GHSP
WEST VIRGINIA GOVERNOR'S HIGHWAY SAFETY PROGRAM

CAMBRIDGE SYSTEMATICS

2018 WEST VIRGINIA OBSERVATIONAL SEAT BELT SURVEY REPORT

prepared for

West Virginia Governor's Highway Safety Program

prepared by

Cambridge Systematics, Inc.

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Executive Summary

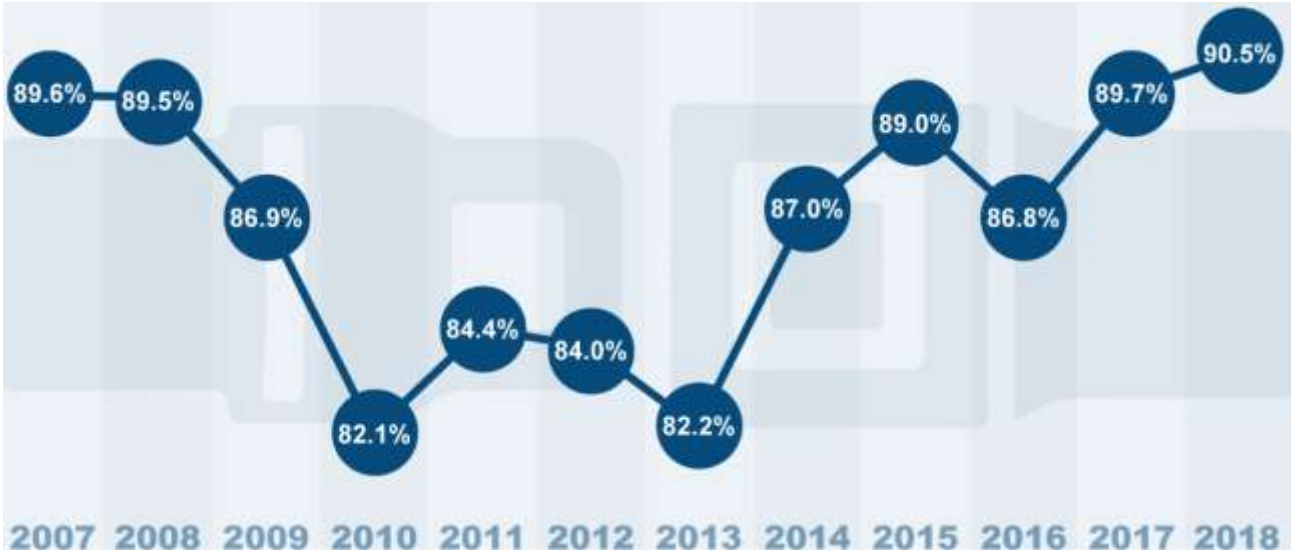
West Virginia has adopted the long term goal of zero fatalities with an interim goal of reducing fatalities by one-half by 2030, using 2006 to 2010 as a five-year average base. Consistently, over half of the fatalities that occur in West Virginia, were unrestrained. If the state is to reach their set targets, reducing non belt use will be one of their top priorities.

This report outlines the observed seat belt usage rate in West Virginia collected throughout the state between May 29 and June 13 on the weekdays and November 10 to 18 on the weekends of 2018. The primary purpose of this report is to document the seat belt use rate and identify the primary sources of variation in seat belt use for the West Virginia Governor's Highway Safety Program (GHSP) and their stakeholders to develop and revise countermeasures to address unrestrained vehicle occupants.

Observers recorded seat belt information on 31,129 drivers and 8,586 outboard front seat passengers for a total of 37,318 observations. Observers were not able to record seat belt use for 155 observations, resulting in a statewide nonresponse rate of 0.39% for the 2018 survey, compared to a nonresponse rate of .42% for the 2017 survey.

The 2018 observed seat belt rate in West Virginia is estimated at 90.53%, an historic high for the state. The rate has a standard error of 1.75% (relative standard error = 1.94%), well within the standard requirement of 2.5% set forth by the National Highway Traffic Safety Administration (NHTSA). This is a slight increase from the peak observed seat belt usage rate in 2017 of 89.7%. All 14 counties where observations occurred had seat belt use rates between 72% and 97% in 2018.

Observed Seat Belt Usage Rates, 2007 to 2018



Source: https://cdan.nhtsa.gov/stsi.htm#.

The following section begins with a discussion of the sampling procedures and methods used to obtain an estimate of the seat belt use rate in West Virginia. Procedures for the selection of counties, stratification of roadways, and observation sites are also described. This is followed by a section of the results beginning with the statewide seat belt use rate and trends over several years. Furthermore, a summary of the

characteristics of occupants, vehicles, and observation sites is provided. The report concludes with an analysis of selected characteristics of vehicle occupants and observation sites. It is anticipated that the information from this report will help to identify the conditions in which seat belts are more or less likely to be used so safety stakeholders across the state can improve upon their strategies for addressing unrestrained vehicle occupants.

Acknowledgements

Cambridge Systematics, Inc. (CS) was a new partner with the GHSP in 2018 to aid in the selection of new survey sites. CS was also involved in the development of this report. The 2018 West Virginia Observational Survey Report would not have been possible without the administration and support of the GHSP staff. Specifically, CS would like to thank Bob Tipton, Director, and Barbara Lobert, Federal Programs Administrator for their assistance in compiling the survey data, overseeing the observers, and managing the day to day operations of the project.

1.0 Methodology

The National Highway Traffic Safety Administration (NHTSA) issued new Uniform Criteria for State Observational Surveys of Seat Belt Use in Federal Register Vol. 76, No. 63 (April 1, 2011, Rules and Regulations, pp. 18042 – 18059). This report represents West Virginia's response to the requirement to submit to NHTSA a study and data collection protocol for an annual state survey to estimate passenger vehicle occupant restraint use. The current methodology is fully compliant with the Uniform Criteria and was utilized for the implementation of West Virginia's 2018 seat belt survey.

The present survey design and methodology is similar to years past, but updated to meet NHTSA's updated requirements. The sample was selected using a multistage, stratified cluster sampling procedure, which is updated this year to reflected the most recent roadway network conditions. West Virginia is divided into 55 counties, 35 of the counties account for 85 percent of all passenger vehicle fatalities. The present survey draws observation sites from an updated selection of 14 counties. A total of 169 observation sites were selected, resulting in 5 to 15 sites per county. The May/ June survey included 134 observation sites, which were selected to observe seat belt usage on weekdays, another 32 sites were added as supplemental samples for conducting additional observation surveys during the weekend in November.

The 2018 observation survey design involved a five step process. The steps included:

1. The selection of counties based on vehicle occupant fatalities and regions of the state.
2. The stratification of roads based on functional use classes.
3. The selection of specific road segments within each stratum and county.
4. The development of seat belt use estimation procedures and computations.
5. The establishment of data collection and quality procedures consistent with NHTSA requirements.

1.1 County Selection

A total of 35 counties were identified as having the most passenger vehicle occupant fatalities. These counties accounted for 85% of all fatalities during this time period. Of the 35 counties, 14 were selected for inclusion in the 2018 observation survey representing all three regions of the state. The selection procedure involved dividing the state into three geographic regions, then allocating the number of counties to be selected by region based on the number of qualified counties in the region, and within each region making probability proportional to size (PPS) selections with the odds of selection proportional to the county's total roadway length. The selected counties and identified regions of the state are shown on the map in Appendix A.

1.1.1 Roadway Stratification and Definitions

The 2018 survey design identified 169 total observation sites across 14 counties in the state. A large number of observation sites were necessary to meet NHTSA's requirement of having a standard error no greater than 2.5%. The 169 sites were determined by the mix of counties and road type distributions within counties. Consistent with NHTSA guidelines, the 2018 survey excludes rural local roads in non-Metropolitan Statistical Area counties. Road strata include Primary Roadways, Secondary Roadways, and Local Roads (excluding

rural local roads in non-MSA counties). Each of the 14 counties has road segments in two or all three road strata. The weekday survey utilized six segments in Primary Roadways Strata, four segments in Secondary Roadways Strata, and two Segments in Local Roads Strata (excluding rural local roads in non-MSA counties). The weekend survey added one segment in each strata. The weekday and weekend surveys together included a total of 15 segments per county.

1.1.2 Roadway Segment and Site Selection

The approach used to identify specific roadway segments involved a probability proportionate to size (PPS) procedure, with lengths of roadways defined as the "size." Segments were randomly drawn from within county-stratum populations of road segments, with the probability of drawing any segment proportional to its proportion of the total roadway lengths within the county-stratum. Sampling called for selecting twice the number of road segments required, retaining the order of selection, to provide for the necessary sample and an equal number of alternates, or "spare" segments. A total of five certainty segments among the 169 primary and alternate segments were selected and distributed across the roadway functional strata.

Prior to actual data collection, specific locations for data observations were selected based on visits to the locations, maps, and/or on-line road level images. The direction of travel to be observed was randomly selected for each segment and/or site. Sites were selected based on having a clear view of the vehicles and taking into account observer and direction of travel of vehicles. Efforts were also made to select observation sites where traffic naturally slows in an effort to improve accuracy. When specific site locations were unusable or not able to provide a clear view of belt use, observers chose alternate locations within the road segment where they could more effectively observe the same traffic stream. Details and reasons for changing locations were documented. A complete list of selected primary road segments is provided in Appendix B.

1.1.3 Seat Belt Rate and Standard Error Calculations

Seat belt use rates were calculated using formulas based on the proportion of the state's total roadway length "represented" by the site. Seat belt use rate calculations followed a four-step process. First, estimated rates were calculated for each road type stratum within each county. The general formula for combining observed belt use rates from observation sites on individual segments, for a single county-stratum, is shown in formula (1).

This formula is used when the county-stratum contains certainty segments. The contribution of each segment to the overall county-stratum rate is proportional to the "size" of the segment's contribution to the entire county-stratum traffic (i.e., its roadway length, adjusted by the inverse of the probability of the segment's being selected into the sample):

$$p_{i(j)k} = \frac{\sum_l S_{i(j)k} W_{i(j)k} p_{i(j)k}}{\sum_l S_{i(j)k} W_{i(j)k}} \quad (1)$$

Where $i(j)$ = county i within region j, k = stratum, l= site within stratum and county, $S_{i(j)k}$ = roadway length for segment l in county-stratum $i(j)k$, and $p_{i(j)k}$ = the observed seat belt use rate at site $i(j)k = BS_{i(j)k}/O_{i(j)k}$ where $B_{i(j)k}$ = total number of belted occupants (drivers and outboard front seat passengers) observed at site, $O_{i(j)k}$ = total number of occupants with known belt use observed at site; and $W_{i(j)k}$ = the inverse of the

probability of segment l's selection, as described above: (certainty segments) $W_{i(j)k} = 1.00$ or (random segments).

$$W_{i(j)k} = \frac{\sum_{m=1}^{N} S_{i(j)klm}}{n * S_{i(j)k}}$$

where n = total number of segments in county-stratum $i(j)k$ excluding the certainty segments and n = number of segments to be randomly selected excluding certainty segments. In the case where there were no certainty segments in the county-stratum, formula (1) reduces to the simple formula (1a):

$$p_{i(j)k} = \frac{\sum_{l=1}^{n_{i(j)k}} p_{i(j)k}}{n_{i(j)k}} \quad (1a)$$

Where $i(j)$ = county i within region j, k = stratum, l= site within stratum and county, $n_{i(j)k}$ = number of sites within the stratum-county combination, and $p_{i(j)k}$ = the observed seat belt use rate at site $i(j)kl$ = $BS_{i(j)kl}/O_{i(j)kl}$ where $B_{i(j)kl}$ = total number of belted occupants (drivers and outboard front seat passengers) observed at site, $O_{i(j)kl}$ = total number of occupants with known belt use observed at site.

Second, a county-by-county seat belt use rate, $p_{i(j)k}$, was obtained by combining county-stratum seat belt use rates across strata within counties, weighted by the stratum's relative contribution to total county roadway length:

$$p_{i(j)} = \frac{\sum_k S_{i(j)k} p_{i(j)k}}{\sum_k S_{i(j)k}} \quad (2)$$

Where $S_{i(j)k}$ = roadway length for all roads in stratum k in county $i(j)$, $p_{i(j)k}$ = the observed seat belt use rate for stratum k in county $i(j)$.

In the third step, category-weighted seat belt use rates for each region of counties was obtained by combining and weighting the rates from the sampled counties in each region by their roadway length and probabilities of being selected:

$$p_j = \frac{\sum_i S_{i(j)} W_{i(j)} p_{i(j)}}{\sum_i S_{i(j)} W_{i(j)}} \quad (3)$$

Where $S_{i(j)k}$ = roadway length for all roads k in county i and region j, $W_{i(j)}$ = the inverse of the probability of the county's selection: $W_{i(j)}$ = 1 for certainty counties and

$$W_{i(j)} = \frac{\sum_{l=1}^{N_{(j)}} S_{i(j)l}}{n_{i(j)} * S_{i(j)}}$$

Where $N_{(j)}$ = the number of high-fatality counties in region j and $n_{i(j)}$=the number of those counties selected.

Finally, the statewide seat belt use proportion was calculated by combining the category proportions weighted by their proportion of statewide roadway length:

$$p = \frac{\sum_{j=1}^{3} S_j p_j}{\sum_{j=1}^{3} S_j}$$

The result was a combination of the individual site seat belt use rates weighted to reflect each site's importance in total state roadway length.

Standard error of estimate values were estimated through a jackknife approach, based on the general formula:

$$\hat{\sigma}_{\hat{p}} = \left[\frac{n-1}{n} \sum_{i=1}^{n} (\hat{p}_i - \hat{p})^2 \right]^{1/2}$$

where $\hat{\sigma}_{\hat{p}}$ = standard deviation (standard error) of the estimated statewide seat belt use proportion $\hat{p}$ (equivalent to p in the notation of formulas 1-4), n = the number of sites, i.e., 169, and $\hat{p}_i$ = the estimated statewide seat belt use proportion with site i excluded from the calculation. The relative error rate, i.e., was calculated, as well as the 95% confidence interval, i.e., $\hat{p} \pm 1.96\hat{\sigma}_{\hat{p}}$. These values are reported for the overall statewide seat belt use rate.

1.2 Procedures

Specific data collection procedures were established prior to the initiation of data collection. The procedures were guided by the updated 2011 Uniform Criteria for State Observational Surveys of Seat Belt Use established by NHTSA.

1.2.1 Observers

The seat belt survey observers were hired under the direction of the Governor's Highway Safety Program. These observers performed all field data collection. Prior to any data collection, all observers received approximately one day of training by Cambridge Systematics staff. The observers received classroom instruction as well as several hours in the field practicing the observations on May 10, 2018. The training was developed to adhere to the observation procedures found in the Uniform Criteria for State Observational Surveys of Seat Belt Use (23 CFR § 1340.7). The topics covered in this training were:

- Review requirements and purpose of the observational seat belt survey.
- Review observation procedures and survey data to be collected.
- Discuss survey scenarios.
- Review survey application.
- Review survey dates and submission process.

Observation protocols noted that all survey data shall be collected through direct observation, surveys must occur at the selected observation sites, surveys must occur on the day and time indicated, and observations

should last exactly one hour for each survey site. If the observation point was on a heavily travelled roadway making it difficult for the observer to note every vehicle, a reference point on the roadway in the appropriate lane was to be chosen. That same reference point then would be used for the remainder of the observations.

The safety of the observers was a priority and covered in the training as well. All observers were to wear a reflective vest and not stand in a location that would impede traffic. Observers were also advised that if construction or weather conditions, such as heavy rain or fog, were present that it was permissible, after notifying GHSP, to reschedule or request an alternate site for the same day and time.

To ensure quality control, the accuracy of observers was determined at the end of classroom training in May. This was done by conducting observations outside the training facility and comparing the simultaneous observations of the same traffic by different observers. Any differences noted after the observation was completed was discussed and resolved.

Lastly, per 23 CFR § 1340.7, observer quality control was ensured overseen by GHSP monitors who went into the field and conducted random unannounced visits to no less than five percent of observation sites. These unannounced visits confirmed that observers were conducting observations at the location, day, and time established in the planning and selection phase.

1.2.2 Observation Schedule

After the new survey sites were approved by NHTSA in March of 2018, Cambridge Systematics worked with the GHSP to establish the observation schedule. Observations were scheduled between 7:00 a.m. and 6:00 p.m. Exact timing of the observation periods was subject to adjustment so that the resulting number of sites being observed throughout the 7 a.m. to 6 p.m. time frame were approximately equal. Whenever possible, three to five sites within relative proximity to each other were scheduled for one observer on any day. The days of the week assigned were balanced to similar counties to ensure all days of the week have similar clusters. The first site in any cluster to be observed each day was randomly selected, and the additional sites were assigned in an order which provided balance by type of site and time of day while minimizing travel distance and time.

Data Collection Dates

Dates	Notes
May 29 – June 13, 2018	Data collected during weekdays
November 10 – 18	Data collected during weekends

1.2.3 Data Collection Application

In an effort to improve not only the timeliness of the observed seat belt usage rate results, but also the uniformity and accuracy of the data collected, a survey application (App) was utilized by observers using tablet computers. The survey App (see Appendix C) was specifically tailored for West Virginia's observers. Cambridge Systematics worked with the App developer to provide them with all of the specific 2018 survey site information. The observers were able to select their survey site from a list and were also provided a map overview of the area on the App to conduct the survey and, if applicable, the survey direction.

As part of the May 2018 observer training, an in-class review of the App was conducted, followed by a one hour period of testing the App and submitting results. Information collected on the survey App included information on the specific observation site as well as vehicle and occupant information (Appendix C).

Data Collected from Observational Surveys

Observation Site	Vehicle and Occupant
Observer's name	Vehicle type (i.e., car, pick-up, SUV, van)
Site number, city name, and notes	Driver and front seat passenger gender
Weather condition (I.e. clear, foggy, cloudy, light rain)	Driver and front seat passenger seat belt use (I.e. yes, no, unknown)
Direction of travel observed	Driver cell phone in use (I.e. yes, no, unknown)
Time observation started/ended	

2.0 Results

The results of the analysis on the 39,870 vehicle and occupant observations made in 2018 are presented in this section. Extensive effort is made to summarize the characteristics of occupants, vehicles, and observation sites. The seat belt use rate based on the weighted sample of observations is provided in the table below. In addition to the overall seat belt use rate, descriptions of the weighted belt use rate by roadway type (i.e., functional class), region, county, and vehicle type are presented. The presentation of the results begins with a description of the sample including the known and unknown number of occupants and their use of a seat belt as well as the nonresponse rate for the survey. This is followed by a brief analysis of the total sample of both drivers and passengers by county.

Seat Belt Use Rate

Statistic	Values	Notes
WV Statewide Seat Belt Use Rate	90.53%	
Standard Error	1.75%	<2.50%
Relative Error Rate	1.94%	(1.75 /0.9053)
95 Percent Confidence Interval Upper Bound	94.0%	0.9053+ 1.96*0.0175
95 Percent Confidence Interval Lower Bound	87.1%	0.9053- 1.96*0.0175

The table below provides a description of the number of occupants using and not using a seat belt and the statewide nonresponse rate. Seat belt use was able to be ascertained for a total of 39,715 occupants, including 31,129 drivers and 8,586 front seat passengers. However, observers were not able to record seat belt use for 155 observations. This resulted in a statewide nonresponse rate of 0.62% for the 2018 survey.

Statewide Seat Belt Use and Nonresponse Rate

Statistic	Values	Notes
Total Occupants with Unknown Seat Belt Status	155	
Total Occupants Observed	39,715	
Sample Non-Response Rate	0.39%	
Statewide Non-Response Rate (Weighted)	0.62%	< 10%

The table below displays the total number and percentage of observed front seat occupants. As shown, a total of 31,226 drivers and 8,644 outboard front seat passengers were observed. These observations were compiled across 169 observation sites and 14 counties. Greater than ten percent of observations occurred in two counties, Lewis (20.4%), and Putnam (15.7%). These counties were followed by Randolph (9.2%), Raleigh (8.9%), and Braxton (8.3%).

Observed Rate by County

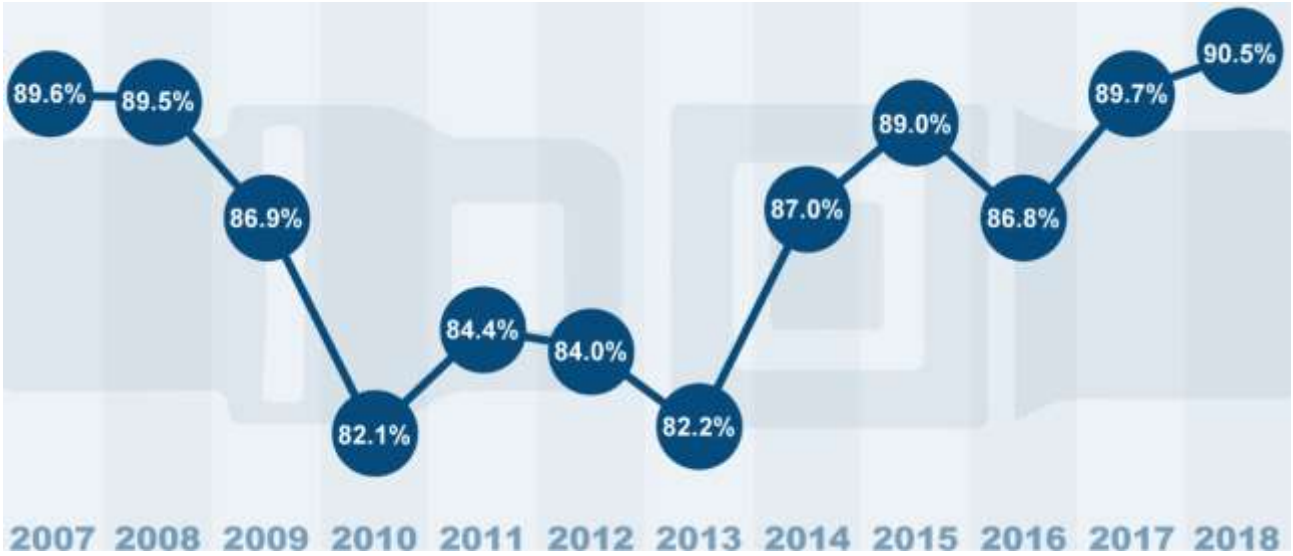
	Drivers		Passengers		Total	
County	**N**	**%**	**N**	**%**	**N**	**%**
Berkeley	2,397	7.7%	890	10.3%	3,287	8.2%
Boone	2,334	7.5%	630	7.3%	2,964	7.4%
Braxton	2,368	7.6%	951	11.0%	3,319	8.3%
Greenbrier	1,082	3.5%	250	2.9%	1,332	3.3%
Harrison	406	1.3%	159	1.8%	565	1.4%
Jackson	341	1.1%	93	1.1%	434	1.1%
Lewis	6,351	20.3%	1,774	20.5%	8,125	20.4%
McDowell	2,141	6.9%	672	7.8%	2,813	7.1%
Mingo	1,578	5.1%	387	4.5%	1,965	4.9%
Monongalia	458	1.5%	90	1.0%	548	1.4%
Pendleton	789	2.5%	236	2.7%	1,025	2.6%
Putnam	4,938	15.8%	1,330	15.4%	6,268	15.7%
Raleigh	3,080	9.9%	487	5.6%	3,567	8.9%
Randolph	2,963	9.5%	695	8.0%	3,658	9.2%
Total	**31,226**	**100.0%**	**8,644**	**100.0%**	**39,870**	**100.0%**

Historically over time West Virginia has seen its weighted seat belt use rate climb. In 1992 the usage rate was at 32% and climbed to 49.5% in 2000. In 2007 and 2008, the weighted seat belt use rate reached a near high of 89.6% and 89.5% respectively. The current rate of 90.5% achieved in 2018 is the highest observed seat belt use rate West Virginia has ever achieved.

Unfortunately, it took nearly ten years for the state to climb back up to 90%. In 2009, the observed seat belt usage rate fell 2.5% to 86.9% and fell again in 2008 to 82.1 percent.

The 2010 seat belt use rate declined further to 82.1%—the lowest observed rate since 2004—before rising again to 84.9% in 2011 and 84.0% in 2012. The rate for 2013 was 82.2%. In 2014 the rate began to climb again into the high eighties until eclipsing 90% for the first time in 2018.

Observed Seat Belt Usage Rates, 2007 to 2018



Source: https://cdan.nhtsa.gov/stsi.htm#.

The percent weighted seat belt use rate for all vehicle occupants by county for 2018 is outlined below. Randolph County was observed with the highest rate at 97%. The lowest rate came from McDowell County with an observed rate of 72%. Of the 14 counties where observations took place, 11 of them had an observed rate greater than 90%.

Weighted Seat Belt Use Rate by County, 2018

County	2018 Seat Belt Use Rate
Berkeley	91.6%
Boone	88.4%
Braxton	93.8%
Greenbrier	88.5%
Harrison	88.5%
Jackson	93.3%
Lewis	91.3%
McDowell	72.0%
Mingo	91.7%
Monongalia	95.4%
Pendleton	91.3%
Putnam	96.0%
Raleigh	92.7%
Randolph	97.0%
Total	**90.5%**

The next table displays the weighted seat belt use rate by county for 2015 to 2018. However, since new survey sites were selected in 2018 not all of the counties where observations once occurred were selected in the current survey. Of the 14 counties where observations occurred in 2018, seven of them were in counties where observations occurred between 2015 and 2017. Of these seven counties with historical trends, four counties (Berkeley, Harrison, Monongalia, and Raleigh) had a higher observed rate than 2017. Since the new survey sites and counties used in 2018 are valid for five years, moving forward a more comprehensive comparison of the observed seat belt rate for all 14 counties will be available.

County	2015	2016	2017	2018
Berkeley	89.6%	88.4%	89.0%	91.6%
Boone	87.6%	90.0%	88.7%	88.4%
Cabell	94.6%	92.9%	92.9%	
Fayette	85.5%	86.9%	90.2%	
Greenbrier	89.4%	91.3%	90.6%	88.5%
Harrison	87.8%	81.6%	82.1%	88.5%
Jackson	80.1%	85.6%	93.5%	93.3%
Jefferson	92.5%	84.6%	88.5%	
Kanawha	91.5%	84.6%	92.0%	
Mason	91.9%	90.9%	99.0%	
Mercer	95.0%	88.5%	90.3%	
Monongalia	88.8%	77.0%	80.7%	95.4%
Raleigh	83.3%	86.9%	89.5%	92.7%
Wood	86.4%	81.8%	86.4%	
Total	**89.0%**	**86.8%**	**89.7%**	**90.5%**

2.1.1 Characteristics of Belted Drivers and Passengers

The previous section presented the results of seat belt use for the state as well as by county. This section analyzes various characteristics of drivers and passengers and their relationship to belt use. The purpose is to identify variation in seat belt usage by occupant, site characteristics, as well as vehicle type. It is anticipated that this information will help to identify the conditions in which seat belts are more or less likely to be used in the state to help develop appropriate countermeasures in education and enforcement.

When segmenting the data by seat belt rate for drivers with or without a passenger in the front seat, some interesting conclusions can be made. Male drivers had a 4.5 point higher seat belt rate with a passenger than when driving alone. Conversely, female drivers had a 12.6 point lower seat belt rate with a passenger than without. Moving forward in future years it may be of interest to see if these results remain consistent. If so, more solid conclusions could be made on the impact of male and female drivers with or without passengers and educational efforts and messaging could then be tailored to better address occupant protection for drivers of both genders.

Weighted Seat Belt Use Rate for Drivers with Passenger versus Without

	Driver with Passenger	Driver without Passenger
Male	90.2%	85.7%
Female	80.8%	93.4%

Generally speaking, male passengers were less likely to use seat belts compared to females passengers. This finding is consistent with previous observational surveys in West Virginia over the past several years. Nevertheless, there still remains a gender gap in seat belt use. Male passengers continued to be substantially less likely to be observed wearing a seat belt.

The distribution of driver's seat belt use by gender and county in 2018 is shown in the table below. Of all 14 counties studied, the belt rate for males (89.1%) and females (93.7%) was relatively close. Of these same counties, females had a higher seat belt rate in ten counties. All of the counties except two, Harrison and Pendleton, had less than a ten point difference between the seat belt rates of males and females. Reviewing previous years data this may suggest that the gender gap among drivers is shrinking.

Driver Belt Use Rates by Gender and County

	Drivers		
	Male %	Female %	Total %
Berkeley	94.2%	91.0%	93.5%
Boone	87.0%	95.7%	88.8%
Braxton	90.4%	95.9%	92.6%
Greenbrier	89.3%	85.1%	87.3%
Harrison	83.9%	99.2%	89.7%
Jackson	89.7%	97.3%	93.4%
Lewis	87.1%	93.2%	90.3%
McDowell	71.9%	70.4%	71.6%
Mingo	91.8%	95.8%	93.4%
Monongalia	92.9%	97.2%	94.3%
Pendleton	86.1%	96.9%	90.3%
Putnam	96.6%	94.5%	96.2%
Raleigh	89.2%	98.1%	92.4%
Randolph	98.2%	98.4%	98.3%
Total	**89.1%**	**93.7%**	**90.7%**

The following table displays the results of seat belt use for passengers by gender and county. Comparable to the results for drivers, the findings illustrate that there are similarities between seat belt use of drivers and passengers by gender. As with drivers noted previously, of the 14 counties studied, the belt rate for males

(88.3%) and females (92.4%) was similar. Of these same counties, once again females had a higher rate in nine of them. One significant difference between the seat belt rate between genders in the counties for passengers was that six counties had a greater than ten point difference between males and females, whereas for drivers that only occurred in two counties.

Passengers Belt Use Rates by Gender and County

	Passengers		
	Male %	Female %	Total %
Berkeley	88.7%	89.5%	89.2%
Boone	87.4%	84.6%	84.4%
Braxton	93.1%	98.2%	97.1%
Greenbrier	84.6%	97.7%	94.7%
Harrison	77.3%	89.6%	84.4%
Jackson	88.5%	99.9%	95.0%
Lewis	94.3%	97.4%	96.5%
McDowell	76.3%	75.5%	75.4%
Mingo	74.9%	92.1%	86.6%
Monongalia	99.6%	98.5%	98.8%
Pendleton	91.7%	98.7%	96.4%
Putnam	99.2%	85.0%	93.7%
Raleigh	99.2%	92.8%	94.5%
Randolph	86.6%	99.3%	91.5%
Total	**88.3%**	**92.4%**	**91.0%**

As with most of the nation, West Virginia saw its lowest seat belt usage rate in pickup trucks (87.4%), followed by cars (91.6%), vans (92.5%), and SUVs (94.9%). Geographically, the Eastern panhandle saw the lowest seat belt usage rate (88.2%), followed by the Southern region of the state (91.4%), with the highest usage rate coming from the Northern part of the state. A map of the State's regions can be found in Appendix A. When reviewing roadway functional class, secondary roadways had the lowest observed seat belt rate at 89.8%, followed closely by local roadways at 90.2%, with primary roadways showing the highest rate with 95.2%.

Seat Belt Use Rate for Drivers and Passengers by Vehicle Type and Site Characteristics

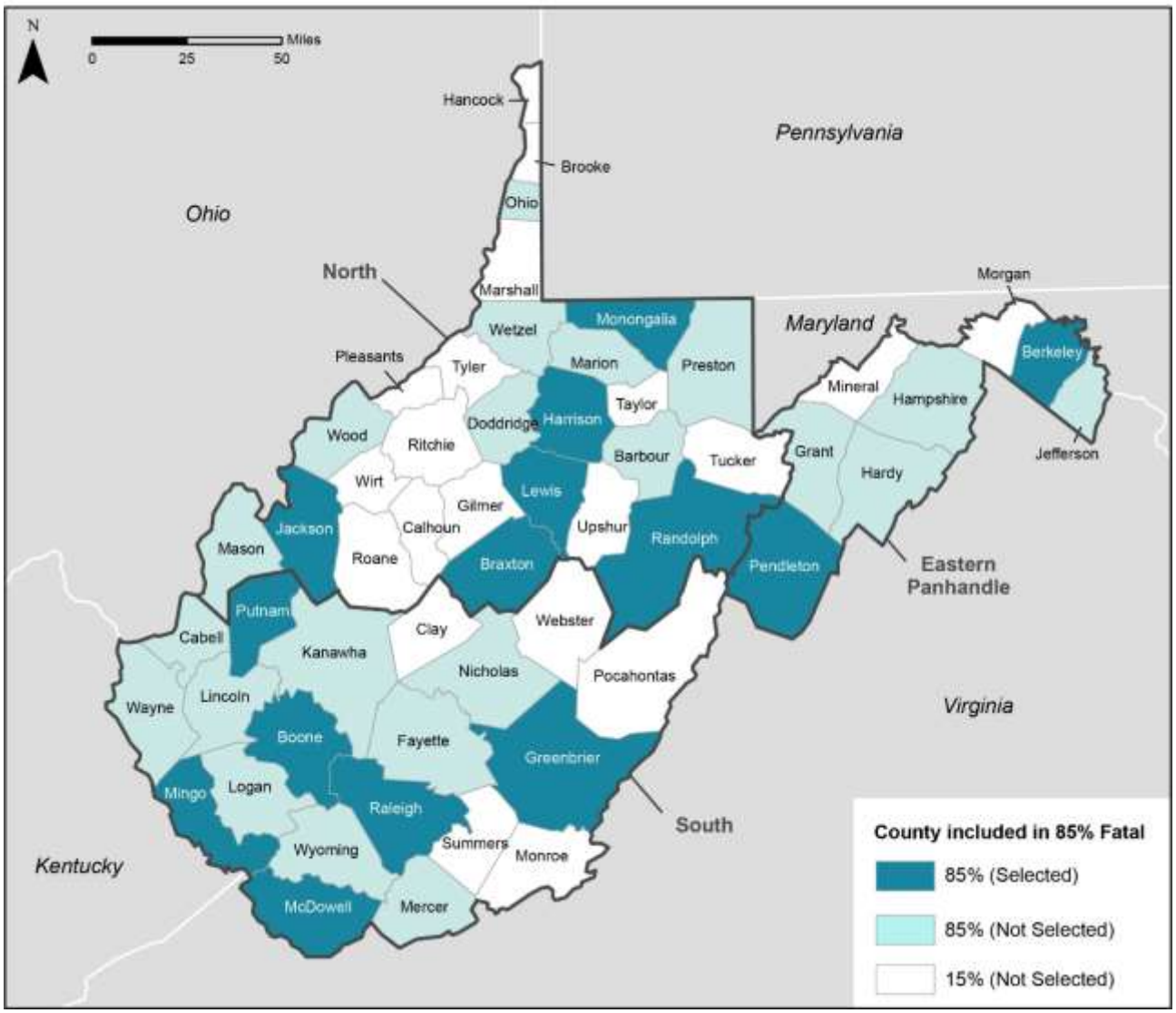
Vehicle Type and Site Characteristics	Driver	Passenger	Total
Vehicle Type			
Car	91.7%	93.7%	**91.6%**
Pickup Truck	87.2%	92.4%	**87.4%**
SUV	93.7%	95.8%	**94.9%**
Van	93.1%	96.8%	**92.5%**
Region			
Eastern Panhandle	90.7%	90.7%	**88.2%**
North	89.1%	90.6%	**93.2%**
South	95.0%	93.2%	**91.4%**
Functional Class			
Primary	94.7%	97.0%	**95.2%**
Secondary	89.2%	92.1%	**89.8%**
Local	90.5%	89.2%	**90.2%**

Cell phone use while driving is one form of distracted driving. The seat belt surveyors were also able to capture observed cell phone use during the survey. The table below notes the number of observations of cell phone use and non-cell phone use and further breaks it down by gender and whether a seat belt was in use. Males had an observed cell phone use of 3.8%, whereas females had a slightly higher observed use of 4.5%. Of drivers using a cell phone, 91.8% were using a seat belt, whereas, drivers not using a cell phone were observed using a seat belt 93.5% of the time. Potentially indicating a correlation between belted drivers being less likely to use a cell phone while driving.

Observed Cell Phone Use by Gender and Seat Belt Use

	Cell Phone Use		No Cell Phone Use	
	Number	Percent	Number	Percent
Gender				
Male Driver	716	59.2%	19,003	63.6%
Female Driver	493	40.8%	10,857	36.4%
Seat Belt Use				
Use	1,110	91.8%	27,936	93.5%
Not Use	99	8.2%	1,930	6.5%

Appendix A. Seat Belt Observational Counties and Regions



Appendix B. Seat Belt Observational Survey Site List

Region	Site Number	County	Road Type	Road Segment Length	Probability of Selection*
1	1	Boone	Secondary	0.364	0.0219
1	2	Boone	Secondary	0.215	0.0129
1	3	Boone	Secondary	0.194	0.0116
1	4	Boone	Secondary	0.187	0.0112
1	5	Boone	Local	0.118	0.0005
1	6	Boone	Local	0.039	0.0002
1	7	Boone	Secondary	0.211	0.0032
1	8	Boone	Local	0.154	0.0003
1	9	Greenbrier	Primary	1.310	0.1446
1	10	Greenbrier	Primary	0.780	0.0860
1	11	Greenbrier	Primary	0.672	0.0742
1	12	Greenbrier	Primary	0.618	0.0682
1	13	Greenbrier	Primary	0.434	0.0479
1	14	Greenbrier	Primary	0.431	0.0475
1	15	Greenbrier	Secondary	0.429	0.0223
1	16	Greenbrier	Secondary	0.232	0.0121
1	17	Greenbrier	Secondary	0.126	0.0066
1	18	Greenbrier	Secondary	0.113	0.0059
1	19	Greenbrier	Local	0.241	0.0052
1	20	Greenbrier	Local	0.201	0.0043
1	21	Greenbrier	Secondary	0.304	0.0040
1	22	Greenbrier	Local	0.107	0.0012
1	23	Greenbrier	Primary	1.593	0.0440
1	24	McDowell	Secondary	0.398	0.0222
1	25	McDowell	Secondary	0.350	0.0196
1	26	McDowell	Secondary	0.327	0.0183
1	27	McDowell	Secondary	0.317	0.0177
1	28	McDowell	Local	0.543	0.0516
1	29	McDowell	Local	0.296	0.0281
1	30	McDowell	Local	0.412	0.0196
1	31	McDowell	Secondary	0.289	0.0040
1	32	Mingo	Primary	0.209	0.0113
1	33	Mingo	Secondary	0.499	0.0270
1	34	Mingo	Secondary	0.333	0.0180
1	35	Mingo	Secondary	0.213	0.0115
2	36	Mingo	Secondary	0.015	0.0019
1	37	Mingo	Local	0.138	0.0175
1	38	Mingo	Secondary	0.298	0.0040
1	39	Mingo	Local	0.578	0.0366

Region	Site Number	County	Road Type	Road Segment Length	Probability of Selection*
1	40	Putnam	Primary	0.920	0.2717
1	41	Putnam	Primary	0.340	0.1003
1	42	Putnam	Primary	0.334	0.0985
1	43	Putnam	Primary	0.282	0.0834
1	44	Putnam	Primary	0.261	0.0770
1	45	Putnam	Primary	0.216	0.0638
1	46	Putnam	Secondary	0.601	0.0396
1	47	Putnam	Secondary	0.375	0.0247
1	48	Putnam	Secondary	0.316	0.0208
1	49	Putnam	Secondary	0.091	0.0060
1	50	Putnam	Secondary	0.685	0.0027
1	51	Putnam	Secondary	0.187	0.0007
1	52	Putnam	Local	0.083	0.0002
1	53	Putnam	Primary	0.194	0.0143
1	54	Putnam	Secondary	0.648	0.0107
1	55	Raleigh	Primary	0.820	0.0753
1	56	Raleigh	Primary	0.691	0.0634
1	57	Raleigh	Primary	0.617	0.0567
1	58	Raleigh	Primary	0.611	0.0561
1	59	Raleigh	Primary	0.599	0.0550
1	60	Raleigh	Primary	0.363	0.0333
1	61	Raleigh	Secondary	1.098	0.0522
1	62	Raleigh	Secondary	0.785	0.0373
1	63	Raleigh	Secondary	0.517	0.0245
1	64	Raleigh	Secondary	0.428	0.0203
1	65	Raleigh	Local	0.709	0.0017
1	66	Raleigh	Local	0.055	0.0001
1	67	Raleigh	Local	0.385	0.0005
1	68	Raleigh	Primary	0.693	0.0159
1	69	Raleigh	Secondary	0.741	0.0088
2	70	Braxton	Primary	1.488	0.1548
2	71	Braxton	Primary	1.440	0.1499
2	72	Braxton	Primary	1.082	0.1126
2	73	Braxton	Primary	0.998	0.1038
2	74	Braxton	Primary	0.325	0.0338
2	75	Braxton	Primary	0.802	0.0834
2	76	Braxton	Secondary	0.840	0.0744
2	77	Braxton	Secondary	0.559	0.0495
2	78	Braxton	Secondary	0.296	0.0262
2	79	Braxton	Secondary	0.212	0.0188
2	80	Braxton	Primary	1.748	0.0455

Region	Site Number	County	Road Type	Road Segment Length	Probability of Selection*
2	81	Braxton	Secondary	0.203	0.0045
2	82	Harrison	Primary	1.503	0.2650
2	83	Harrison	Primary	0.485	0.0856
2	84	Harrison	Primary	0.454	0.0801
2	85	Harrison	Primary	0.431	0.0760
2	86	Harrison	Primary	0.253	0.0446
2	87	Harrison	Primary	0.246	0.0434
2	88	Harrison	Secondary	0.822	0.0453
2	89	Harrison	Secondary	0.555	0.0306
2	90	Harrison	Secondary	0.214	0.0118
2	91	Harrison	Secondary	0.249	0.0137
2	92	Harrison	Local	0.230	0.0020
2	93	Harrison	Local	0.030	0.0003
2	94	Harrison	Secondary	0.146	0.0020
2	95	Harrison	Local	0.258	0.0011
2	96	Harrison	Primary	0.302	0.0133
2	97	Jackson	Primary	1.554	0.1572
2	98	Jackson	Primary	1.471	0.1488
2	99	Jackson	Primary	1.360	0.1376
2	100	Jackson	Primary	1.090	0.1103
2	101	Jackson	Primary	1.064	0.1076
2	102	Jackson	Primary	0.486	0.0492
2	103	Jackson	Secondary	0.551	0.0625
2	104	Jackson	Secondary	0.338	0.0384
2	105	Jackson	Secondary	0.323	0.0366
2	106	Jackson	Secondary	0.232	0.0264
2	107	Jackson	Local	0.160	0.0070
2	108	Jackson	Local	0.054	0.0024
2	109	Jackson	Local	0.047	0.0010
2	110	Jackson	Primary	0.471	0.0119
2	111	Jackson	Secondary	0.076	0.0022
2	112	Lewis	Primary	4.894	0.8614
2	113	Lewis	Primary	4.634	0.8156
2	114	Lewis	Primary	2.795	0.4919
2	115	Lewis	Primary	1.161	0.2043
2	116	Lewis	Primary	1.021	0.1797
2	117	Lewis	Primary	0.854	0.1503
2	118	Lewis	Secondary	0.866	0.0984
2	119	Lewis	Secondary	0.145	0.0165
2	120	Lewis	Secondary	0.157	0.0179
2	121	Lewis	Local	0.133	0.0151

Region	Site Number	County	Road Type	Road Segment Length	Probability of Selection*
2	122	Lewis	Local	0.145	0.0086
2	123	Lewis	Local	0.148	0.0088
2	124	Lewis	Local	0.081	0.0024
2	125	Lewis	Secondary	0.542	0.0154
2	126	Lewis	Primary	0.603	0.0265
2	127	Monongalia	Primary	1.657	0.2058
2	128	Monongalia	Primary	1.034	0.1284
2	129	Monongalia	Primary	0.996	0.1237
2	130	Monongalia	Primary	0.466	0.0579
2	131	Monongalia	Primary	0.443	0.0550
2	132	Monongalia	Primary	0.384	0.0476
2	133	Monongalia	Secondary	0.747	0.0497
2	134	Monongalia	Secondary	0.720	0.0480
2	135	Monongalia	Secondary	0.708	0.0472
2	136	Monongalia	Secondary	0.689	0.0459
2	137	Monongalia	Local	0.048	0.0001
2	138	Monongalia	Secondary	0.040	0.0001
2	139	Monongalia	Secondary	0.568	0.0095
2	140	Monongalia	Primary	0.715	0.0222
2	141	Monongalia	Local	0.215	0.0003
2	142	Randolph	Secondary	1.316	0.0708
2	143	Randolph	Secondary	1.072	0.0577
2	144	Randolph	Secondary	0.695	0.0374
2	145	Randolph	Local	0.085	0.0046
2	146	Randolph	Local	0.081	0.0028
2	147	Randolph	Local	0.040	0.0014
3	148	Berkeley	Primary	0.252	0.0387
3	149	Berkeley	Primary	1.834	0.2822
3	150	Berkeley	Primary	0.249	0.0383
3	151	Berkeley	Primary	0.659	0.1015
3	152	Berkeley	Primary	0.195	0.0299
3	153	Berkeley	Primary	0.295	0.0454
3	154	Berkeley	Secondary	0.329	0.0303
3	155	Berkeley	Secondary	0.331	0.0304
3	156	Berkeley	Secondary	0.265	0.0243
3	157	Berkeley	Secondary	0.211	0.0194
3	158	Berkeley	Local	0.048	0.0001
3	159	Berkeley	Local	0.317	0.0009
3	160	Berkeley	Secondary	0.218	0.0050
3	161	Berkeley	Local	0.212	0.0003
3	162	Berkeley	Primary	0.295	0.0114

Region	Site Number	County	Road Type	Road Segment Length	Probability of Selection*
3	163	Pendleton	Secondary	0.250	0.0185
3	164	Pendleton	Secondary	0.587	0.0434
3	165	Pendleton	Secondary	0.565	0.0417
3	166	Pendleton	Secondary	0.508	0.0375
2	167	Pendleton	Secondary	0.303	0.0056
3	168	Randolph	Secondary	0.189	0.0025
3	169	Randolph	Local	0.062	0.0011

Appendix C. Observational Survey Collection Form