2023 WEST VIRGINIA OBSERVATIONAL SEAT BELT SURVEY REPORT

prepared for

West Virginia Governor's Highway Safety Program

GHSP
WEST VIRGINIA GOVERNOR'S HIGHWAY SAFETY PROGRAM

prepared by

Cambridge Systematics, Inc.

CAMBRIDGE SYSTEMATICS

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Executive Summary

West Virginia has adopted the long-term goal of zero traffic fatalities, with an interim goal of reducing fatalities by one-half by 2030, using 2006 to 2010 as a five-year average base. According to the National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System (FARS), from 2017 to 2021 the average percentage of unrestrained fatalities in the State was 28 percent. To reach the State's target of zero traffic fatalities, increasing seat belt use should be a top priority.

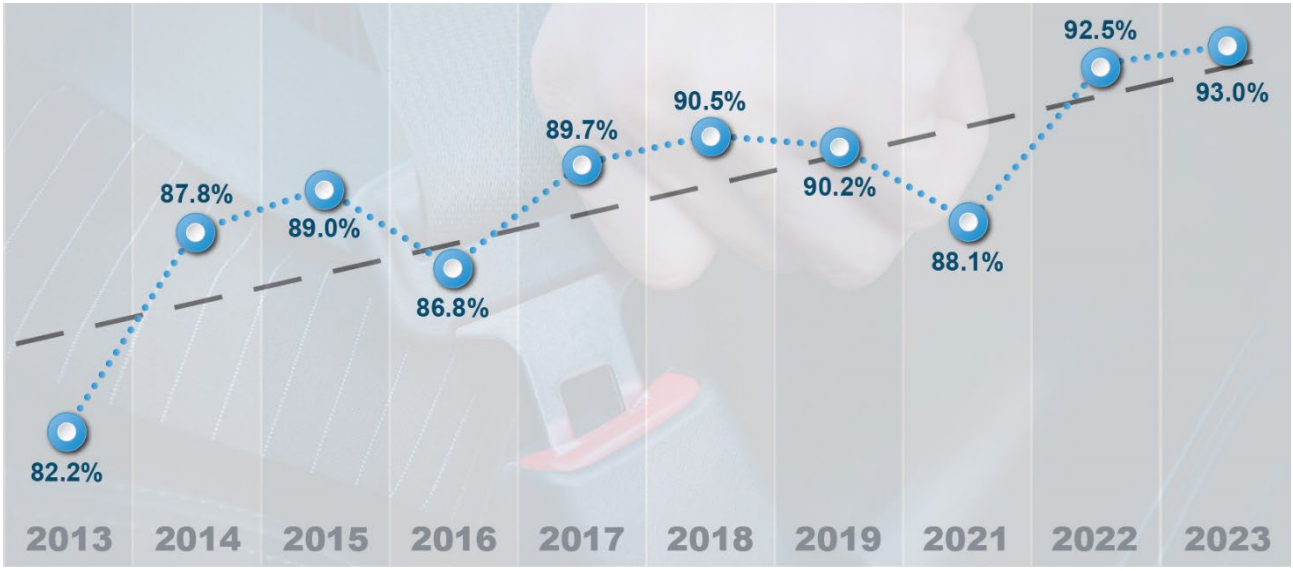
This report outlines the observed seat belt use rate in West Virginia collected between May 30 and June 11, 2023, during both the weekdays and weekends. This report also documents the seat belt use rate and identifies the primary sources of variation in seat belt use, allowing the Governor's Highway Safety Program (GHSP) and its stakeholders to develop and revise countermeasures to address unrestrained vehicle occupants.

Observers recorded seat belt information on 22,903 drivers and 6,410 onboard front seat passengers for a total of 29,313 observations. Observers were not able to record seat belt use for 79 observations, resulting in a statewide nonresponse unweighted rate of 0.27 percent for the 2023 survey, compared to a nonresponse rate of 0.59 percent for the State's 2022 survey. An observational seat belt survey was not conducted in 2020 due to the COVID-19 pandemic. As such, in the various charts and tables in this report there will be no data to report for 2020.

The 2023 seat belt rate in West Virginia once again improved to its highest ever recorded observed rate at 93.0 percent (Figure ES.1). The rate has a standard error of 0.01 percent (relative standard error = 0.01 percent), well within the standard requirement of 2.5 percent set forth by NHTSA. This is a substantial increase from the 2021 observed seat belt use rate of 88.1 percent, and a notable increase from the 2022 observed seatbelt use rate of 92.5 percent. All 14 counties where observations occurred had seat belt use rates between 78.8 percent and 97.4 percent in 2023.

Figure ES.1 West Virginia Observed Seat Belt Use Rates

2013 to 2023



Source: https://cdan.nhtsa.gov/stsi.htm# and 2022 observational seat belt survey.

Section 1 of this report discusses the sampling procedures and methods used to obtain an estimate of the seat belt use rate in West Virginia; it also describes procedures for the selection of counties, stratification of roadways, and observation sites. Section 2 details the results of this effort, beginning with the statewide seat belt use rate and trends over several years, along with a summary of the characteristics of occupants, vehicles, and observation sites. The report concludes with an analysis of selected characteristics of vehicle occupants and observation sites. The information provided by this report will help to identify the conditions under which seat belts are more or less likely to be used, allowing safety stakeholders across the State to improve upon their strategies for addressing unrestrained vehicle occupants.

Acknowledgments

Cambridge Systematics, Inc. (CS) began a partnership with the GHSP in 2018 to aid in the selection of new survey sites. CS also was involved in the development of this report. The 2023 West Virginia Observational Seat Belt 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, Barbara Lobert, Federal Programs Administrator, and Amy Boggs, Grants Program Manager for their assistance in compiling the survey data, overseeing the observers, and managing the day-to-day operations of the project.

1.0 Methodology

In 2011, 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, pages 18042–18059). This report represents West Virginia's fulfillment of the NHTSA requirement to submit 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 used to implement West Virginia's newly revised 2023 seat belt survey which will remain in effect through 2027.

The present survey design and methodology is identical to the 2018 selection process and is updated to meet NHTSA's updated requirements. The surveyors selected the sample using a multistage, stratified cluster sampling procedure, to reflect the most recent roadway network conditions. West Virginia is divided into 55 counties, and 32 of the counties account for 85 percent of all passenger vehicle fatalities between 2016 and 2020. The present survey draws observation sites from an updated selection of 14 counties. Surveyors selected a total of 116 observation sites, resulting in 4 to 12 sites per county during the survey period in May and June. Surveyors used the same methodology approved by NHTSA for the 2023 survey, and the methodology is valid through 2027 unless otherwise noted.

The 2023 observation survey design, which will remain valid through 2027, 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

Surveyors identified a total of 32 counties as having the most passenger vehicle occupant fatalities. These counties accounted for 85 percent of all fatalities during the time period studied. Of the 32 counties, 14 were selected for inclusion in the 2023 observation survey to represent all three regions of the State. The selection procedure involved dividing the State into three geographic regions, then allocating the number of counties 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. Appendix A shows the selected counties and identified regions of the State on the map.

1.1.1 Roadway Stratification and Definitions

The 2023 survey design identified 116 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 percent. The surveyors determined the 116 sites by the mix of counties and road type distributions within counties. Consistent with NHTSA guidelines, the 2023 survey excluded rural local roads in non - Metropolitan Statistical Area (MSA) counties. Road strata include Primary Roadways, Secondary

Roadways, and Local Roads (excluding rural local roads in non-MSA counties). Of the 14 counties surveyed, only four had Secondary Roadways that were surveyed. The survey used 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).

1.1.2 Roadway Segment and Site Selection

The surveyors used an approach to identify specific roadway segments that involved a PPS procedure, with lengths of roadways defined as the "size." Segments were randomly drawn from county-stratum populations of road segments, with the probability of drawing any segment proportional to its portion 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. Surveyors selected and distributed a total of five certainty segments among the 116 primary and alternate segments across the roadway functional strata.

Prior to actual data collection, surveyors selected specific locations for data observations based on visits to the locations, maps, and/or online 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 considering observer and direction of travel of vehicles. Efforts also were made to select observation sites where traffic naturally slows 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. Surveyors documented details and reasons for changing locations; Appendix B provides a complete list of selected primary road segments.

1.1.3 Seat Belt Rate and Standard Error Calculations

Surveyors calculated seat belt use rates 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 were 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:

$$p = \frac{\sum_{j=1}^{3} S_j p_j}{\sum_{j=1}^{3} S_j} \quad (4)$$

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 was estimated through a jackknife approach, based on the general formula:

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

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., 116, and $\hat{p}_i$ = the estimated statewide seat belt use proportion with site i excluded from the calculation. The relative error rate was calculated, as well as the 95 percent 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, 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 GHSP. These observers performed all field data collection. Prior to any data collection, all observers received approximately one day of training by CS staff in 2018 after the current methodology used was approved by NHTSA. The observers received classroom instruction and several hours in the field practicing observation. Before observers conducted the observations in 2023, GHSP provided a refresher training. The staff developed training to adhere to the observation procedures found in the Uniform Criteria for State Observational Surveys of Seat Belt Use (23 Code of Federal Regulations [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 dictate that all survey data must 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 traveled roadway making it difficult for the observer to note every vehicle, a reference point on the roadway in the appropriate lane should 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 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 staff assessed accuracy of observers at the end of classroom training previously conducted. This was done by conducting observations outside the training facility and comparing the simultaneous observations of the same traffic by different observers. Staff identified any differences noted after the observation was completed and discussed and resolved them with the observers.

Lastly, per 23 CFR § 1340.7, observer quality control was overseen by GHSP monitors who went into the field and conducted random unannounced visits at 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. For the 2023 survey, the observer staff remained the same as the previous year. The observers were provided with the PowerPoint presentation from 2018 to serve as a refresher for adherence to the observation procedures found in the Uniform Criteria for State Observational Surveys of Seat Belt Use (23 CFR § 1340.7).

1.2.2 Observation Schedule

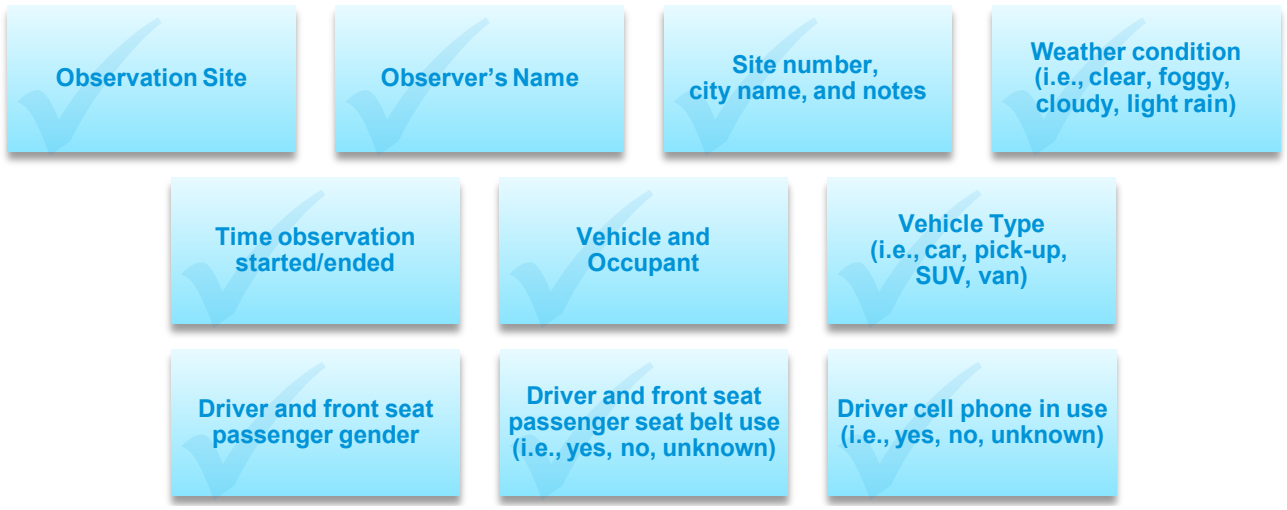
Using the new survey sites approved by NHTSA in March of 2023, CS worked with the GHSP to establish the observation schedule for 2023. Observations were scheduled between 7:00 a.m. and 6:00 p.m. Exact timing of the observation periods was subject to adjustment so that the resulting number of sites being observed throughout the chosen timeframe 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 that provided balance by type of site and time of day while minimizing travel distance and time.

1.2.3 Data Collection Application

To improve not only the timeliness of the observed seat belt use rate results, but also the uniformity and accuracy of the data collected, observers used a survey application (App) on tablet computers. The survey App (see Appendix C) was specifically tailored for West Virginia's observers and did not materially change between its use in the 2018 survey and the 2023 survey. CS worked with the App developer to provide them with all the specific 2023 survey site information. The observers were able to select their survey site from a list; the App provided a map overview of the area to conduct the survey and, if applicable, the survey direction.

As part of the observer training, staff conducted an in-class review of the App when it was first utilized in 2018, 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 and vehicle and occupant information (Appendix C).

Figure 1.1 Data Collected from Observational Surveys



2.0 Results

This section presents the results of the analysis on the 29,313 vehicle and occupant observations made in 2023. Surveyors made an extensive effort to summarize the characteristics of occupants, vehicles, and observation sites. The table below provides the seat belt use rate based on the weighted sample of observations. In addition to the overall seat belt use rate, this section presents descriptions of the weighted belt use rate by county, roadway type, gender, vehicle type, cell phone use, and observed belt use of both the driver and front seat passenger. The analysis begins with a description of the sample, including the known and unknown number of occupants, their use of a seat belt, and the nonresponse rate for the survey. This information is followed by a brief analysis of the total sample of both drivers and passengers by county.

Table 2.1 Seat Belt Use Rate

Statistic	Values	Notes
WV Statewide Seat Belt Use Rate	93.02%	
Standard Error	0.01%	<2.50%
Relative Error Rate	0.01%	(0.0001 / 0.9302)
95 Percent Confidence Interval Upper Bound	93.04%	0.9302 + 1.96*0.0001
95 Percent Confidence Interval Lower Bound	93.00%	0.9302 - 1.96*0.0001

The table below provides a description of the number of occupants using and not using a seat belt and the statewide nonresponse rate. Observers were able to ascertain seat belt use for 29,313 occupants, including 22,903 drivers and 6,410 front seat passengers. However, observers were not able to record seat belt use for 79 observations. This resulted in a statewide nonresponse rate (weighted) of 0.18 percent for the 2023 survey, well within the 2.5 percent threshold of acceptability.

Table 2.2 Statewide Seat Belt Use and Nonresponse Rate

Statistic	Values	Notes
Total Occupants with Unknown Seat Belt Status	79	
Total Occupants Observed	29,313	
Sample Nonresponse Rate	0.27%	
Statewide Nonresponse Rate (Weighted)	0.18%	< 10%

The table below displays the total number and percentage of observed front seat occupants. As shown, a total of 22,903 drivers and 6,410 outboard front seat passengers were observed. These observations were compiled across 116 observation sites, except for one site for which no records occurred during the observation period, and 14 counties. Four counties had observation counts that exceeded 11 percent of all observations, Braxton (12.6 percent), Cabell (13.2 percent), Putnam (11.8 percent), and Raleigh (11.1 percent). These four counties collectively account for more than 45 percent of all observations in the state (48.6 percent).

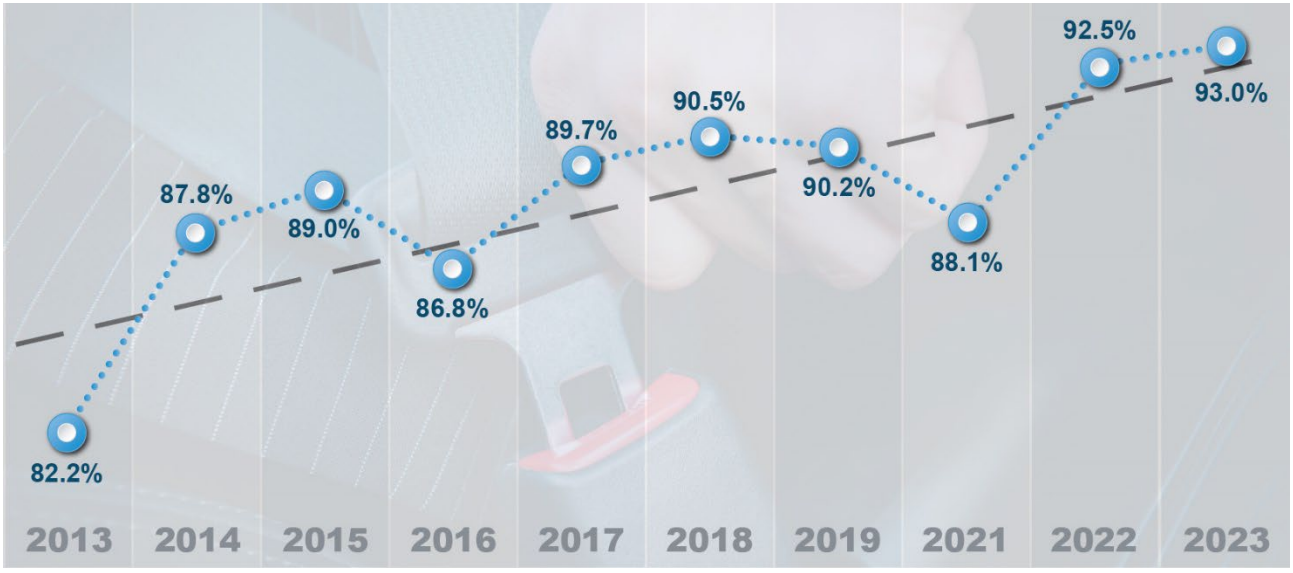
Table 2.3 Observed Rate by County

County	Drivers		Passengers		Total	
	N	%	N	%	N	%
Braxton	2,731	11.9%	955	14.9%	3,686	12.6%
Cabell	3,143	13.7%	726	11.3%	3,869	13.2%
Greenbrier	2,220	9.7%	765	11.9%	2,985	10.2%
Harrison	2,084	9.1%	547	8.5%	2,631	9.0%
Jefferson	1,827	8.0%	652	10.2%	2,479	8.5%
Lewis	1,250	5.5%	370	5.8%	1,620	5.5%
Lincoln	665	2.9%	152	2.4%	817	2.8%
Mason	938	4.1%	297	4.6%	1,235	4.2%
McDowell	328	1.4%	119	1.9%	447	1.5%
Morgan	800	3.5%	148	2.3%	948	3.2%
Putnam	2,880	12.6%	577	9.0%	3,457	11.8%
Raleigh	2,650	11.6%	592	9.2%	3,242	11.1%
Randolph	587	2.6%	133	2.1%	720	2.5%
Upshur	799	3.5%	377	5.9%	1,176	4.0%
Total	**22,903**	**100.0%**	**6,410**	**100.0%**	**29,312**	**100.0%**

Historically, over time, West Virginia has seen its weighted seat belt use rate climb. In 1992, the usage rate was at 32 percent and climbed to 49.5 percent in 2000. The rate of 93.02 percent achieved in 2023 is the highest ever observed seat belt use rate, surpassing the 2022 observed rate by half a percentage point from 92.5 percent. Figure 2.1 shows the linear trend over the last 10 years continues to move upwards, indicating the overall observed seat belt use rate continues to improve despite some historical year-over-year downturns.

Figure 2.1 Observed Seat Belt Use Rates

2013 to 2023



Source: https://cdan.nhtsa.gov/stsi.htm# and 2022 observational seat belt survey.

The percent weighted seat belt use rate for all vehicle occupants by county for 2023 is shown in Figure 2.2. Seven counties had weighted seat belt use rates above 95 percent, including Harrison, Jefferson, Lewis, Mason, Raleigh, Randolph, and Upshur. The lowest rate was observed in McDowell County with a rate of 78.8 percent (declined from 84 percent in 2022, as one of seven sites that were randomly reselected). Of the 14 counties where observations took place, 12 counties had an observed rate greater than 90 percent, equivalent to more than 85 percent.

Figure 2.2 Weighted Seat Belt Use Rate by County

2023

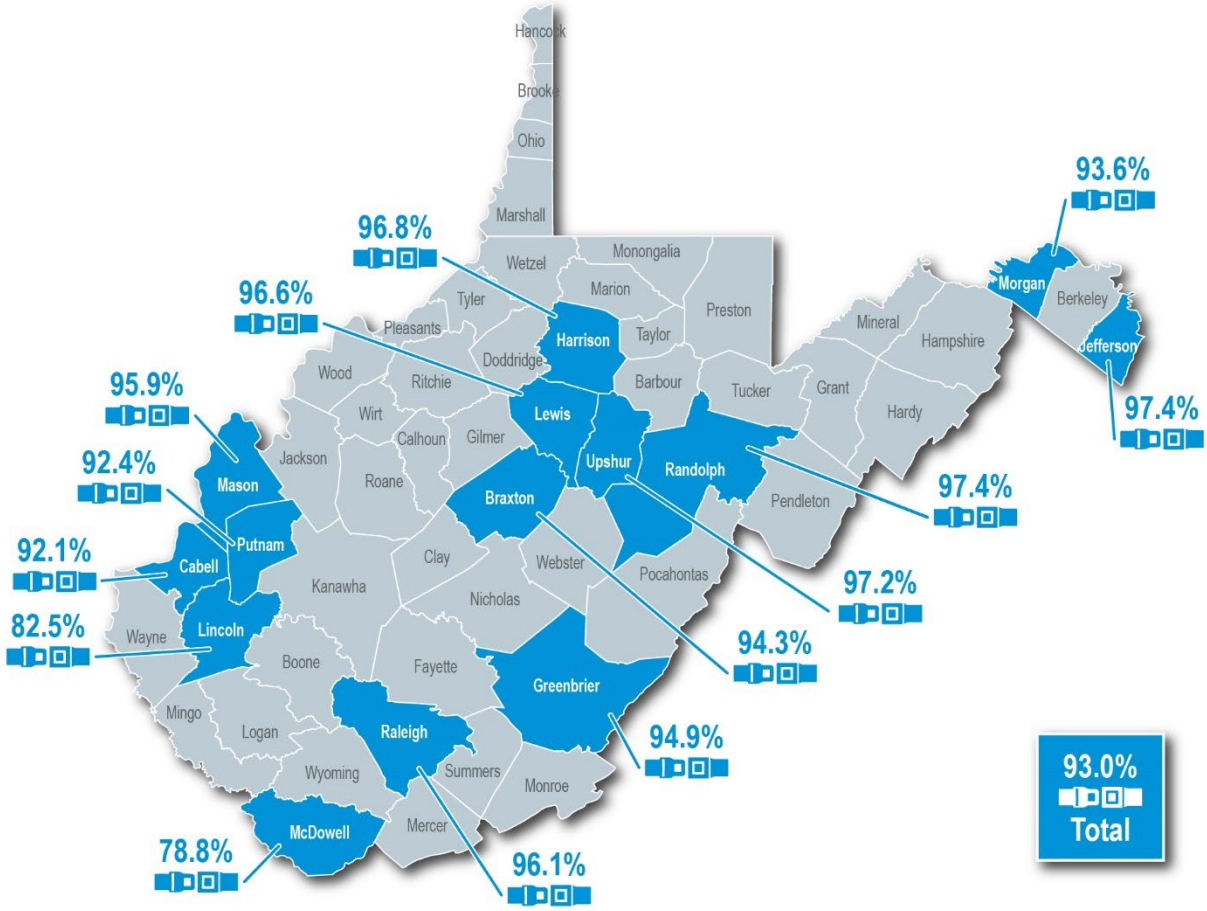


Table 2.4 displays the weighted seat belt use rate by county for 2018 to 2023. However, since new survey sites were selected in 2023, counties of the 2023 selection are shown and only the matching eight counties are included back to 2018. Of these eight counties with historical trends, three counties (Putnam, Raleigh, and Randolph) had a higher observed rate in 2023 than 2022.

Table 2.4 Select County Observed Seat Belt Rates (2018 Selection)

2018–2023

County	2018	2019	2021	2022	2023
Berkeley	91.6%	99.7%	83.9%	96.3%	
Boone	88.4%	93.1%	83.5%	85.9%	
Braxton	93.8%	92.7%	96.9%	97.2%	94.3%
Greenbrier	88.5%	94.9%	95.9%	98.7%	94.9%
Harrison	88.5%	62.2%	85.7%	99.2%	96.8%
Jackson	93.3%	90.1%	90.4%	83.9%	
Lewis	91.3%	95.8%	92.7%	99.4%	96.6%
McDowell	72.0%	80.5%	73.8%	84.0%	78.8%
Mingo	91.7%	72.1%	85.6%	85.7%	
Monongalia	95.4%	97.2%	95.5%	96.2%	
Pendleton	91.3%	98.5%	89.6%	90.9%	
Putnam	96.0%	90.5%	87.6%	89.0%	92.4%
Raleigh	92.7%	97.1%	89.0%	95.3%	96.1%
Randolph	97.0%	99.7%	88.0%	97.3%	97.4%
Total	90.5%	90.2%	88.1%	92.5%	93.0%

Table 2.5 shows the survey results for the 14 counties selected in 2023. Notably, there was a nearly 35-point gain in Harrison County from 2019 to 2023. This change falls outside the deviation that would be expected over the 2018 to 2023 period, but generally post-COVID trends were unpredictably dynamic. While only eight counties were consistent between the 2018 and 2023 selection, all but Putnam County saw increased seatbelt usage, and Putnam declined by less than 4-points to 92.4 percent.

Table 2.5 County Weighted Seat Belt Rates (2023 Selection)

2018–2023

	2018	2019	2021	2022	2023
Braxton	88.4%	92.7%	96.9%	97.2%	94.3%
Cabell					92.1%
Greenbrier	88.5%	94.9%	95.9%	98.7%	94.9%
Harrison	88.5%	62.2%	85.7%	99.2%	96.8%
Jefferson					97.4%
Lewis	91.3%	95.8%	92.7%	99.4%	96.6%
Lincoln					82.5%
Mason					95.9%

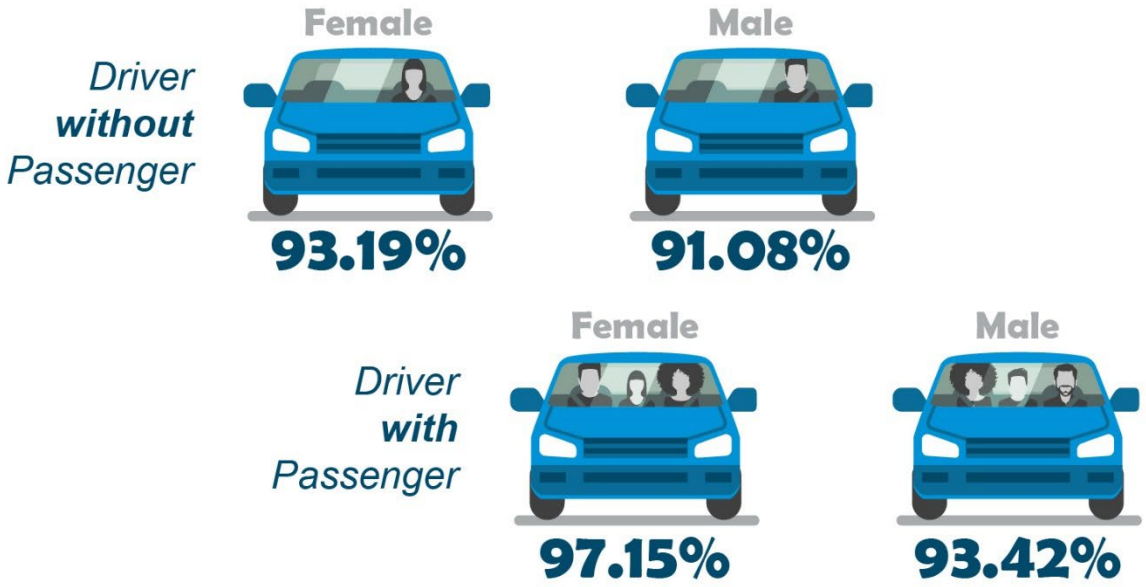
McDowell					78.8%
Morgan					93.6%
Putnam	96.0%	90.5%	87.6%	89.0%	92.4%
Raleigh	95.4%	97.1%	89.0%	95.3%	96.1%
Randolph	92.7%	99.7%	88.0%	97.3%	97.4%
Upshur					97.2%
Total	90.5%	90.2%	88.1%	92.5%	93.0%

2.1 Characteristics of Belted Drivers and Passengers

This section analyzes various characteristics of drivers and passengers and their relationships with belt use to identify variations in seat belt use by occupant, site characteristics, and vehicle type. It is anticipated this information will help to identify the conditions where 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, the observations led to some interesting findings. In the 2021 survey, male drivers had an 11.2-point higher seat belt rate with a passenger than driving alone, and female drivers had a 2.8-point higher seat belt rate with a passenger than without. In the 2022 survey, male drivers had a 4.8-point higher seat belt rate with a passenger than driving alone, and female drivers had a 1.9-point higher seat belt rate with a passenger than without. Finally, in the most recent 2023 survey, male drivers had a 2.3-point higher seat belt rate with a passenger than driving alone, and female drivers had a 4.0-point higher seat belt rate with a passenger than without. In comparing the three years of data, it appears there may be a correlation emerging that drivers, specifically males, with a passenger are more likely to be belted generally, though no statistically significant conclusions are assessed. Additionally, the 2023 survey showed, for the first time since the 2018 survey, female drivers having a higher point differential with a passenger than without, where historically the male drivers had the higher point differential. As additional years' worth of data become available, stronger conclusions and correlations may be possible.

Figure 2.3 Weighted Seat Belt Use Rate for Drivers with Passenger Versus Without



Generally speaking, male drivers were less likely to use seat belts compared to female drivers (Table 2.6). This finding is consistent with previous observational surveys in West Virginia over the past several years. Male drivers (91.3 percent) continued to be less likely to be observed wearing a seat belt in comparison to female drivers (95.5 percent). In 2023, the gap between male and female remained constant from 2022 at 4 points. Similarly, in Table 2.7, male passengers were less likely to use a seat belt (88.9 percent) compared to female passengers (97.0 percent).

Table 2.6 shows the distribution of the driver's seat belt use by gender and county in 2023. Across the 14 counties studied, the belt use rate for males (91.3 percent) was lower than females (95.5 percent). Females had a higher seat belt rate in 13 of the 14 counties. Only in McDowell County did females (74.0 percent) have a lower seat belt rate than males (78.3 percent). This disparity is likely not the result of a trend, but a low observation count resulting in a high relative proportion of non-use female drivers. Reviewing previous years' data suggests that the gender gap among drivers is not shrinking (according to 2022 data).

Table 2.6 Driver Belt Use Rates by Gender and County

	Drivers		
	Male %	Female %	Total %
Braxton	91.5%	98.7%	93.7%
Cabell	91.0%	95.7%	92.3%
Greenbrier	93.5%	96.3%	94.4%
Harrison	95.4%	98.3%	96.6%
Jefferson	96.7%	99.8%	98.0%
Lewis	95.0%	99.7%	96.5%
Lincoln	77.4%	95.2%	83.7%
Mason	94.0%	97.1%	95.3%
McDowell	78.3%	74.0%	76.9%

	Drivers		
	Male %	Female %	Total %
Morgan	93.7%	95.2%	94.2%
Putnam	91.1%	99.6%	94.6%
Raleigh	94.2%	99.0%	95.5%
Randolph	95.6%	100.0%	97.0%
Upshur	96.6%	97.3%	96.9%
Total	**91.3%**	**95.5%**	**93.0%**

The following table (Table 2.7) displays the results of seat belt use for passengers by gender and county. Similar to the results for drivers, the findings showed correlations between seat belt use of passengers by gender. Across the 14 counties studied, the belt use rate for male passengers (88.9 percent) is much less than female passengers (97.0 percent) based on the algorithm used for all sites in the same county and same road stratum weight. The largest disparity was in Lincoln County where male passengers were observed using seat belts 74.7 percent of the time compared to 100.0 percent for their female counterparts. This is likely, again, a result of statistical nuance rather than a widespread concern of 25-point differentials; though, within the passenger category, male usage of seat belts was substantially lower than female usage statewide. (According to methodology, high weight is allocated to the local roads, and in Lincoln County there were very few male passenger observations with low rates for seat belt use on local roads).

Table 2.7 Passenger Belt Use Rates by Gender and County

	Passengers		
	Male %	Female %	Total %
Braxton	89.6%	97.8%	96.0%
Cabell	76.9%	94.7%	87.6%
Greenbrier	93.9%	97.6%	96.6%
Harrison	95.1%	99.6%	98.0%
Jefferson	99.8%	94.2%	95.7%
Lewis	91.6%	100.0%	97.6%
Lincoln	74.7%	100.0%	77.6%
Mason	96.8%	99.3%	98.7%
McDowell	81.7%	86.4%	84.1%
Morgan	80.7%	96.0%	91.7%
Putnam	77.4%	99.7%	85.0%
Raleigh	97.3%	98.2%	89.2%
Randolph	95.8%	100.0%	98.7%
Upshur	98.3%	97.7%	97.7%
Total	**88.9%**	**97.0%**	**92.0%**

As with most of the nation, West Virginia saw its lowest seat belt use rate in pickup trucks (89.6 percent), followed by cars (92.9 percent), then vans (95.3 percent) and SUVs (95.6 percent) which tend to both be

similar in use rate. Geographically, the Northern region of the State saw the highest seat belt use rate (96.4 percent), followed by the Eastern Panhandle (95.5 percent), with the lowest use rate coming from the Southern region of the State (89.5 percent). These results are similar to those of last year's study (2022). A map of the State's regions can be found in Appendix A. When reviewing roadway functional class, local roadways had the lowest observed seat belt rate at 92.2 percent, followed by secondary roadways at 93.6 percent, with primary roadways showing the highest rate with 95.2 percent.

Table 2.8 Seat Belt Use Rate for Drivers and Passengers by Vehicle Type and Site Characteristics

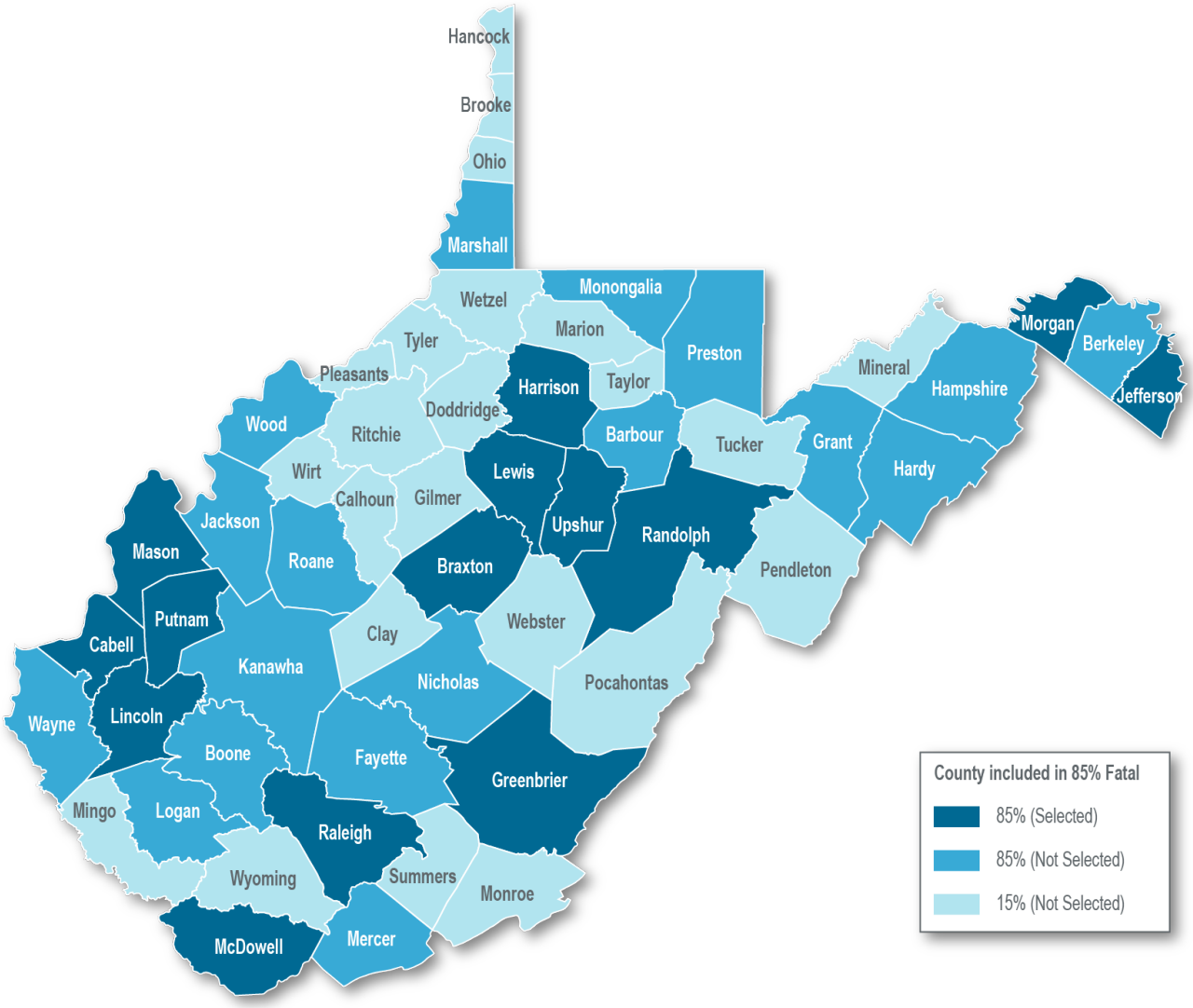
Vehicle Type and Site Characteristics	Driver	Passenger	Total
Vehicle Type			
Car	92.8%	95.7%	92.9%
Pickup Truck	90.3%	91.3%	89.6%
Van	94.0%	82.7%	95.3%
SUV	95.3%	98.1%	95.6%
Region			
Eastern Panhandle	96.1%	93.7%	95.5%
North	96.0%	97.8%	96.4%
South	89.5%	86.7%	89.5%
Functional Class			
Primary	95.0%	95.8%	95.2%
Secondary	93.0%	87.7%	93.6%
Local	93.0%	88.6%	92.2%

Cell phone use while driving is one form of distracted driving. The seat belt observers also were able to capture observed cell phone use during the survey. The table below shows the number of observations of driver cell phone use and no cell phone use and breaks it down by gender and whether a seat belt was in use. Males had an observed cell phone use of 2.1 percent, whereas females had a slightly higher observed use of 2.6 percent. Of drivers using a cell phone, 88.9 percent were using a seat belt, whereas drivers not using a cell phone were observed using a seat belt 95.0 percent of the time. This could suggest a correlation between belted drivers and being less likely to use a cell phone while driving.

Table 2.9 Observed Cell Phone Use by Gender and Seat Belt Use

	Cell Phone Use		No Cell Phone Use	
	Number	Percent	Number	Percent
Gender				
Male Driver	298	58.0%	14,220	63.7%
Female Driver	216	42.0%	8,101	36.3%
Seat Belt Use				
Use	456	88.9%	21,209	95.0%
No Use	57	11.1%	1,110	5.0%

Appendix A. Seat Belt Observational Counties and Regions



Appendix B. Seat Belt Observational Survey Site List

Site ID	Site Type	Date Observed	Sample Weight	Number of drivers	Number of front passengers	Number of occupants[1] belted	Number of occupants unbelted	Number of occupants with unknown belt use
1	Original	6/5/2023	195.9564274	525	182	697	10	0
2	Original	6/5/2023	60.89874885	287	25	307	5	0
3	Original	6/11/2023	37.94752263	513	244	703	50	4
4	Original	6/5/2023	34.33292677	362	118	475	4	1
5	Original	6/11/2023	46.79573242	557	233	735	48	7
6	Original	6/11/2023	104.6254887	32	15	42	4	1
7	Original	6/5/2023	83.38969712	18	5	21	2	0
8	Original	6/5/2023	97.01485109	358	96	451	3	0
9	Original	6/11/2023	118.8783971	18	7	22	3	0
10	Original	6/11/2023	400.7510877	61	30	82	6	3
11	Original	6/4/2023	48.71925934	94	43	122	15	0
12	Original	6/2/2023	535.2243165	223	28	237	13	1
13	Original	6/5/2023	10.78064635	291	50	321	20	0
14	Original	6/4/2023	16.43338823	163	43	192	14	0
15	Original	6/2/2023	73.94961085	243	62	273	31	1
16	Original	6/5/2023	22.69966833	265	80	304	40	1
17	Original	6/2/2023	20.95914984	447	98	523	21	1
18	Original	6/5/2023	458.5011944	557	134	649	42	0
19	Original	6/4/2023	43.30379815	473	130	562	41	0
20	Original	6/2/2023	41.1505315	271	33	278	26	0
21	Original	6/5/2023	2393.127703	90	15	94	11	0
22	Original	6/4/2023	5684.699291	26	10	34	2	0
23	Original	6/5/2023	15.02642364	253	44	284	13	0
24	Original	6/5/2023	29.28744827	238	67	297	8	0
25	Original	6/5/2023	53.86705472	223	20	238	5	0
26	Original	6/3/2023	22.83646007	403	206	582	27	0
27	Original	6/3/2023	22.11341068	175	31	199	7	0
28	Original	6/3/2023	39.43405413	368	220	562	26	0
29	Original	6/5/2023	853.6494067	26	4	30	0	0
30	Original	6/3/2023	337.8260025	100	42	131	11	0
31	Original	6/3/2023	906.7408018	326	113	385	54	0
32	Original	6/5/2023	52.57852473	108	18	122	4	0
33	Original	5/30/2023	558.9788664	484	155	622	17	0

Site ID	Site Type	Date Observed	Sample Weight	Number of drivers	Number of front passengers	Number of occupants[1] belted	Number of occupants unbelted	Number of occupants with unknown belt use
34	Original	6/1/2023	30.45702406	179	45	210	13	1
35	Original	6/1/2023	43.4503916	38	11	46	3	0
36	Original	6/1/2023	33.123556	200	55	240	15	0
37	Original	5/30/2023	33.41574168	193	44	232	5	0
38	Original	6/1/2023	18.96670035	201	52	237	16	0
39	Original	6/1/2023	310.9369491	195	43	228	10	0
40	Original	5/30/2023	210.2922716	230	44	268	6	0
41	Original	5/30/2023	465.8961893	161	23	180	4	0
42	Original	5/30/2023	72.60691844	203	75	273	5	0
43	Original	6/4/2023	11.48978261	75	37	105	6	1
44	Original	6/2/2023	10.72853306	83	22	94	11	0
45	Original	6/2/2023	21.88368349	88	21	100	9	0
46	Original	6/2/2023	14.07645263	106	28	123	11	0
47	Original	6/4/2023	14.85136257	76	32	103	4	1
48	Original	6/4/2023	3.488506515	51	18	68	1	0
49	Original	6/2/2023	34.76682081	166	14	173	7	0
50	Original	6/3/2023	363.2157598	194	81	265	10	0
51	Original	6/3/2023	88.229718	78	30	105	2	1
52	Original	6/4/2023	685.8462661	874	354	1206	19	3
53	Original	6/3/2023	728.9352297	28	11	37	2	0
54	Original	6/3/2023	3605.572051	8	4	12	0	0
55	Original	6/2/2023	8.184947767	224	68	278	14	0
56	Original	6/3/2023	53.0863417	88	39	122	5	0
57	Original	6/3/2023	37.24591211	41	15	55	1	0
58	Original	6/3/2023	28.35346222	51	15	66	0	0
59	Original	6/2/2023	4.066083095	122	35	153	4	0
60	Original	6/2/2023	6.896019428	260	59	316	3	0
61	Original	6/2/2023	37.87959928	114	21	131	4	0
62	Original	6/3/2023	227.6250028	87	37	121	3	0
63	Original	6/3/2023	260.5972796	54	24	72	6	0
64	Original	6/2/2023	353.9821505	209	57	258	8	0
65	Original	5/31/2023	719.4532903	95	22	104	6	7
66	Original	6/9/2023	229.1065587	159	35	168	18	8
67	Original	5/31/2023	130.2891788	227	52	248	21	10
68	Original	5/31/2023	108.2630155	70	17	73	9	5
69	Original	6/9/2023	330.0919732	14	4	14	4	0

Site ID	Site Type	Date Observed	Sample Weight	Number of drivers	Number of front passengers	Number of occupants[1] belted	Number of occupants unbelted	Number of occupants with unknown belt use
70	Original	6/9/2023	264.6671452	100	22	102	17	3
71	Original	6/1/2023	174.8482841	84	27	63	48	0
72	Original	6/1/2023	320.4090778	43	17	57	3	0
73	Original	6/1/2023	719.5819402	159	61	167	53	0
74	Original	6/1/2023	237.0728389	42	14	49	7	0
75	Original	6/3/2023	109.2376466	56	10	60	6	0
76	Original	6/3/2023	209.5423842	223	80	291	12	0
77	Original	6/3/2023	93.9091008	303	96	393	6	0
78	Original	6/3/2023	3451.559604	356	111	458	9	0
79	Original	6/6/2023	66.8101227	230	42	254	18	0
80	Original	6/5/2023	485.4152616	178	33	198	13	0
81	Original	6/5/2023	25.86542665	93	21	108	6	0
82	Original	6/5/2023	196.3331486	59	13	67	5	0
83	Original	6/6/2023	418.0663179	65	16	76	5	0
84	Original	6/6/2023	616.3109402	175	23	185	13	0
85	Original	6/1/2023	13.41230106	484	105	556	31	2
86	Original	6/1/2023	12.42833201	460	104	532	32	0
87	Original	5/30/2023	18.62641562	384	67	437	12	2
88	Original	5/31/2023	25.64277389	272	47	302	16	1
89	Original	5/31/2023	23.07991276	123	21	121	19	4
90	Original	5/31/2023	58.33467318	411	103	498	14	2
91	Original	6/1/2023	231.5053769	157	31	167	18	3
92	Original	5/31/2023	35.86192863	97	11	104	4	0
93	Original	5/30/2023	53.79682324	147	25	167	4	1
94	Original	5/30/2023	553.0141789	283	56	332	7	0
95	Original	6/1/2023	2885.644783	11	3	12	2	0
96	Original	5/30/2023	1364.37114	52	4	55	1	0
97	Original	6/4/2023	130.5563237	166	38	196	8	0
98	Original	6/4/2023	39.37387119	297	39	324	12	0
99	Original	6/1/2023	60.39972088	317	83	386	14	0
100	Original	6/4/2023	160.3226461	130	16	142	4	0
101	Original	6/1/2023	138.3297619	271	78	334	14	1
102	Original	6/1/2023	122.206824	325	92	393	22	2
103	Original	6/1/2023	206.9952513	333	65	369	28	1
104	Original	6/2/2023	452.5408631	204	44	232	16	0
105	Original	6/2/2023	142.4885108	115	33	144	4	0

Site ID	Site Type	Date Observed	Sample Weight	Number of drivers	Number of front passengers	Number of occupants[1] belted	Number of occupants unbelted	Number of occupants with unknown belt use
106	Original	6/2/2023	126.1758151	234	50	272	12	0
107	Original	6/2/2023	3262.18082	17	5	21	1	0
108	Original	6/4/2023	3833.033079	241	49	281	9	0
109	Original	6/1/2023	57.05588572	119	45	160	4	0
110	Original	6/1/2023	33.91695113	78	19	92	5	0
111	Original	6/1/2023	33.0675239	105	35	138	2	0
112	Original	6/1/2023	327.7963074	285	34	314	5	0
113	Original	6/4/2023	48.42695075	146	63	203	6	0
114	Original	6/4/2023	50.14197877	65	26	86	5	0
115	Original	6/4/2023	344.5322152	305	144	441	8	0
116	Original	6/4/2023	44.56608907	283	144	422	5	0
Total				**22,903**	**6,410**	**27,821**	**1,413**	**79**

[1] Occupants refer to both drivers and passengers.

Appendix C. Observational Survey Collection Form