohio training manual included a list of any differences and highlighted those during the training session.

Quality control monitors mentioned above were given an additional half day training focusing on their specific duties. These duties include conducting unannounced site visits of data collectors at 5% of sites (a minimum of 12 randomly selected sites, i.e. 237 sites * .05 = 11.85 sites to be visited) and reviewing the field protocol during the visit. The quality control monitors were also available throughout the survey to respond to questions and offer assistance to Data Collectors as needed.

**Observation Periods and Quality Control**

All seat belt and booster seat use observations were conducted during weekdays and weekends between 7:00 a.m. and 6:00 p.m. The schedule included rush hour (before 9:30 a.m. and after 3:30 p.m.) and non-rush hour observations. Data collection was conducted for 50 minutes immediately following a 5-minute traffic count; a second 5-minute traffic count immediately followed the observation. Observers recorded seat belt use and demographic information of interest to Ohio, both while vehicles were stopped in the designated lane at the traffic control device (if present) and while traffic was moving through the intersection, ramp, or road segment whenever possible. When traffic was moving, observers recorded data for as many vehicles as possible. Approximately 8 counties were covered per day with an average of four or five sites scheduled for each county. Start times were organized to ensure that a representative number of weekday versus weekend and rush hour versus non-rush hour sites were included.

Maps showing the location of all observation sites and Site Assignment Sheets were provided to the Data Collectors and QC Monitors. These indicated the observed road name, the crossroad included within the road segment (or nearest crossroad), assigned date, assigned time, and assigned direction of travel. Sites within relatively close geographic proximity were assigned as data collection clusters. The first site within each cluster was assigned a random day and time for completion. Next, all other sites within a cluster were assigned to the same day by geographic proximity in order to minimize travel costs.

**Data Collection**

All passenger vehicles, including commercial vehicles with a gross vehicle weight rating (GVWR) of less than 10,000 pounds, were eligible for observation. The Seat Belt Survey Site Description Form and the Observation Form are shown in Appendix F. The Site Description Form obtains descriptive information for each site, including: date, site location, site number, alternate site data, assigned traffic flow, number of lanes available and observed, start and end times for observations, and weather conditions. This form was completed by the Data Collector at each observation site.
The Seat Belt Survey Observation Form was used to record seat belt use by drivers and front seat passengers. Additional forms were provided for each observer since some sites had a significantly higher traffic volume than average. After being reviewed by QC Monitors, the forms were scanned and the data were imported directly into a database for analysis.

The data collectors observed as many lanes of traffic as they could accurately monitor while obtaining data on 99% of the vehicles. Only one direction of traffic was observed at any given site.

Observations were made of all drivers and right front seat occupants, including children riding in booster seats. The only right front seat occupants excluded from the analysis were child passengers who were traveling in child seats with harness straps.

Alternate Sites and Rescheduling

When a site was temporarily unavailable due to a crash or inclement weather, data collection was rescheduled for a corresponding time of day and day of week. In the event that the site was permanently unusable an alternate site, selected as part of the reserve sample, was used as a permanent replacement. The alternate for each site was clearly identified and listed on the Site Assignment Sheet and additional site selection support was provided by the staff member responsible for site selection.

Quality Control Procedures

The Quality Control (QC) Monitors made unannounced visits to at least twelve data collection sites throughout the state. During these visits, the QC Monitor first evaluated the Data Collector’s performance from a nonintrusive distance (if possible), and then observed alongside the Data Collector. This procedure helped ensure that the Data Collector followed survey protocol including: being on time at assigned sites, completing the Site Description Form and observation forms, and making accurate observations of seat belt use. In the event it is discovered that a Data Collector falsified data, the Data Collector will be replaced by a back-up Data Collector and the back-up Data Collector will revisit all sites proven to be, or suspected, to be falsified and recollect all data. However, no Data Collector has ever been found to be untrustworthy. At the end of each observation period, the Data Collector shipped the forms by overnight service to Miami University’s Applied Research Center (ARC) in Middletown, Ohio. The QC monitors and Applied Research Center Staff reviewed the forms. If the rate of unknowns exceeded 10% for any site (potentially leading to an overall nonresponse rate of 10% or more), then the Data Collector was sent back to that site for an additional observation period. These same procedures were successfully completed in 2016. The ARC reviewed all data submitted by observers and the data were rigorously collected and were found to be statistically consistent and complete.
**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.

**Estimation and Variance Estimation**

**Imputation**

Imputation on missing data was unnecessary, per the protocol and Ohio’s past experience with observational surveys.

**Sampling Weights**

We selected a stratified random sample within road type strata in each county. In addition, the number of segments selected was small relative to the number of possible road segments. As a consequence, finite population correction factors were not used. Initial sampling weights were defined as the reciprocal of the proportion of segments sampled within a stratum.

**Nonresponse Adjustment**

The data collection protocol in this plan includes a provision for the use of alternate observation sites and road segments with non-zero eligible traffic volume; consequently, zero observations at a site will be unlikely. However, if no vehicles pass a site during the 50 minute observation period or if the site is closed for some other reason, an alternate site that is paired with the selected site will be used. Consequently, a nonresponse adjustment in these cases will be unnecessary, since the alternative observation site is already associated with the selected observation site. If the alternate site is also unavailable, the site’s sampling weight will be redistributed over the other segments of the same road type in its county. Let $p_{isj}$ be the road segment selection probability for observation site $j$ of segment $s$ in county $i$, and

$$w_{isj} = \frac{1}{p_{isj}}$$

be the road segment weight. Weights for non-missing road segments of the same road type within the same county will be multiplied by the adjustment factor for a nonresponding site,

$$f_{is} = \frac{\sum_{all\ j} w_{isj}}{\sum_{responding\ j} w_{isj}}$$
and the missing road segments will be dropped from the analysis file. Moreover, since we will be left with fewer than two observed sites of segment type $s$ within county $i$, we adjust our estimates by combining strata within the county. In other cases of nonresponse (e.g. cars with unobservable seat belt status), each site’s initial sampling weight will be adjusted by multiplying by the reciprocal of its observed response rate. These adjustments are described in Section 5.4.

**Estimators**

5.4.1: Stratification and Allocation

County “i” can be considered a population comprised of 3 strata ($i=1, \ldots, 57$): “P” = primary; “S” = secondary; and “L” = local segments. The numbers of segments in each stratum are $N_{ip}$, $N_{is}$ and $N_{il}$, respectively. A county is represented as:

\[
\begin{array}{c}
P: N_{ip} \\
S: N_{is} \\
L: N_{il}
\end{array}
\]

When a county does not have any primary road segments, it is represented as:

\[
\begin{array}{c}
S: N_{is} \\
L: N_{il}
\end{array}
\]

The size of the sample from each stratum is $n_{ip}=2$, $n_{is}=2$ and $n_{il}=1$, except for counties with 10,000,000 or higher DMVT, in which case $n_{il}=2$. 
5.4.2: Estimators

Within an observation site, the estimated seat belt use rate $\hat{\pi}_{isj}$ is calculated as:

$$\hat{\pi}_{isj} = \sum \frac{u_{dtv|isj}y_{dtv|isj}}{u_{dtv|isj}},$$

where $u_{dtv|isj}$ is the sampling weight of vehicle $v$ in lane $l$ travelling in direction $d$, and $y_{dtv|isj} = 1$ if a seat belt is in use and 0 if not. The vehicle sampling weight is defined as $u_{dtv|isj} = \frac{1}{p_{dtv|isj} = \frac{1}{p_{d|isj}p_{l|isjd}p_{v|isjd|l}}}$, where, $p_{d|isj}$ represents the probability of traffic direction selection, $p_{l|isjd}$ is the probability of lane selection within direction, and $p_{v|isjd|l}$ is the probability of vehicle selection within the lane.

County estimate (stratified estimator, adjusted for nonresponse)

The initial sampling weight for observation site $j$ in stratum $s$ within county $i$ is the reciprocal, $\frac{N_{is}}{n_{is}}$, of the proportion of segments sampled within the stratum. If the response rate at the site is denoted $r_{isj}$, the nonresponse-adjusted weight, $w_{isj}$, is obtained by multiplying the initial sample weight by $r_{isj}^{-1}$; hence, $w_{isj} = \frac{N_{is}}{n_{is}r_{isj}}$. The county estimate for the rate of seat-belt use is then

$$\hat{\pi}_{c_i} = \frac{\sum_{s \in \{P, S, L\}} \sum_{j=1}^{n_{is}} w_{isj} \hat{\pi}_{isj}}{\sum_{s \in \{P, S, L\}} \sum_{j=1}^{n_{is}} w_{isj}}.$$

Region estimate

Suppose counties $C_1, ..., C_R$ comprise a region. Then the region seat belt use estimate is given by

$$\hat{\pi}_{region} = \sum_{i=1}^{R} \left( \frac{N_{c_i}^*}{N_{region}^*} \right) \hat{\pi}_{c_i},$$

where $N_{region}^* = \sum_{l \in region} N_{i}^*$.

State estimate

The Ohio seat belt use estimate and its variance are similarly defined:

$$\hat{\pi}_{state} = \sum_{i=1}^{57} \left( \frac{N_{i}^*}{N_{state}^*} \right) \hat{\pi}_{c_i},$$

where $N_{state}^* = \sum_{i=1}^{57} N_{i}^*$. 
5.4.3: Variance Estimation

To derive an estimate for the variance of $\hat{\pi}_{Ci}^*$, we first note that the county seat-belt use estimate above can be re-expressed as the algebraically-equivalent weighted-average of stratum-specific estimates:

$$\hat{\pi}_{Ci}^* = \sum_{s \in \{P, S, L\}} W_{is}^* \hat{\pi}_{is} = \frac{1}{N_i^*} \sum_{s \in \{P, S, L\}} N_{is}^* \hat{\pi}_{is}.$$

In addition to suggesting that counties are strata in the state, we are suggesting the use of stratified sampling of segment type \{P, S, L\} within each county. Thus, the county estimate is constructed as a weighting of estimates from each segment strata in a county. Here $W_{is}^*$ is the (non-response adjusted) proportion of road segments in county “i” that are of types. Note that this differs from the $N_i^*/N_{\text{state}}^*$ weights that are used to combine county estimates into a state or region estimate.

In defining the component quantities, of $\hat{\pi}_{Ci}^*$ above, we take advantage of the fact that any stratum will have at most two observation sites (that is, $n_{is} \leq 2$). For a stratum with two observation sites, we define the nonresponse-adjusted effective stratum size as $N_{is}^* = \frac{N_{is}}{r_{is1} + r_{is2}}$ and the nonresponse-adjusted stratum seat belt use estimate as

$$\hat{\pi}_{is} = \hat{\pi}_{is1} \left( \frac{r_{is2}}{r_{is1} + r_{is2}} \right) + \hat{\pi}_{is2} \left( \frac{r_{is1}}{r_{is1} + r_{is2}} \right).$$

For a stratum with only one observation site, these quantities are defined as $N_{is}^* = \frac{N_{is}}{r_{is1}}$ and $\hat{\pi}_{is} = \hat{\pi}_{is1}$. The overall effective county size is $N_i^* = N_{ip}^* + N_{is}^* + N_{il}^*$, and the final weights for in the formula above are given by $W_{ip}^* = \frac{N_{ip}^*}{N_i^*}$, $W_{is}^* = \frac{N_{is}^*}{N_i^*}$, and $W_{il}^* = \frac{N_{il}^*}{N_i^*}$, the nonresponse-adjusted effective proportion of each segment type sampled in county $i$.

When $n_{il} = 1$, we combine the local and secondary sites together into a new strata (denoted with a subscript “N”) to obtain the estimated variance of $\hat{\pi}_{Ci}^*$, i.e., there are two stratum considered in the variance estimation, primary and secondary/local. Then estimated variance of $\hat{\pi}_{Ci}^*$ can then be expressed as

$$\hat{\nu}(\hat{\pi}_{Ci}^*) = \sum_{s \in \{P, N\}} \left[ W_{is}^* \frac{2 n_{is}^*}{n_{is}} \sum_{j=1}^{n_{is}} \left( \hat{\pi}_{isj} - \hat{\pi}_{is} \right)^2 \right].$$

- assuming the secondary and local sites are homogeneous
- $W_{ip}^* = \frac{N_{ip}^*}{N_i^*}$, $W_{in}^* = \frac{N_{is}^* + N_{il}^*}{N_i^*}$
- ignoring FPC since $N_{is}^* >> n_{is}$

If $n_{il} = 0$ because of nonresponse, i.e., neither the initially sampled site nor the reserve sample site is available, cells will be collapsed across strata within county in a similar manner.
Bound on error of estimate = 2 \sqrt{\hat{V}(\hat{r}_{Ci}^*)}

Confidence interval: \( \hat{r}_{Ci}^* \pm 2 \sqrt{\hat{V}(\hat{r}_{Ci}^*)} \)

The variance of the region estimate is given by

\[
\hat{V}(\hat{r}_{region}) = \sum_{i=1}^{R} \left( \frac{N_{Ci}^*}{N_{region}^*} \right)^2 \hat{V}(\hat{r}_{Ci}^*) .
\]

Error bounds and confidence intervals for the regional estimates are defined similarly to those for county estimates.

The variance of the state estimate is given by

\[
\hat{V}(\hat{r}_{state}) = \sum_{i=1}^{57} \left( \frac{N_i^*}{N_{state}^*} \right)^2 \hat{V}(\hat{r}_{Ci}^*) .
\]

The error bound and confidence interval for the state estimate is defined similarly to those for county estimates.

All computations were performed using standard statistical software, such as SPSS, proc surveyreg in SAS, or the survey package in R.
RESULTS

Statewide Seat Belt Use

The official 2016 overall seat belt use rate for vehicle occupants from Ohio is 83.8% (Table 3), nearly identical to the 2015 rate of 83.9%. Due to the large sample size of 23,082 occupant observations (19,083 drivers plus 3,999 passengers), the survey has a confidence interval of approximately plus or minus 1.0%. An average of 81 vehicles and 97 occupants were observed per site.

Alone, the 2016 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 certainty. NHTSA guidelines specify a 95% confidence level and a confidence interval of plus or minus 5%. Using the statistical weighting procedures outlined in the methodology, we can be 95% certain that Ohio’s seat belt usage for all vehicle occupants is within approximately ± 1.0% of 83.8%.

95% Confidence Interval: 82.8% - 84.8%
**OSHP District Seat Belt Use**

As illustrated in Table 1 and Figure 2, Cleveland and Jackson Ohio State Highway Patrol (OSHP) Districts have lower seat belt use rates than other districts.

<table>
<thead>
<tr>
<th>OSHP</th>
<th>Usage Rate</th>
<th>Standard Error</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
<th>Unweighted N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Findlay</td>
<td>90.2%</td>
<td>0.0122</td>
<td>0.8782</td>
<td>0.9262</td>
<td>2,338</td>
</tr>
<tr>
<td>Bucyrus</td>
<td>81.7%</td>
<td>0.0162</td>
<td>0.7848</td>
<td>0.8482</td>
<td>2,307</td>
</tr>
<tr>
<td>Cleveland</td>
<td>77.4%</td>
<td>0.0131</td>
<td>0.7481</td>
<td>0.7995</td>
<td>4,712</td>
</tr>
<tr>
<td>Warren</td>
<td>81.8%</td>
<td>0.0206</td>
<td>0.7773</td>
<td>0.8579</td>
<td>3,738</td>
</tr>
<tr>
<td>Piqua</td>
<td>84.8%</td>
<td>0.0054</td>
<td>0.8278</td>
<td>0.8490</td>
<td>2,399</td>
</tr>
<tr>
<td>Columbus</td>
<td>84.7%</td>
<td>0.0253</td>
<td>0.7970</td>
<td>0.8963</td>
<td>3,445</td>
</tr>
<tr>
<td>Cambridge</td>
<td>84.8%</td>
<td>0.0256</td>
<td>0.7979</td>
<td>0.8983</td>
<td>1,331</td>
</tr>
<tr>
<td>Wilmington</td>
<td>90.2%</td>
<td>0.0148</td>
<td>0.8733</td>
<td>0.9312</td>
<td>2,151</td>
</tr>
<tr>
<td>Jackson</td>
<td>78.1%</td>
<td>0.0283</td>
<td>0.7259</td>
<td>0.8367</td>
<td>661</td>
</tr>
<tr>
<td><strong>Statewide</strong></td>
<td><strong>83.8%</strong></td>
<td><strong>0.0070</strong></td>
<td><strong>0.8237</strong></td>
<td><strong>0.8513</strong></td>
<td><strong>23,082</strong></td>
</tr>
</tbody>
</table>

**Figure 2  Seat Belt Use by District**

![Bar chart showing seat belt use rates by OSHP District](chart.png)
It is important to note that the overall seat belt use estimate is based on all front outboard occupants observed in five vehicle types.\(^1\) Because pickup trucks were excluded from the survey until 1998, the 2016 rate is only comparable to rates since 1998. Calculating the unweighted 2016 rate without trucks indicates a usage rate of approximately 86.9%, highlighting the detrimental effect of low seat belt use rates among truck occupants on the overall seat belt use rate. Figure 3 represents un-weighted seat belt usage excluding pickup trucks (in red). In comparison, the weighted rate including pickup trucks (in blue) shows that while the rate without pickup trucks is higher than when they are included, the rates converged until 2012, when the new methodology was implemented.

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

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure3}
\caption{Seat Belt Use for Passenger Car, Van/Minivan, and SUV Occupants}
\end{figure}

\begin{itemize}
\item [1] Data on four vehicle types—passenger cars, vans/minivans, sport utility vehicles, and pickup/light trucks—have been collected since the 1998 survey. The 2012 methodology update subdivided trucks into “light” and “heavy” classes; both are excluded from the unweighted rate in Figure 3.
\end{itemize}
Vehicle Type and Seat Belt Use

Following the pattern of previous surveys and expectations, light truck occupants had a significantly lower seat belt use rate than occupants of other vehicle types during 2016, presenting an opportunity to increase overall seat belt use in the future (see Table 2).

Table 2: Seat Belt Use by Vehicle Type²

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Usage Rate</th>
<th>Standard Error</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
<th>Unweighted n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger Car</td>
<td>85.0%</td>
<td>0.0081</td>
<td>0.8341</td>
<td>0.8659</td>
<td>10,515</td>
</tr>
<tr>
<td>Van/Minivan</td>
<td>85.4%</td>
<td>0.0096</td>
<td>0.8349</td>
<td>0.8728</td>
<td>2,294</td>
</tr>
<tr>
<td>SUV</td>
<td>87.1%</td>
<td>0.0134</td>
<td>0.8445</td>
<td>0.8971</td>
<td>6,162</td>
</tr>
<tr>
<td>Light Truck</td>
<td>79.4%</td>
<td>0.0184</td>
<td>0.7581</td>
<td>0.8301</td>
<td>3,404</td>
</tr>
<tr>
<td>Statewide</td>
<td>83.8%</td>
<td>0.0070</td>
<td>0.8237</td>
<td>0.8513</td>
<td>23,057</td>
</tr>
</tbody>
</table>

Figure 4 illustrates the extent to which van/minivan and SUV occupant seat belt use exceeds the passenger car occupant use rate and, especially, the light truck occupant use rate.

The results for each vehicle type by OSHP district are presented in Table 3. As shown, occupants of light trucks had a significantly lower rate of seat belt use than occupants in all other vehicle types in every district. Seat belt use was lowest among light truck occupants in the Warren, Cleveland and Jackson districts.

---

² Insufficient heavy truck observations for accurate weighting. Unweighted rate is 79.8% of 678 occupants.
Table 3: Vehicle Type Usage Rates by OSHP District

<table>
<thead>
<tr>
<th>Region</th>
<th>Passenger Car Unweighted N</th>
<th>Unweighted Van / Minivan N</th>
<th>Unweighted SUV N</th>
<th>Unweighted Light Truck N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Findlay</td>
<td>92.5%</td>
<td>84.8%</td>
<td>93.7%</td>
<td>83.2%</td>
</tr>
<tr>
<td></td>
<td>1,112</td>
<td>254</td>
<td>605</td>
<td>365</td>
</tr>
<tr>
<td>Bucyrus</td>
<td>80.7%</td>
<td>82.7%</td>
<td>86.8%</td>
<td>78.0%</td>
</tr>
<tr>
<td></td>
<td>962</td>
<td>219</td>
<td>724</td>
<td>309</td>
</tr>
<tr>
<td>Cleveland</td>
<td>78.4%</td>
<td>81.1%</td>
<td>82.1%</td>
<td>73.5%</td>
</tr>
<tr>
<td></td>
<td>2,168</td>
<td>370</td>
<td>1,426</td>
<td>571</td>
</tr>
<tr>
<td>Warren</td>
<td>83.7%</td>
<td>89.7%</td>
<td>82.2%</td>
<td>70.8%</td>
</tr>
<tr>
<td></td>
<td>1,718</td>
<td>469</td>
<td>861</td>
<td>567</td>
</tr>
<tr>
<td>Piqua</td>
<td>87.7%</td>
<td>85.1%</td>
<td>88.2%</td>
<td>77.8%</td>
</tr>
<tr>
<td></td>
<td>1,146</td>
<td>318</td>
<td>472</td>
<td>425</td>
</tr>
<tr>
<td>Columbus</td>
<td>87.0%</td>
<td>83.3%</td>
<td>85.5%</td>
<td>79.4%</td>
</tr>
<tr>
<td></td>
<td>1,404</td>
<td>311</td>
<td>1,045</td>
<td>523</td>
</tr>
<tr>
<td>Cambridge</td>
<td>87.3%</td>
<td>89.7%</td>
<td>85.3%</td>
<td>81.1%</td>
</tr>
<tr>
<td></td>
<td>535</td>
<td>126</td>
<td>346</td>
<td>222</td>
</tr>
<tr>
<td>Wilmington</td>
<td>88.4%</td>
<td>95.6%</td>
<td>93.4%</td>
<td>86.9%</td>
</tr>
<tr>
<td></td>
<td>1,173</td>
<td>175</td>
<td>513</td>
<td>280</td>
</tr>
<tr>
<td>Jackson</td>
<td>76.8%</td>
<td>83.5%</td>
<td>82.3%</td>
<td>73.8%</td>
</tr>
<tr>
<td></td>
<td>297</td>
<td>52</td>
<td>170</td>
<td>142</td>
</tr>
<tr>
<td>Statewide</td>
<td>85.0%</td>
<td>85.4%</td>
<td>87.1%</td>
<td>79.4%</td>
</tr>
<tr>
<td></td>
<td>10,515</td>
<td>2,294</td>
<td>6,162</td>
<td>3,404</td>
</tr>
</tbody>
</table>
Ohio’s seat belt observation survey has traditionally found differences between drivers and passengers in their rates of seat belt use, although the two rates are strongly correlated and reciprocal. Table 4 depicts the results for drivers and passengers, respectively, by OSHP district. Meanwhile, Figure 5 illustrates the relative differences by OSHP districts.

<table>
<thead>
<tr>
<th>Region</th>
<th>Drivers</th>
<th>Unweighted N</th>
<th>Passengers</th>
<th>Unweighted N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Findlay</td>
<td>89.9%</td>
<td>1,873</td>
<td>91.2%</td>
<td>465</td>
</tr>
<tr>
<td>Bucyrus</td>
<td>81.3%</td>
<td>1,751</td>
<td>83.7%</td>
<td>556</td>
</tr>
<tr>
<td>Cleveland</td>
<td>77.7%</td>
<td>4,012</td>
<td>78.1%</td>
<td>700</td>
</tr>
<tr>
<td>Warren</td>
<td>82.2%</td>
<td>3,026</td>
<td>78.9%</td>
<td>712</td>
</tr>
<tr>
<td>Piqua</td>
<td>83.7%</td>
<td>1,992</td>
<td>90.5%</td>
<td>407</td>
</tr>
<tr>
<td>Columbus</td>
<td>85.0%</td>
<td>2,925</td>
<td>82.4%</td>
<td>520</td>
</tr>
<tr>
<td>Cambridge</td>
<td>83.4%</td>
<td>1,085</td>
<td>89.1%</td>
<td>246</td>
</tr>
<tr>
<td>Wilmington</td>
<td>90.2%</td>
<td>1,860</td>
<td>92.8%</td>
<td>291</td>
</tr>
<tr>
<td>Jackson</td>
<td>77.4%</td>
<td>559</td>
<td>81.8%</td>
<td>102</td>
</tr>
<tr>
<td>Statewide</td>
<td>83.7%</td>
<td>19,083</td>
<td>85.5%</td>
<td>3,999</td>
</tr>
</tbody>
</table>

Figure 5   Relative Seat Belt Use of Drivers Versus Passengers, by OSHP District
Separate estimates were generated for male and female front outboard occupants. Consistent with past Ohio survey results, female occupants had higher rates of seat belt use than did male occupants. The disparity was greatest in the Cambridge district and least in the Wilmington district. (Table 5). Figure 6 illustrates a comparison of the results by district.

### Table 5: Male and Female Usage Rates by OSHP District

<table>
<thead>
<tr>
<th>Region</th>
<th>Male</th>
<th>Unweighted N</th>
<th>Female</th>
<th>Unweighted N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Findlay</td>
<td>87.4%</td>
<td>1,165</td>
<td>92.5%</td>
<td>1,165</td>
</tr>
<tr>
<td>Bucyrus</td>
<td>78.2%</td>
<td>1,240</td>
<td>85.9%</td>
<td>1,064</td>
</tr>
<tr>
<td>Cleveland</td>
<td>75.2%</td>
<td>2,706</td>
<td>80.7%</td>
<td>1,978</td>
</tr>
<tr>
<td>Warren</td>
<td>79.3%</td>
<td>2,029</td>
<td>85.0%</td>
<td>1,701</td>
</tr>
<tr>
<td>Piqua</td>
<td>80.3%</td>
<td>1,303</td>
<td>88.4%</td>
<td>1,093</td>
</tr>
<tr>
<td>Columbus</td>
<td>82.0%</td>
<td>1,943</td>
<td>88.4%</td>
<td>1,502</td>
</tr>
<tr>
<td>Cambridge</td>
<td>80.2%</td>
<td>775</td>
<td>92.1%</td>
<td>555</td>
</tr>
<tr>
<td>Wilmington</td>
<td>88.2%</td>
<td>1,189</td>
<td>93.1%</td>
<td>959</td>
</tr>
<tr>
<td>Jackson</td>
<td>75.9%</td>
<td>374</td>
<td>81.7%</td>
<td>286</td>
</tr>
<tr>
<td><strong>Statewide</strong></td>
<td><strong>81.1%</strong></td>
<td><strong>12,724</strong></td>
<td><strong>87.3%</strong></td>
<td><strong>10,300</strong></td>
</tr>
</tbody>
</table>

### Figure 6  Seat Belt Use by Sex

![Graph showing seat belt use by sex for different districts](image-url)
Age of Vehicle Occupants and Seat Belt Use

Compared to other age groups, seat belt use was lowest (83.6%) among vehicle occupants age 26-64. However, seat belt use increases among older occupants, reaching 90.0% among occupants age 65 and older. Table 6 summarizes the results for each age group by OSHP district. A comparison of these results by district is contained in Figure 7.

Table 6: Age Group Usage Rates by OSHP District

<table>
<thead>
<tr>
<th>Region</th>
<th>15-25</th>
<th>Unweighted N</th>
<th>26-64</th>
<th>Unweighted N</th>
<th>65+</th>
<th>Unweighted N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Findlay</td>
<td>90.8%</td>
<td>415</td>
<td>90.1%</td>
<td>1,550</td>
<td>91.1%</td>
<td>331</td>
</tr>
<tr>
<td>Bucyrus</td>
<td>79.2%</td>
<td>241</td>
<td>80.8%</td>
<td>1,648</td>
<td>86.2%</td>
<td>381</td>
</tr>
<tr>
<td>Cleveland</td>
<td>86.0%</td>
<td>229</td>
<td>77.9%</td>
<td>4,170</td>
<td>92.8%</td>
<td>253</td>
</tr>
<tr>
<td>Warren</td>
<td>85.3%</td>
<td>1,094</td>
<td>82.2%</td>
<td>2,045</td>
<td>89.2%</td>
<td>523</td>
</tr>
<tr>
<td>Piqua</td>
<td>71.2%</td>
<td>295</td>
<td>85.5%</td>
<td>1,707</td>
<td>85.9%</td>
<td>359</td>
</tr>
<tr>
<td>Columbus</td>
<td>86.0%</td>
<td>502</td>
<td>83.8%</td>
<td>2,284</td>
<td>86.3%</td>
<td>610</td>
</tr>
<tr>
<td>Cambridge</td>
<td>86.8%</td>
<td>232</td>
<td>82.2%</td>
<td>890</td>
<td>86.9%</td>
<td>182</td>
</tr>
<tr>
<td>Wilmington</td>
<td>88.2%</td>
<td>434</td>
<td>89.4%</td>
<td>1,297</td>
<td>95.8%</td>
<td>399</td>
</tr>
<tr>
<td>Jackson</td>
<td>77.8%</td>
<td>124</td>
<td>76.8%</td>
<td>438</td>
<td>82.6%</td>
<td>94</td>
</tr>
<tr>
<td>Statewide</td>
<td>84.9%</td>
<td>3,566</td>
<td>83.6%</td>
<td>16,029</td>
<td>90.0%</td>
<td>3,132</td>
</tr>
</tbody>
</table>

There were too few occupants younger than 15 to accurately estimate seat belt use for children. Historically, however, children’s restraint use has been relatively low and may be hampered by parents’ misunderstanding of, or simply not owning, booster and/or safety seats for the youngest passengers.
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 the 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 (n = 1,339) and is probably an underrepresentation of the number of African-American drivers and front-seat passengers using Ohio roads. Due to the low number of African-Americans in the survey, an accurate weighted estimate of their seat belt use rate was unable to be determined with accuracy. The Cleveland OSHP district has more than four times as many observations of African-Americans as the next closest district of Columbus, so rates in that district may be more representative than others. Table 7 shows unweighted rates for both African-Americans and Caucasians, but these results should be interpreted with caution. The weighted rates for Caucasians are included in the final column for comparison.

The lack of observed data for African-Americans presents both a challenge and opportunity for increasing overall seat belt use in Ohio, and reducing the number of fatalities and serious injuries suffered by African-Americans.

<table>
<thead>
<tr>
<th>Region</th>
<th>African-American</th>
<th>Unweighted N</th>
<th>Caucasian</th>
<th>Unweighted N</th>
<th>Caucasian (Weighted Rates)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Findlay</td>
<td>84.1%</td>
<td>69</td>
<td>89.3%</td>
<td>2,255</td>
<td>90.2%</td>
</tr>
<tr>
<td>Bucyrus</td>
<td>80.0%</td>
<td>65</td>
<td>89.6%</td>
<td>2,183</td>
<td>86.4%</td>
</tr>
<tr>
<td>Cleveland</td>
<td>70.2%</td>
<td>574</td>
<td>78.9%</td>
<td>3,982</td>
<td>76.6%</td>
</tr>
<tr>
<td>Warren</td>
<td>75.1%</td>
<td>197</td>
<td>82.3%</td>
<td>3,486</td>
<td>82.2%</td>
</tr>
<tr>
<td>Piqua</td>
<td>77.0%</td>
<td>87</td>
<td>86.4%</td>
<td>2,296</td>
<td>84.0%</td>
</tr>
<tr>
<td>Columbus</td>
<td>81.5%</td>
<td>173</td>
<td>87.5%</td>
<td>3,188</td>
<td>85.4%</td>
</tr>
<tr>
<td>Cambridge</td>
<td>71.4%</td>
<td>21</td>
<td>88.4%</td>
<td>1,305</td>
<td>86.1%</td>
</tr>
<tr>
<td>Wilmington</td>
<td>88.0%</td>
<td>125</td>
<td>93.6%</td>
<td>1,998</td>
<td>91.8%</td>
</tr>
<tr>
<td>Jackson</td>
<td>67.9%</td>
<td>28</td>
<td>76.2%</td>
<td>630</td>
<td>78.3%</td>
</tr>
<tr>
<td>Statewide</td>
<td>75.7%</td>
<td>1,339</td>
<td>85.6%</td>
<td>21,323</td>
<td>84.6%</td>
</tr>
</tbody>
</table>
Table 8 summarizes the results for usage by observation site type and by OSHP district.

<table>
<thead>
<tr>
<th>Region</th>
<th>Intersection</th>
<th>Unweighted N</th>
<th>Freeway</th>
<th>Unweighted N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Findlay</td>
<td>90.2%</td>
<td>1,465</td>
<td>96.0%</td>
<td>305</td>
</tr>
<tr>
<td>Bucyrus</td>
<td>80.0%</td>
<td>1,220</td>
<td>94.3%</td>
<td>531</td>
</tr>
<tr>
<td>Cleveland</td>
<td>77.3%</td>
<td>2,176</td>
<td>81.0%</td>
<td>1,836</td>
</tr>
<tr>
<td>Warren</td>
<td>81.7%</td>
<td>2,196</td>
<td>85.7%</td>
<td>830</td>
</tr>
<tr>
<td>Piqua</td>
<td>83.4%</td>
<td>1,228</td>
<td>94.3%</td>
<td>764</td>
</tr>
<tr>
<td>Columbus</td>
<td>84.2%</td>
<td>1,535</td>
<td>88.5%</td>
<td>1,390</td>
</tr>
<tr>
<td>Cambridge</td>
<td>84.7%</td>
<td>541</td>
<td>88.4%</td>
<td>544</td>
</tr>
<tr>
<td>Wilmington</td>
<td>90.2%</td>
<td>1,003</td>
<td>94.7%</td>
<td>857</td>
</tr>
<tr>
<td>Jackson</td>
<td>78.1%</td>
<td>559</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Statewide</td>
<td>83.5%</td>
<td>11,923</td>
<td>89.6%</td>
<td>7,057</td>
</tr>
</tbody>
</table>

As seen in previous years, seat belt use is higher on limited access roadways (i.e., interstates and expressways). This 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.

A comparison of weighted seat belt use rates by site designation and OSHP district is illustrated in Figure 8.
Table 9 and Figure 9 summarize the results for usage by observation site designation.

Starting in 2012, the analysis also included a separate road type category, distinguishing “primary” routes (interstate highways) and “secondary” routes (U.S. and state routes) from municipal/rural routes. Since there are fewer municipal roads in the survey and comparatively fewer observations for municipal routes, the weighted estimate for such roads was unable to be accurately determined.

### Table 9: Seat Belt Use by Road Type and OSHP District (Weighted)

<table>
<thead>
<tr>
<th>Region</th>
<th>Primary</th>
<th>Unweighted N</th>
<th>Secondary</th>
<th>Unweighted N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Findlay</td>
<td>94.3%</td>
<td>680</td>
<td>84.4%</td>
<td>920</td>
</tr>
<tr>
<td>Bucyrus</td>
<td>95.1%</td>
<td>508</td>
<td>80.5%</td>
<td>1,046</td>
</tr>
<tr>
<td>Cleveland</td>
<td>80.1%</td>
<td>1,675</td>
<td>84.7%</td>
<td>1,656</td>
</tr>
<tr>
<td>Warren</td>
<td>81.8%</td>
<td>1,017</td>
<td>82%</td>
<td>1,571</td>
</tr>
<tr>
<td>Piqua</td>
<td>88.3%</td>
<td>696</td>
<td>84.5%</td>
<td>1,037</td>
</tr>
<tr>
<td>Columbus</td>
<td>81.8%</td>
<td>1,150</td>
<td>88.0%</td>
<td>1,215</td>
</tr>
<tr>
<td>Cambridge</td>
<td>88.4%</td>
<td>544</td>
<td>82.3%</td>
<td>471</td>
</tr>
<tr>
<td>Wilmington</td>
<td>94.7%</td>
<td>857</td>
<td>92.9%</td>
<td>788</td>
</tr>
<tr>
<td>Jackson*</td>
<td>-</td>
<td>-</td>
<td>78.1%</td>
<td>559</td>
</tr>
<tr>
<td>Statewide</td>
<td>84.5%</td>
<td>7,127</td>
<td>85.7%</td>
<td>9,263</td>
</tr>
</tbody>
</table>

The unweighted rates for primary, secondary, and local roads are contained in Table 10. Figure 9 illustrates the weighted results by road type and region.

### Table 10: Seat Belt Use by Road Type and OSHP District (Unweighted)

<table>
<thead>
<tr>
<th>Region</th>
<th>Primary</th>
<th>Unweighted N</th>
<th>Secondary</th>
<th>Unweighted N</th>
<th>Local</th>
<th>Unweighted N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Findlay</td>
<td>93.7%</td>
<td>680</td>
<td>84.1%</td>
<td>920</td>
<td>91.2%</td>
<td>273</td>
</tr>
<tr>
<td>Bucyrus</td>
<td>98.1%</td>
<td>508</td>
<td>84.3%</td>
<td>1,046</td>
<td>88.9%</td>
<td>197</td>
</tr>
<tr>
<td>Cleveland</td>
<td>78.3%</td>
<td>1,675</td>
<td>78.3%</td>
<td>1,656</td>
<td>73.6%</td>
<td>681</td>
</tr>
<tr>
<td>Warren</td>
<td>86.1%</td>
<td>1,017</td>
<td>79.3%</td>
<td>1,571</td>
<td>81.7%</td>
<td>438</td>
</tr>
<tr>
<td>Piqua</td>
<td>88.3%</td>
<td>696</td>
<td>85.1%</td>
<td>1,037</td>
<td>83.4%</td>
<td>259</td>
</tr>
<tr>
<td>Columbus</td>
<td>88.5%</td>
<td>1,150</td>
<td>87.2%</td>
<td>1,215</td>
<td>84.4%</td>
<td>560</td>
</tr>
<tr>
<td>Cambridge</td>
<td>89.2%</td>
<td>544</td>
<td>86.4%</td>
<td>471</td>
<td>92.6%</td>
<td>70</td>
</tr>
<tr>
<td>Wilmington</td>
<td>95.6%</td>
<td>857</td>
<td>92.3%</td>
<td>788</td>
<td>86.9%</td>
<td>215</td>
</tr>
<tr>
<td>Jackson</td>
<td>-</td>
<td>-</td>
<td>75.8%</td>
<td>559</td>
<td>86.9%</td>
<td>0</td>
</tr>
<tr>
<td>Statewide</td>
<td>88.0%</td>
<td>7,127</td>
<td>83.1%</td>
<td>9,263</td>
<td>82.7%</td>
<td>2,693</td>
</tr>
</tbody>
</table>

* There are no primary segments in Jackson OSHP district.
Figure 9  Seat Belt Use by Road Type

Findlay  Bucyrus  Cleveland  Warren  Piqua  Columbus  Cambridge  Wilmington  Jackson

Primary  Secondary

94.3%  96.7%  84.4%  84.1%  83.9%  84.9%  81.9%  84.5%  84.0%  88.0%  88.4%  94.7%  92.9%  78.1%
Cross-tabulations of Observation Characteristics and Seat Belt Use

The seat belt use rates in Tables 11 through 13 and Figures 10 through 12 are based on several demographic, occupant, and vehicle characteristics. As indicated and consistent with previous survey results, male light truck drivers age 15-25 had the lowest seat belt usage rate of all drivers, while female van/minivan occupants 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 light trucks had relatively low usage rates.

**Table 11: Driver and Passenger Usage Rates by Age and Sex**

<table>
<thead>
<tr>
<th>Ages</th>
<th>Drivers</th>
<th>Unweighted N</th>
<th>Passengers</th>
<th>Unweighted N</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-25</td>
<td>Males</td>
<td>81.4%</td>
<td>1,410</td>
<td>65.2%</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>88.3%</td>
<td>1,428</td>
<td>87.1%</td>
</tr>
<tr>
<td>26-64</td>
<td>Males</td>
<td>82.5%</td>
<td>8,189</td>
<td>74.1%</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>87.6%</td>
<td>5,603</td>
<td>90.1%</td>
</tr>
<tr>
<td>65+</td>
<td>Males</td>
<td>87.0%</td>
<td>1,618</td>
<td>85.4%</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>92.2%</td>
<td>765</td>
<td>92.5%</td>
</tr>
</tbody>
</table>

**Table 12: Driver and Passenger Usage Rates by Age and Vehicle Type**

<table>
<thead>
<tr>
<th>Ages</th>
<th>Drivers</th>
<th>Unweighted N</th>
<th>Passengers</th>
<th>Unweighted N</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-25</td>
<td>Passenger Car</td>
<td>86.1%</td>
<td>1,679</td>
<td>81.6%</td>
</tr>
<tr>
<td></td>
<td>Van / Minivan</td>
<td>85.4%</td>
<td>171</td>
<td>66.1%</td>
</tr>
<tr>
<td></td>
<td>SUV</td>
<td>87.7%</td>
<td>625</td>
<td>84.3%</td>
</tr>
<tr>
<td></td>
<td>Light Truck</td>
<td>73.3%</td>
<td>329</td>
<td>63.0%</td>
</tr>
<tr>
<td>26-64</td>
<td>Passenger Car</td>
<td>85.5%</td>
<td>5,940</td>
<td>85.1%</td>
</tr>
<tr>
<td></td>
<td>Van / Minivan</td>
<td>87.4%</td>
<td>1,347</td>
<td>90.5%</td>
</tr>
<tr>
<td></td>
<td>SUV</td>
<td>87.3%</td>
<td>3,848</td>
<td>88.6%</td>
</tr>
<tr>
<td></td>
<td>Light Truck</td>
<td>76.0%</td>
<td>2,165</td>
<td>73.6%</td>
</tr>
<tr>
<td>65+</td>
<td>Passenger Car</td>
<td>89.1%</td>
<td>1,184</td>
<td>90.5%</td>
</tr>
<tr>
<td></td>
<td>Van / Minivan</td>
<td>87.8%</td>
<td>254</td>
<td>92.5%</td>
</tr>
<tr>
<td></td>
<td>SUV</td>
<td>91.2%</td>
<td>578</td>
<td>93.4%</td>
</tr>
<tr>
<td></td>
<td>Light Truck</td>
<td>83.1%</td>
<td>331</td>
<td>82.7%</td>
</tr>
</tbody>
</table>

**Table 13: Driver and Passenger Usage Rates by Sex and Vehicle Type**

<table>
<thead>
<tr>
<th>Drivers</th>
<th>Unweighted N</th>
<th>Passengers</th>
<th>Unweighted N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>Passenger Car</td>
<td>84.5%</td>
<td>4,847</td>
</tr>
<tr>
<td></td>
<td>Van / Minivan</td>
<td>85.3%</td>
<td>948</td>
</tr>
<tr>
<td></td>
<td>SUV</td>
<td>86.7%</td>
<td>2,339</td>
</tr>
<tr>
<td></td>
<td>Light Truck</td>
<td>76.1%</td>
<td>2,572</td>
</tr>
<tr>
<td>Females</td>
<td>Passenger Car</td>
<td>88.0%</td>
<td>3,970</td>
</tr>
<tr>
<td></td>
<td>Van / Minivan</td>
<td>89.6%</td>
<td>826</td>
</tr>
<tr>
<td></td>
<td>SUV</td>
<td>88.9%</td>
<td>2,712</td>
</tr>
<tr>
<td></td>
<td>Light Truck</td>
<td>82.1%</td>
<td>257</td>
</tr>
</tbody>
</table>
Figure 10  Seat Belt Use by Age and Sex

Figure 11  Seat Belt Use by Age and Vehicle Type

Figure 12  Seat Belt Use by Sex and Vehicle Type
The 2016 Observational Seat Belt Study reports only results from the second observational survey which occurred in June, after multiple interventions, including media campaigns and enforcement initiatives such as *Click It or Ticket*. Therefore, it is useful to compare usage rates between both surveys, shown in Figure 13. The increase in seat belt use between surveys is consistent with data from prior years. This increase may at least partially be attributed to the efforts by federal and state agencies to encourage seat belt use by Ohio vehicle occupants. However, as shown in Figure 14, not all districts experienced increases in seat belt use rates; Piqua and Jackson districts saw a slight drop-off in use rates during the June survey. In contrast, the rural Findlay district showed relatively better post-intervention rates than districts with traditionally high seat belt use rates.

**Figure 13  2015 Seat Belt Use by Survey Number**

![Chart showing seat belt use rates](chart1.png)

**Figure 14  2015 Seat Belt Use by Survey Number and District**

![Chart showing seat belt use rates by district](chart2.png)
Conclusions

As reported, the 2016 overall Ohio seat belt use rate is 83.8%, nearly identical to the 2015 rate of 83.9%. Without a primary seat belt law in Ohio, 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:

- Vehicle occupants in rural counties/districts
- Vehicle occupants age 15-25
- Male vehicle occupants
- Light truck 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 6%. A primary law could continue to increase seat belt use in diminishing increments thereafter, until a state maximum level is reached. The passage of a primary seat belt law could give Ohioans the “push” they need to comply with seat belt laws. A 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.
The 2016 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: Vehicle occupants in the Jackson and Cleveland districts; young drivers and their passengers; male drivers and their passengers; and light truck drivers and passengers. 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 occupants with these characteristics is necessary to achieve a statewide seat belt use rate of 85% or greater.

1. Rural OSHP District Vehicle Occupants: During 2016, compared to other Ohio districts, the Jackson and Cleveland OSHP districts had the lowest seat belt use rates (78% and 77%, respectively). The Jackson district comprises mainly rural counties, only three of which are part of the statewide sample. As a result, most of those observation sites are intersections, which typically have lower usage rates than freeway ramps. Also, a higher proportion of occupants were observed in light trucks in rural districts than in other areas of the state. Once again, light truck drivers and their passengers are a high risk subpopulation. Due to changes in Ohio State Highway Patrol District designations over the years, it is harder to determine why the Cleveland district has low seat belt use in 2016; this could be a statistical anomaly, but close observation going forward is warranted.

2. Vehicle Occupants Age 15-25: Vehicle occupants age 15-25 has improved somewhat to nearly 85%. It is much lower in rural districts; for example, the Piqua district seat belt usage rate of 71% for occupants age 15-25 is lowest of the eight districts. 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. 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 2016 and previous years, male driver and passenger seat belt usage rates were significantly lower than rates for female passengers regardless of vehicle type. 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.
4. **Light Truck Occupants:** The 2016 light truck occupant seat belt use rate is 79.4%. As in previous years, light truck occupants (formerly designated as 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. The exception in 2016 are light truck occupants in the Wilmington and Findlay OSHP districts, with seat belt use rates of 87% and 83%, respectively. Among male occupants of light trucks, 76% of drivers and 61% of passengers wore seat belts. In contrast, usage rates are 82% for female light truck drivers and 87% for female light truck passengers. The usage rate is also low for light truck drivers and passengers ages 15 to 25, at 73% and 63%, respectively. Overall, 15% of drivers and passengers occupied light trucks during the 2016 survey. Based on the percentage of all registered vehicles in Ohio that are light trucks, the percent that are involved in fatal crashes, and the low compliance with seat belt law among light truck occupants, this group is at higher risk for death or serious injury from crashes. Therefore, increasing seat belt use among light truck drivers and passengers, especially males, is very important to reduce Ohio’s traffic-related fatalities and serious injuries.

In summary, innovative and sustained actions by the ODPS and the OJCS on the above four 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., 2003-2009). Furthermore, a state can expect to experience a marked increase in seat belt use—perhaps 5% or more—with the passage of a primary seat belt use law. This may be particularly important in light of the fact that seat belt use has increased only incrementally during the last decade. Therefore, positive outcomes on seat belt use resulting from ODPS and OJCS actions on the above four recommendations would be further enhanced and sustained by passage of a primary seatbelt law.


## Appendix A: Site Locations

<table>
<thead>
<tr>
<th>Site Number</th>
<th>OHSP Region</th>
<th>Geographical Region</th>
<th>County</th>
<th>Road to be Observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Columbus</td>
<td>CN</td>
<td>Delaware</td>
<td>I-71</td>
</tr>
<tr>
<td>2</td>
<td>Columbus</td>
<td>CN</td>
<td>Delaware</td>
<td>I-71</td>
</tr>
<tr>
<td>3</td>
<td>Columbus</td>
<td>CN</td>
<td>Delaware</td>
<td>US Hwy 42</td>
</tr>
<tr>
<td>4</td>
<td>Columbus</td>
<td>CN</td>
<td>Delaware</td>
<td>S Old State Rd (County Rd 10)</td>
</tr>
<tr>
<td>5</td>
<td>Columbus</td>
<td>CN</td>
<td>Fairfield</td>
<td>I-70</td>
</tr>
<tr>
<td>6</td>
<td>Columbus</td>
<td>CN</td>
<td>Fairfield</td>
<td>I-70</td>
</tr>
<tr>
<td>7</td>
<td>Columbus</td>
<td>CN</td>
<td>Fairfield</td>
<td>N Memorial Dr</td>
</tr>
<tr>
<td>8</td>
<td>Columbus</td>
<td>CN</td>
<td>Fairfield</td>
<td>SR-256</td>
</tr>
<tr>
<td>9</td>
<td>Columbus</td>
<td>CN</td>
<td>Fairfield</td>
<td>Fairfield Beach Rd NE</td>
</tr>
<tr>
<td>10</td>
<td>Columbus</td>
<td>CN</td>
<td>Franklin</td>
<td>I-71</td>
</tr>
<tr>
<td>11</td>
<td>Columbus</td>
<td>CN</td>
<td>Franklin</td>
<td>I-270</td>
</tr>
<tr>
<td>12</td>
<td>Columbus</td>
<td>CN</td>
<td>Franklin</td>
<td>Southeast Expressway</td>
</tr>
<tr>
<td>13</td>
<td>Columbus</td>
<td>CN</td>
<td>Franklin</td>
<td>W Innerbelt (OH 315)</td>
</tr>
<tr>
<td>14</td>
<td>Columbus</td>
<td>CN</td>
<td>Franklin</td>
<td>Farmers Dr</td>
</tr>
<tr>
<td>15</td>
<td>Columbus</td>
<td>CN</td>
<td>Franklin</td>
<td>Foster Ave</td>
</tr>
<tr>
<td>16</td>
<td>Columbus</td>
<td>CN</td>
<td>Knox</td>
<td>Martinsburg Rd (Market St in Martinsburg) / OH-586</td>
</tr>
<tr>
<td>17</td>
<td>Columbus</td>
<td>CN</td>
<td>Knox</td>
<td>SR-3</td>
</tr>
<tr>
<td>18</td>
<td>Columbus</td>
<td>CN</td>
<td>Licking</td>
<td>I-70</td>
</tr>
<tr>
<td>19</td>
<td>Columbus</td>
<td>CN</td>
<td>Licking</td>
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## Appendix B: Ohio Average Passenger Vehicle Crash-Related Fatalities by County 2006-2010

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<th>Average Fatalities</th>
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<th>Cumulative Percent</th>
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# Appendix C: Ohio Regions, Counties, and DVMT

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Due to errors in the road designation variable in the segment database obtained from NHTSA, three (3) counties (Athens, Columbiana, and Darke) each had one (1) local segment mislabeled as a primary segment. Marion County had ten (10) local segments mislabeled as primary segments. Each of these mislabeled segments was checked on a map to ensure they were actually local segments. Because Athens, Columbiana, Darke, and Marion County were each counties without an MSA, these local roads were discarded from selection process. Additionally, while two (2) counties (Ottawa and Sandusky) had multiple primary segments, due to the rural nature of the counties, in each there was only one legal place (i.e., exit ramp) for observers to safely observe the primary traffic. Finally, Pickaway County had primary segments, but no exit ramps. Therefore, although our sampling program drew primary segments from Ottawa, Sandusky, and Pickaway, some were unusable, so the number of primary sites (and the total number of sites to be observed) is four (4) fewer than the sampling program selected. See the “Totals” and “Actual Number to be Observed” lines at the end of the following table.

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# Appendix E: Sampled Road Segments

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<tr>
<td>237</td>
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</table>
Statewide Seat Belt Survey - Site Description Form 2015

Observer Name

Road to be Observed: __________________________________________________________

Direction of Observation: ____________________________________________________

Cross Street: _______________________________________________________________

County: __________________________ Nearest City: __________________________ OSP District: __________________________

Site: __________________________ Day: __________________________ Date: __________________________

Start Time: __________________________ End Time: __________________________

Interuptions: __________________________

1st Traffic Count: __________________________ 2nd Traffic Count: __________________________

Total Lanes: __________________________

<table>
<thead>
<tr>
<th>Weather</th>
<th>Visibility</th>
<th>Site</th>
<th>Site Type</th>
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</thead>
<tbody>
<tr>
<td>Sunny/Mostly Sunny</td>
<td>Poor</td>
<td>Primary</td>
<td>Intersection</td>
</tr>
<tr>
<td>Cloudy/Mostly Cloudy</td>
<td>Satisfactory</td>
<td>Alternate</td>
<td>Freeway Ramp</td>
</tr>
<tr>
<td>Light Rain</td>
<td>Excellent</td>
<td>Other</td>
<td>Toll</td>
</tr>
<tr>
<td>Heavy Rain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snow</td>
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Observer Comments:

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________
### Ohio Seat Belt Survey - Observation Form

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<table>
<thead>
<tr>
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<tbody>
<tr>
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</tr>
<tr>
<td>Van</td>
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<tr>
<td>SUV</td>
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<table>
<thead>
<tr>
<th>Driver Belted</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
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</table>

<table>
<thead>
<tr>
<th>Driver Sex</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
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<tr>
<td>Female</td>
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<table>
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</table>

<table>
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<tbody>
<tr>
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</tr>
<tr>
<td>African American</td>
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<tr>
<td>Other</td>
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<table>
<thead>
<tr>
<th>Driver Cell Phone</th>
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<tbody>
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<tr>
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<table>
<thead>
<tr>
<th>Passenger Belted</th>
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<tbody>
<tr>
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<td></td>
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<tr>
<td>No</td>
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<thead>
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<td>Female</td>
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<tr>
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 Applied Research Center
 Miami University