

2018 NEW MEXICO OCCUPANT SEAT BELT OBSERVATION STUDY

DAYTIME AND
NIGHTTIME SURVEYS

STATE OF NEW MEXICO
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New Mexico DEPARTMENT OF
TRANSPORTATION
MOBILITY FOR EVERYONE



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NIGHTTIME SURVEYS

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**New Mexico's
2018 seat belt
use rate is
90.2%.**

Executive Summary

Report Organization

This report summarizes the results of New Mexico's 2018 Occupant Seat Belt Observation Study providing daytime and nighttime seat belt observation results. Recommendations based on the findings are presented. Appendices are given at the end of the report.

2018 New Mexico Occupant Seat Belt Observation Survey (Daytime)

The purpose of the study is to provide a statewide estimate of daytime seat belt use using a NHTSA-approved sampling design. New Mexico's safety belt observation methodology has evolved considerably since the first surveys conducted in 1982. The current report will show seat belt results from 2005 to present.

In 2018 the road segments used for New Mexico's statewide seat belt survey were resampled to be consistent with federal regulations which require a resampling of sites every five years. The sites were selected in a manner identical to that described in the approved survey design (created in 2013), but using updated data. Thus, observations for the 2018 survey occurred at brand new sites which are different from the sites used for the 2013 through 2017 surveys.

Road segments from 19 of New Mexico's 33 counties (accounting for at least 85% of passenger vehicle crash-related fatalities) were sampled for inclusion in the survey (identical to those observed in 2015 and

2016). A total of 94 segments were observed with 28 on Primary highways and 33 each on Secondary and Local roads. All passenger vehicles (cars, pickups, vans and SUVs) with a gross vehicle weight up to 10,000 pounds were observed in the survey including small commercial vehicles. The target population was all drivers and right front seat passengers (excluding middle passengers) of vehicles traveling on public roads between the hours of 7 AM and 6 PM. The observation period for each selected road segment was 20 minutes.

Quality control measures enacted during the study included: Ensuring qualified individuals conducted the observations; Increasing efficiency and minimizing travel costs by assigning sites within relatively close geographic proximity; Mandating that quality control monitors make random, unannounced visits to at least 5% of the observation sites to evaluate the observers' performance from a distance (when possible) and then to work alongside observers.

Pre- and post-Click It Or Ticket (CIOT) campaign data collection and the number of vehicles, total occupants, drivers and passengers observed are noted below.

	Vehicles	Occupants	Drivers	Passengers
2018 Pre-Campaign	3,821	4,946	3,821	1,125
2018 Post-Campaign	4,060	5,158	4,060	1,098

Daytime data collection efforts for the 2018 New Mexico Occupant Seat Belt Observation Survey included a pre-campaign measure conducted from April 7 through April 21, 2018 and a post-campaign measure conducted between May 27 and June 20, 2018. Four observers gathered observation data for both periods.

The weighted seat belt use rate for 2018 is 90.2%. The use rate for 2017 was 91.5%. Although the percentage point difference (-1.3) appears large, the difference is not significant. The total number of observations in 2018 was lower than in previous years, adding some noise to the data. The 2017 and 2018 confidence intervals show a large amount of overlap, thus indicating no significant change.

Analyses were also conducted using weighted data to explore pre- to post-campaign program changes in daytime belt use for 2018. New Mexico drivers and front outboard passengers had a seat belt use rate of 90.2% during the pre-campaign measure and 90.2% post-campaign measure. The rates were unchanged from pre- to post-campaign. Unweighted data were used for all remaining analyses.

Driver belt use showed no significant change from pre-campaign (89.8%) to post-campaign (90.5%). The small decrease in passenger use (90.9% pre-campaign to 90.6% post-campaign) was not significant. Pickup Truck seat belt use increased slightly, but not significantly, from pre- to post-campaign (88.1% and 88.5%, respectively). Car/Van/SUV seat belt use increased slightly, but not significantly, from pre- to post-campaign (91.0% to 91.6%, respectively). Road stratification analyses showed small increases from pre- to post-CIOT, none of which were significant. Primary road belt use increased slightly from 91.5% to 92.1%; Secondary road belt use remained fairly stable (89.7% and 89.8%, pre to post); and Local road belt use increased from 87.4% (pre-campaign) to 88.5% (post-campaign).

The difference between Car/Van/SUV Driver and Pickup Truck Driver seat belt use post-campaign measures (91.6% and 88.3%, respectively) is not statistically significant. The difference between Car/Van/SUV Passenger belt use (91.4%) and Pickup Truck Passenger belt use (89.0%) was not significant.

During the study, 2,341 occupants were observed on Primary roads, 1,611 occupants were observed on Secondary roads, and 1,206 occupants were observed on Local roads. Primary roads had the highest seat belt usage rates at 92.1%. Secondary roads (89.8%) and Local roads (88.5%) showed lower use rates.

Daytime seat belt use in New Mexico dropped to just above 90% for the first time in many years. One hypothesis about what might be contributing to the decrease in use is that an oversampling of rural sites likely occurred for the 2018 resampling. This is because the method used to sample sites in New Mexico is based primarily on the length of road segments. In fact, more rural occupants were present in this year's survey compared to 2017 (from 877 or 10% of occupants in 2017 to 1,206 or 23% of occupants in 2018). This also resulted in a drop in the number of total observations likely due to lower traffic volume on rural roads.

The State may wish to consider redrawing sites again prior to the 2019 survey using the approved design or explore a full redesign. It may be that sampling based on a measure of traffic volume, versus the current length of roadway, will result in a "better" representation of actual traffic flow in the State.

On a positive note, most categories showed small increases in belt use from pre- to post-campaign, albeit not significant. Primary road users show consistently high belt use rates (over 90% belted) and showed a slight increase from pre- (91.5%) to post-campaign (92.1%). Whereas Secondary road users showed no change from pre- to post-campaign measures (89.7%), belt use rates on Local roads did show a slight increase in use (from 87.4% pre-campaign to 88.5% post-campaign). Although these differences were not significant, they are encouraging. Some subgroups (i.e. local roads, pickup truck occupants) with substantially lower use rates could be targets for future programmatic and campaign efforts.

A nighttime photograph of a busy highway. In the foreground, a red SUV is visible on the left side of the road. Further down the road, several other vehicles are traveling in both directions. The background features a large, rugged mountain range under a dark blue sky. Streetlights and the lights of buildings, including a 'DISCOUNT TIRE' store, are visible along the roadside.

2018 New Mexico Occupant Seat Belt Observation Survey (Nighttime)

The fourth New Mexico Nighttime Occupant Seat Belt Observation Study occurred in 2018. This study provides a statewide estimate of seat belt use for night drivers using a sub-sample of the same 94 sites examined as part of the NHTSA-approved sampling design for daytime belt use in 2017. A resample of sites conducted in 2018 for daytime sites will be used for the selection of night time sites for 2019.

Safer New Mexico Now (Safer) and Preusser Research Group (PRG) observers partnered to conduct the nighttime survey for adults in front seat outboard positions using night vision equipment when needed.

The same vehicle and driver characteristics used to select vehicles for daytime observation were used in night observations, but a few changes were made to the protocol to facilitate nighttime data collection. Observations were made for vehicles traveling on public roads between the hours of 9 PM and 2 AM. The observation period for each selected road segment was 45 minutes. The road segments remained the same, though the observer was permitted to adjust the location for vantage point in case of unsafe conditions and/or lighting conditions.

Observations at night were always conducted by a two-person team with one person acting as the observer and the other documenting the observation data as verbalized by the observer. Attempts were made to conduct night observations in locations with adequate overhead lighting when possible. Observers only used night vision equipment when roadway lighting was insufficient to make natural observations.

Data collection for the 2018 New Mexico Nighttime Occupant Seat Belt Observation Survey was conducted from July 20, 2018 to July 25, 2018. Six observers gathered observation data over the 2018 study period with 1,261 vehicles observed and belt use noted for 1,735 occupants.

Shoulder belt use status was observed and recorded on 1,735 front seat occupants, including 1,261 drivers and 474 passengers. New Mexico nighttime drivers and front outboard passengers had a combined unweighted seat belt use of 85.6%. Driver usage was recorded at 85.7% and front seat outboard passenger usage at 85.2%.

Shoulder belt use status in Cars/Van/SUV categories were observed and recorded on 1,414 front seat occupants, including 1,020 drivers and 394 passengers. Drivers accounted for 72.1% of persons observed. Nighttime drivers and front outboard passengers in these vehicle categories had a combined seat belt use of 86.8%. Driver usage was recorded at 87.2% and front seat outboard passenger usage at 85.8%.

Shoulder belt use status in the Pickup category was observed and recorded on 321 front seat occupants, including 241 drivers and 80 passengers. Nighttime

drivers and front outboard passengers in this vehicle category had a combined seat belt use of 80.4%. Pickup Truck Driver use was recorded at 79.7% and front passenger seat belt use was recorded at 82.5%.

During the 2018 nighttime surveying period, 1,075 occupants were observed on Primary roads, 297 occupants were observed on Secondary roads, and 363 occupants were observed on Local roads. Approximately 1,400 of the vehicles observed fell into the Car/Van/SUV categories (1,414) and 321 trucks were observed. Secondary roads had the highest nighttime seat belt usage at 88.6%, followed by Primary roads at 86.3%. The lowest percentage of seat belt usage was observed on Local roads at 81.0%.

Night belt observations from 2015 to 2018 took place one to two months following implementation of the CIOT high visibility enforcement campaign. A 2.2 percentage point reduction in use was observed from 2016 to 2017, followed by a two percentage point reduction again from 2017 to 2018. This should be explored further. As with daytime belt use, pickup truck drivers demonstrate lower nighttime belt use. These should be considered important populations to target.





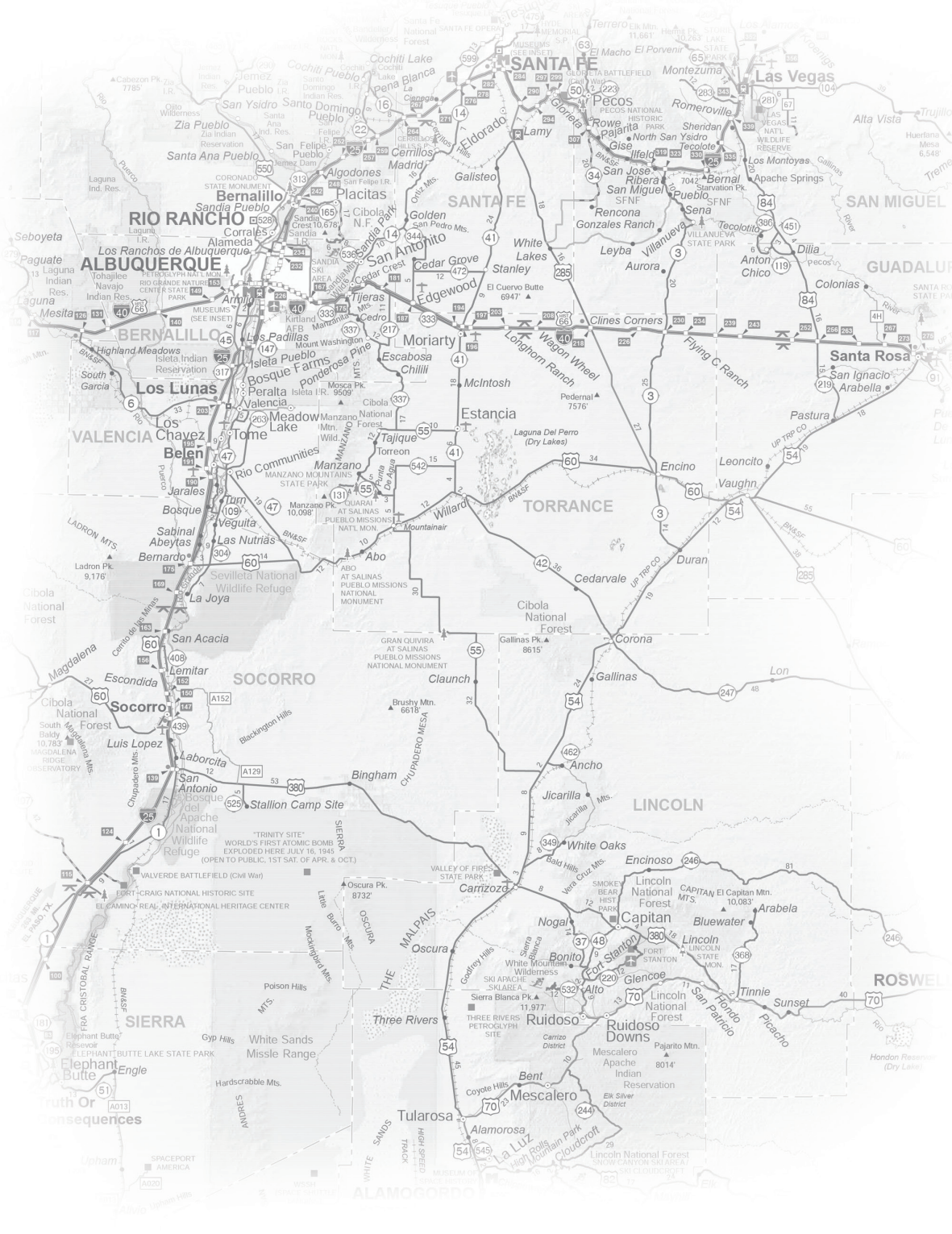
Recommendations

New Mexico's decline in seat belt use rate should be explored more deeply. With a third year of decline, New Mexico's rate is now just barely above the 90% rate.

One hypothesis about what might be contributing to the decrease in use is that an oversampling of rural sites likely occurred for the 2018 resampling. This is because the method used to sample sites in New Mexico is based primarily on the length of road segments. The State may wish to consider redrawing sites again prior to the 2019 survey using the approved design or explore a full redesign. It may be that sampling based on a measure of traffic volume, versus the current length of roadway, will result in a "better" representation of actual traffic flow in the State. The use of rural sites also leads to an overall lower number of observations in 2018, likely causing higher variability, as reflected in the large confidence intervals obtained.

Timely and effective programming should be undertaken to maintain but optimally increase the use rate in the State. The drop, albeit not significant, may also be a function of the re-sampling and use of new sites for 2018. It might also be advisable to identify whether programming changes from 2015 to 2018 (type or intensity of media, enforcement, etc.) might be contributing to the belt use decline. High visibility enforcement in particular is generally considered to be the best means for achieving increases in belt use. Enforcement rates are declining in much of the country.

As with previous years, there are areas deserving of extra efforts to continue to make New Mexico roads safer. Particularly, drivers of pickup trucks and drivers on local roads have the lowest daytime seat belt use rates. In addition, findings from the nighttime study showed lower belt use for the same subgroups of vehicles and road types compared to their corresponding daytime seat belt use rates.





Report Organization

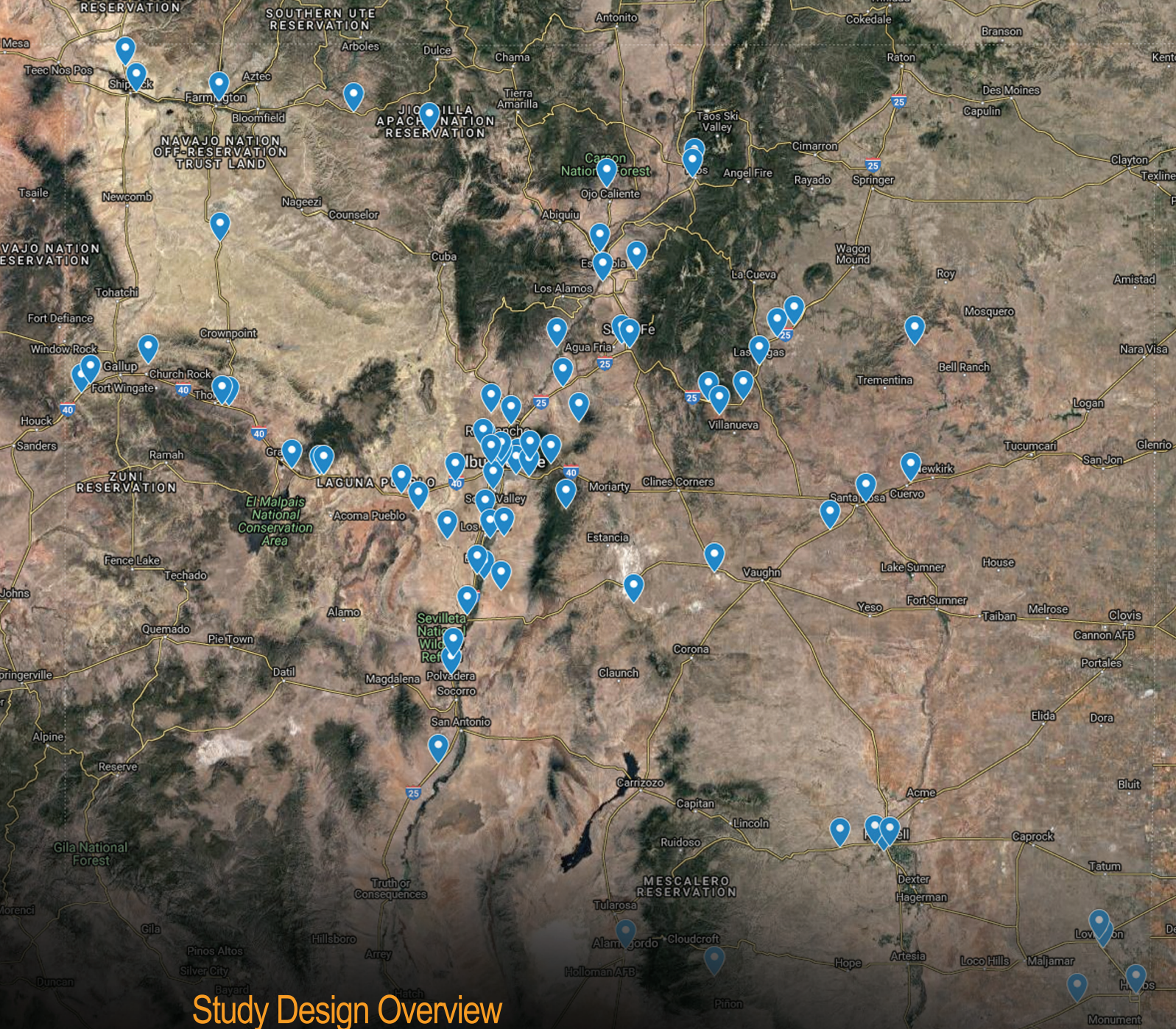
This report summarizes the results of the 2018 New Mexico Occupant Seat Belt Observation Survey conducted since 1982. It continues the presentation of nighttime observation data which began in 2015. Both the daytime and nighttime surveys have a section in the report with seven subsections: 1) Study Purpose; 2) Study Design Overview; 3) Sampling; 4) Observer Selection, Training, and On-site Procedures; 5) Data Collection and Analysis; 6) Results; and 7) Discussion. A section for recommendations presents findings based on both surveys. Appendices included at the end of the report include weighting methodology and the day and night observation forms.

2018 New Mexico Occupant Seat Belt Observation Survey (Daytime)

Study Purpose

The purpose of this study is to use a NHTSA-approved sampling design to provide the State of New Mexico with a statewide estimate of seat belt use. In 2018, the road segments used for New Mexico's statewide seat belt survey were resampled to be consistent with federal regulations which require a resampling of sites every five years. The sites were selected in a manner identical to that described in the approved survey design (created in 2013), but using updated data. Thus, observations for the 2018 survey occurred at brand new sites which are different from the sites used for the 2013 through 2017 surveys.

Sites were selected based on weighted random probability assessment of road segments from 19 New Mexico counties. These counties contained 85% of all motor vehicle occupant fatalities over the past several years (at the time of survey design). Preusser Research Group was contracted by the New Mexico Department of Transportation (NMDOT), Traffic Safety Division (TSD) to conduct the 2018 New Mexico Occupant Seat Belt Observation Study. Observers from the local organization Safer New Mexico Now provided Preusser Research Group with local personnel who surveyed seat belt use for front seat outboard positions at 94 sites for both a pre- and post-campaign measure.



Study Design Overview

A number of research designs have been implemented since law implementation in 1982. The National Highway Traffic Safety Administration's (NHTSA) 2011 issuance of new Uniform Criteria for State Observational Surveys of Seat Belt Use resulted in new approved design being implemented for the seat belt survey years of 2012-2017.

A resample of sites was used for 2018 as mandated by NHTSA following the same site selection criteria as the previous design. Road segments from 19 of New Mexico's 33 counties (accounting for at least 85% of passenger vehicle crash-related fatalities) were sampled for inclusion in the survey. The road segments were divided into Primary, Secondary or Local road classifications for stratification and sampling selection. Because this was the first year of resample, several sites that were selected as primary sites were replaced with spares. Replacement occurred for sites on unpaved roadways, dead ends, and tribal lands among others. Five of the sites had zero cars observed at them.

The target population included all drivers and right front seat passengers (excluding middle passengers) of vehicles traveling on public roads between the hours of 7 AM and 6 PM. All passenger vehicles (cars, pickup trucks, vans and SUVs) with a gross vehicle weight up to 10,000 pounds were observed in the survey. Observations included small commercial vehicles. The observation period for each selected road segment was twenty minutes. The road segments vary in length, permitting the observer to adjust for vantage point in case of unsafe conditions at the usual observation location. Data collection was conducted by trained observers, many who participated in previous seat belt surveys. Data were entered and analyzed by Preusser Research Group.

Sampling

As new redesigns were implemented over the years, the sampling segments that were used varied for the annual rates calculated and reported in this document. There was a new design in 2012 which was revised in 2013 and the current survey sites were resampled (as required by federal regulation) using the design developed in 2013.

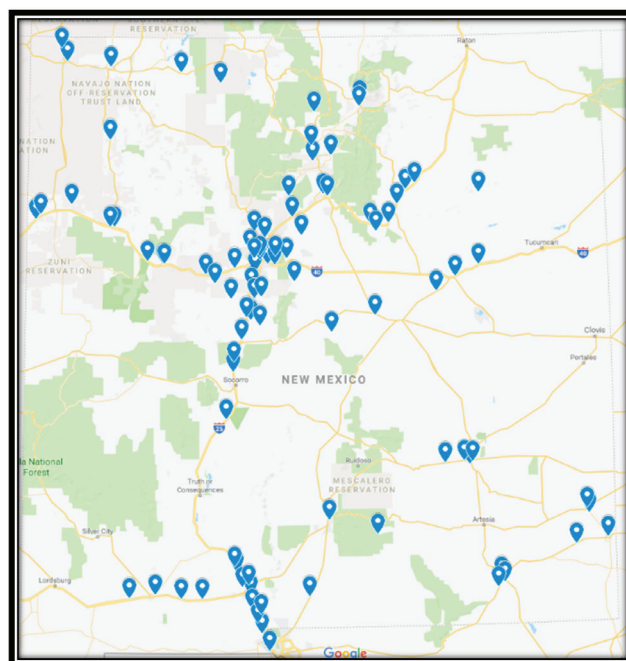
For the 2012 survey, a file of road segments was obtained from NHTSA containing 2010 TIGER data developed by the U.S. Census Bureau. These segments are classified by the U.S. Census Bureau using the MAF/TIGER Feature Class Code (MTFCC) with the three main classifications of primary roads, secondary roads and local roads. Road segment listings in the file included those designations along with specified segment lengths as determined by TIGER. This descriptive information allowed for stratification of road segments by MTFCC. A systematic probability proportional to size (PPS) sampling (with no certainty sites) was employed to then select the road segments to be used as observation sites. These were used for the data collection years of 2012 to current.

A year after the resample changes described above were made, the number of road segments selected and the number of vehicles observed were also revised. The same 108 road segments had been used for seat belt observations from 1998 through 2012. This was reduced to 94 segments in 2013 with 28 on Primary highways and 33 each on Secondary and Local roads. These reductions were structured to most effectively manage

resources while also meeting the NHTSA-required standard error rate of 2.5% or less. Additional data collection may be scheduled in instances where the standard error rates exceed required levels. Exclusion options were exercised to remove aberrant locations such as rural roads in non-MSA counties, non-public roads, unnamed roads, unpaved roads, vehicular trails, access ramps, cul-de-sacs, traffic circles, and service drives.

When any of these selected road segments become permanently unavailable, a reserve road segment is used. The reserve road segment sample consists of an additional 20% of road segments per MTFCC. More detailed information about the sampling methodology can be found in the Appendix of the 2014 report (Davis, Pearce & Logstead, 2014).

The same method described for the 2013 redesign was used to sample new sites for the 2018 survey. The distribution of sites across roadway type remained consistent. The end result was new sites observed that differed from those that were in use from 2013 through 2017.



Observer Selection, Training, and On-site Procedures

Qualified individuals meeting New Mexico-established criteria conducted the observations. A three-hour refresher training was held. Practice surveys were completed and checks for inter-observer consistency were performed.

Maps showing the location of all observation sites and Site Assignment Sheets were provided to the observers. 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 are assigned as data collection clusters to minimize travel costs.

During the site survey, the observer:

- Observed as many lanes of traffic as could be comfortably monitored while obtaining data on 99% of the vehicles;
- Observed only one predetermined direction of traffic (the opposite direction could be used and noted if sunshine in the eyes or other factors hampered observation);
- Observed all passenger vehicles, including commercial vehicles weighing less than 10,000 pounds;
- Recorded seat belt use by both drivers and right front seat occupants, including children riding in booster seats.

All observers used audio recorders to record observations when observing in high traffic volume segments and then transcribed them to the 2018 NMDOT Seat Belt Observation Form. Observers marked the forms directly during observation periods in low volume areas. Observers recorded belt use by marking the form appropriately for each person in each vehicle, with no marks made for absent passengers. A seat belt observation form was provided for entry (Appendix I). Occupants were recorded as:

- Belted if the shoulder belt was in front of the person's shoulder;
- Unbelted if the shoulder belt was not in front of the person's shoulder;
- Unknown if it could not reasonably be determined whether the driver or right front passenger was belted.

Quality control monitors made random, unannounced visits to at least 5% of the observation sites. During these visits, the quality control monitor evaluated the observer's performance from a distance (if possible), and then worked alongside the observer. The quality control monitor ensured that the observer was following all survey protocols including: arriving on time at assigned sites, completing the cover sheet and observation forms, and making accurate observations of seat belt use. The quality control monitor prepares site visit reports highlighting any problems with data collection site locations and observer performance. The quality control monitor also serves as a point of contact during the data collection should the observers have a question arising during this time.



Data Collection and Analysis

Daytime data collection efforts for the 2018 New Mexico Occupant Seat Belt Observation Survey included a pre-measure conducted from April 7 through April 21, 2018 and a post-measure conducted between May 27 and June 20, 2018. Four observers gathered observation data. Completed observation data forms were sent to Preusser Research Group for data entry using Excel and/or SPSS. Data cleaning procedures were performed included 10% entry checks to assess entry accuracy across all data entry forms completed and variable frequency counts to identify ineligible entry values or outliers.

Results

During the pre-measure, shoulder belt use was observed and recorded on 4,946 front seat occupants including 3,821 drivers and 1,125 passengers. Drivers accounted for 77.3% of persons observed with passengers accounting for 22.7%. For the post-measure, shoulder belt use status was observed and recorded on 5,158 front seat occupants, including 4,060 drivers and 1,098 passengers. Drivers accounted for 78.7% of persons observed and passengers accounted for 21.3% of persons observed.

A total of 42 observations (less than 1%) of the entire observation sample for both waves combined were marked as seat belt use “unknown.” These cases were removed for weighting and analysis, but the overall numbers were well within allowable targeted observation limits therefore no sites needed to be re-observed.

The total number of vehicles and occupants observed for 2005 to 2018 post measures are presented in Table 1. (Reduced numbers of vehicles and occupants observed beginning in 2013 came as a result of a study design change.)

TABLE 1
Vehicles and
Occupants
Observed in
Official Seat Belt
Surveys,
New Mexico,
2005-2018

	2005	2006	2007	2008	2009
Number of Observers	5	5	5	5	4
Total Vehicles Observed	15,540	15,362	15,085	15,153	14,756
Total Occupants Observed	18,378	17,836	17,593	17,525	17,314

	2010	2011	2012	2013	2014
Number of Observers	4	4	4	3	3
Total Vehicles Observed	14,977	14,531	14,059	5,215	3,870
Total Occupants Observed	17,411	16,588	16,151	6,874	5,013

	2015	2016	2017	2018
Number of Observers	4	4	4	4
Total Vehicles Observed	6,540	6,660	6,780	4,060
Total Occupants Observed	8,449	8,530	8,642	5,158

Overall and Pre to Post Weighted Daytime Seat Belt Use

Analyses were conducted to explore pre to post program changes in daytime belt use for 2018. The official daytime use rate for New Mexico was 90.2%, compared to 91.5% in 2017. The percentage point difference (-1.3) is not significant. The total number of observations in 2018 was lower than in previous years, thus adding noise to the data which may result in large confidence intervals. The 2017 and 2018 confidence intervals show a large amount of overlap, thus indicating no significant change. Although not statistically significant, the drop is meaningful and should be further examined. Analyses were also conducted using weighted data to explore pre- to post-program changes in daytime belt use for 2018. New Mexico Drivers and front outboard Passengers had a seat belt use rate of 90.2% during the pre-measure -- unchanged from the post program rate. All remaining analyses on belt use data are with unweighted data.

Categories of Daytime Seat Belt Use (Raw Data)

Pre to post analyses were conducted to identify changes in belt use during the campaign while trend analyses were used to identify trends in belt use data going back to 2005. Tables 2A and 2B show the Driver, Passenger and combined occupant seat belt use rates gathered during the pre and post measures in 2018.

For the pre measure, New Mexico drivers had unweighted seat belt use rate of 89.8%. Belt use rate increased to 90.5% post-measure (not significant). Passenger belt use showed a slight (non-significant) decrease in belt use from 90.9% (pre) to 90.6% (post).

TABLE 2A Pre-Enforcement Seat Belt Use 2018	Type of Vehicle	Number of Occupants Observed (PRE)	Seat Belt Use Percent (PRE)
	Car/Van/SUVs (all)	3,393	91.0%
	Driver	2,619	90.8%
	Passenger	774	91.9%
	Pickup Trucks (all)	1,553	88.1%
	Driver	1,202	87.9%
	Passenger	351	88.9%
	All Vehicles (all)	4,946	90.1%
	Driver	3,821	89.8%
	Passenger	1,125	90.9%

TABLE 2B
Post-
Enforcement
Seat Belt Use
2018

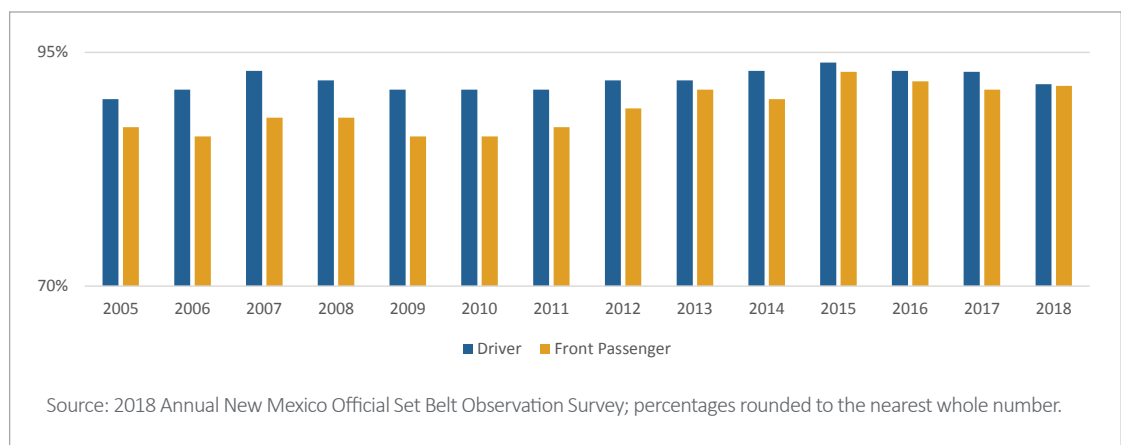
Type of Vehicle	Number of Occupants Observed (POST)	Seat Belt Use Percent (POST)
Car/Van/SUVs (all)	3,443	91.6%
Driver	2,698	91.6%
Passenger	745	91.4%
Pickup Trucks (all)	1,715	88.5%
Driver	1,362	88.3%
Passenger	353	89.0%
All Vehicles (all)	5,158	90.5%
Driver	4,060	90.5%
Passenger	1,098	90.6%

Changes pre to post belt use by vehicle type (Car, Truck, Van and SUV) and road type (Primary, Secondary, and Local Roads) were also examined. Two vehicle categories were created, one which included pickup trucks only and one with cars, SUVs and vans combined. The isolation of pickup trucks as its own category was due to the existence of previous analyses demonstrating that pickup trucks lag behind the other three vehicle types in seat belt use.

Pickup truck seat belt use remained relatively constant from pre to post (88.1% and 88.5% respectively) and did not show a significant change. Car/Van/SUV seat belt use showed a small (non-significant) increase from pre to post (91.0% and 91.6%, respectively). The three road types were analyzed separately for pre to post changes in belt use. Primary road belt use increased slightly (non-significant) from 91.5% to 92.1%. Secondary road belt use remained stable from pre to post (89.7% to 89.8%, respectively – not significant). Local road belt use increased slightly from 87.4% to 88.5% (not significant).

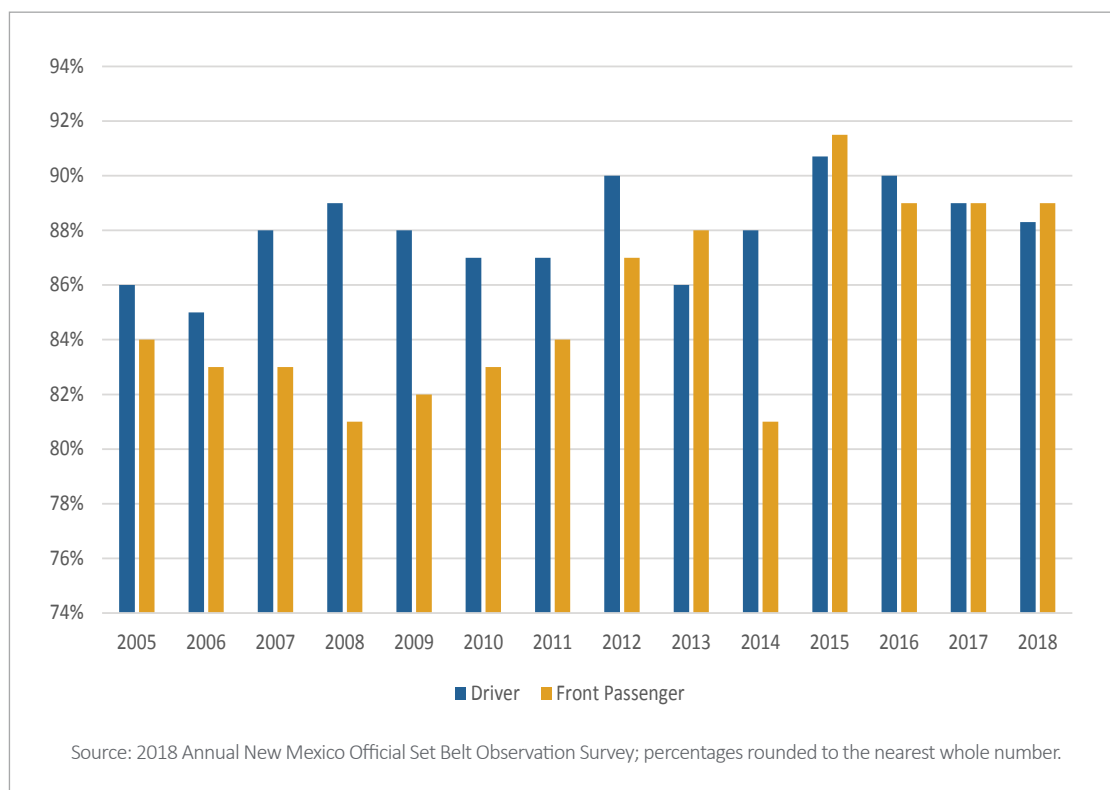
Trend assessments of daytime seat belt use post campaign showed that Driver and Passenger belt use rates by vehicle type has fluctuated slightly in recent years. As shown by Figure 1, observed Car/Van/SUV driver seat belt use rates reached a peak of 94% in 2015 and decreased slightly to 93% in 2016 and 2017. The 2018 rate decreased further to 92%. Passenger use showed a positive trend from 2010 to 2015 (peaking at 93%), and decreased slightly to 92% in 2016 and 91% in 2017 and 2018.

FIGURE 1
Observed
Car/Van/SUV
Seat Belt Use,
New Mexico,
2005-2018



Pickup driver seat belt use measured in 2018 was recorded at 88.3% compared to Car/SUV/Van driver use of 91.6% (not significant). Pickup truck passenger use (89.0%) was not significantly different than non-pickup truck passenger use (91.4%). Figure 2 shows fluctuations in pickup truck driver belt use. It reached a peak of 91% in 2015 followed by a decreasing trend since (90% in 2016, 89% in 2017 and 88% in 2018). Pickup truck passenger seat belt use shows a more continuous rising trend from 2008 through 2013, with a steep drop off in 2014 but a recovery and increase to 92% belt use for 2015. Since then, pickup truck passenger belt use has remained stable at 89%.

FIGURE 2
Official
Observed
Pickup Truck
Seat Belt Use,
New Mexico,
2005-2018



Road class differences in observed seat belt use were also explored. During the 2018 New Mexico Occupant Seat Belt Observation Study, 2,341 occupants were observed on Primary roads, 1,611 occupants were observed on Secondary roads, and 1,206 occupants were observed on Local roads. Most vehicles observed fell into the Car/Van/SUV categories (3,443) and 1,715 trucks were observed.

Table 3 provides counts of the numbers of vehicles observed by road classification and vehicle type. Figure 3 illustrates observed seat belt use for Car/Van/SUV belt use and pickup truck belt use on the three road classifications.

FIGURE 3
Seat Belt Use
Comparison
by Road
Classification,
New Mexico,
2018

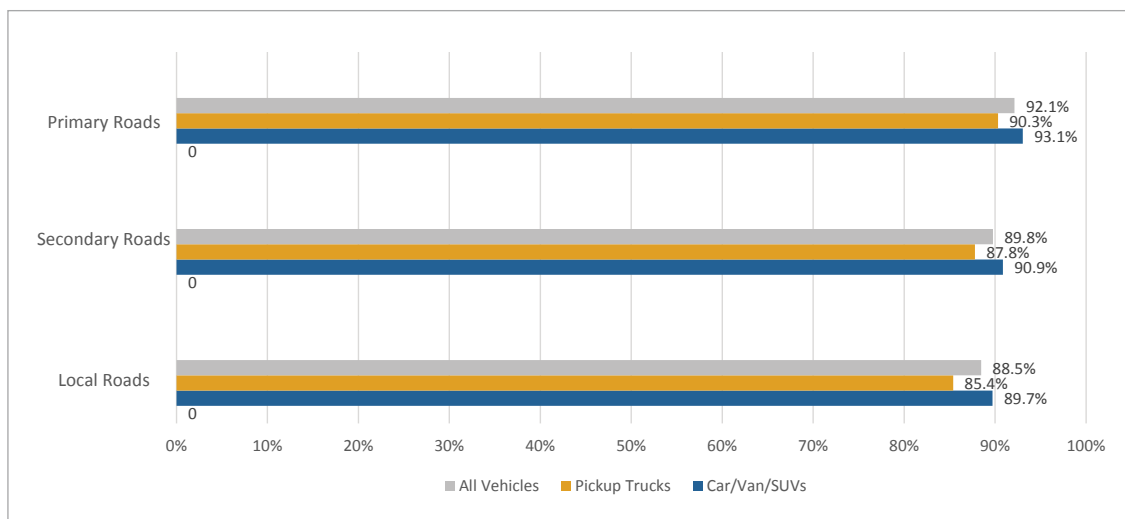


TABLE 3
Surveys
by Road
Classification
and Vehicle
Type,
New Mexico,
2018

Road Classification	Car/Van/SUVs	
	# People Observed	Belt Use
Primary Roads	1,556	93.1%
Secondary Roads	1,030	90.9%
Local Roads	857	89.7%
Statewide Total	3,443	91.6%

Road Classification	Pickup Trucks	
	# People Observed	Belt Use
Primary Roads	785	90.3%
Secondary Roads	581	87.8%
Local Roads	349	85.4%
Statewide Total	1,715	88.5%

Road Classification	All Vehicles	
	# People Observed	Belt Use
Primary Roads	2,341	92.1%
Secondary Roads	1,611	89.8%
Local Roads	1,206	88.5%
Statewide Total	5,158	90.5%

Combining across vehicle types, the lowest percentage of seat belt usage (post) was observed on Local roads at 88.5% compared to 89.8% for Secondary roads and 92.1% for Primary roads. The difference in seat belt use between Primary and Secondary roads was significant ($\chi^2(1)=6.73, p< .05$) as was the difference between Primary and Local roads ($\chi^2(1)=12.92, p< .05$). The lowest belt use rate overall was in pickup truck occupants on local roads, at 85.4%. Pickup truck belt use peaked at 90.3% on Primary road, followed by Secondary roads at 87.8%. The only significant difference in pickup truck belt use was between Primary and Local roads ($\chi^2(1)=5.91, p< .05$). Car/Van/SUV use followed a similar pattern with highest use found on Primary roads (93.1%), followed by Secondary roads (90.9%), and was lowest on Local roads (89.7%). The difference in Car/Van/SUV belt use was significant between Primary and Secondary roads ($\chi^2(1)=4.11, p< .05$), as was the difference between Primary and Local roads ($\chi^2(1)=8.20, p< .05$).



Discussion

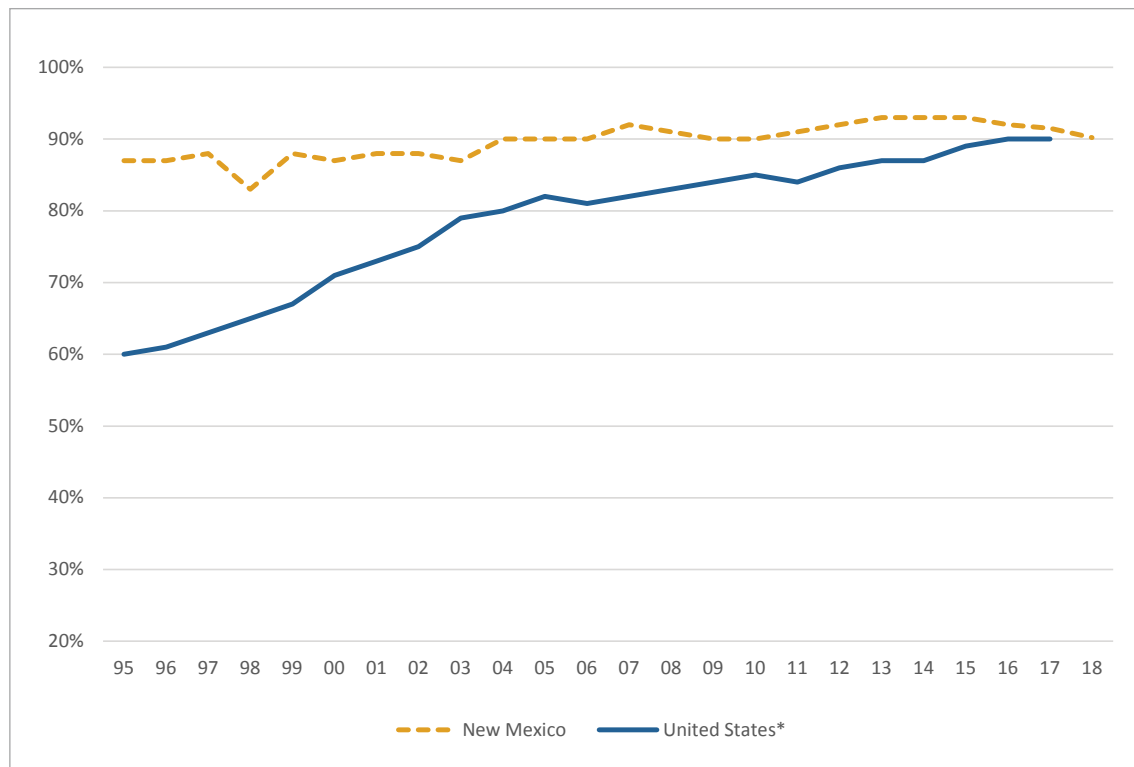
Daytime seat belt use in New Mexico dropped to just above 90%. There was a pre-existing downward trend over the past few years.

One possible factor contributing to the decrease in use is that an oversampling of rural sites likely occurred for the 2018 resampling. This is because the method used to sample sites in New Mexico is based primarily on the length of road segments. In fact, more rural occupants were present in this year's survey compared to 2017 – from 877 or 10% of occupants in 2017 to 1,206 or 23% of occupants in 2018. This also resulted in a drop in the number of total observations conducted likely due to lower traffic volume on rural roads. Other occupant factors associated with lower use such as pickup trucks or vehicle passengers are very similar for 2017 and 2018. Unfortunately, there is no way to tease apart the cause of the decrease (actual drop in use versus resampling effects) with any degree of certainty.

The State may wish to consider redrawing sites again prior to the 2019 survey using the approved design in the hopes of selecting a more representative sample (assuming the decrease was not indicative of actual use in the State). Alternatively, the State may wish to explore a full redesign. It may be that sampling based on a measure of traffic volume, versus the current length of roadway, will result in a “better” representation of actual traffic flow in the State.

On a positive note, most categories showed small increases in belt use from pre to post, albeit not significantly so. Primary road users show consistently high belt use rates (over 90% belted) and showed a slight increase from pre (91.5%) to post (92.1%). Whereas Secondary road users showed no change from pre to post (89.7%), belt use rates on Local roads did show a slight increase in use (from 87.4% pre to 88.5% post). Although these differences were not significant, they are encouraging. Some subgroups (i.e. local roads, pickup trucks occupant) with substantially lower use rates could be targets for future programmatic and campaign efforts.

FIGURE 4
Official
Observed
Seat Belt Use -
New Mexico
vs. U.S.
1995-2018



A nighttime photograph of a traffic intersection. The sky is a vibrant orange and yellow from the setting or rising sun. Several cars are stopped at a red traffic light. In the foreground, the rear of a silver Honda Civic is visible on the right. Other cars are visible in the background, including a dark SUV. The overall scene is dimly lit, with the primary light source being the sunset sky and the car's taillights.

2018 New Mexico Occupant Seat Belt Observation Survey (Nighttime)

Study Purpose

This portion of the study provides a statewide estimate of seat belt use for night drivers. This is the third year for nighttime seat belt data collection. Safer New Mexico Now and Preusser Research Group observers partnered to conduct the nighttime survey for adults in front seat outboard positions using night vision equipment when needed.

Study Design Overview

This study replicates the method used in the 2015-2017 studies. Data collection was conducted by trained Preusser Research Group nighttime observers partnering with trained daytime observers, who all had participated in previous seat belt surveys. Data were entered and analyzed by Preusser Research Group.

Just as with the daytime seat belt survey, all passenger vehicles (cars, pickups, vans and SUVs) with a gross vehicle weight up to 10,000 pounds were observed in the survey. This included small commercial vehicles. The target population was all drivers and right front seat passengers (excluding middle passengers and children harnessed in child safety seats) of vehicles traveling on public roads at night, with observers assessing belt use between the hours of 9 PM and 2 AM. The observation period for each selected road segment was 45 minutes. The road segments vary in length permitting the observer to adjust for vantage point in case of unsafe conditions and/or lighting conditions at the usual observation location.

Sampling

The sites observed for the 2018 nighttime survey were the same as for 2017 and the same methodology was used. (Night sites in 2019 will be drawn from the new resample sites used in 2018.)

To recap the sampling methodology used when the night sites were initially selected three years ago, seven counties were involved in the nighttime survey (Bernalillo, Doña Ana, McKinley, Otero, San Juan, Sandoval, and Santa Fe). From these counties, 35 sites were selected (on an a priori basis) using the number of daytime observations to weight selection toward higher volume sites (a process fundamentally similar to that used to select daytime sites from the universe of roadways).

in daytime observations. Attempts were made to conduct night observations in locations with adequate overhead lighting when possible. Observers only used night vision equipment when roadway lighting was insufficient to make observations. The near-military grade equipment (night vision goggles and infrared spotlights not visible to the naked eye) provided visibility in both dark and less dark conditions. This made vehicle occupants visible for belt observations even in total darkness. Local enforcement agencies were made aware of survey operations.

Observer Selection, Training, and On-site Procedures

The on-site procedures used for nighttime observations were very similar to the daytime procedures with a few modifications. Observations at night were always conducted by a two-person team. Preusser Research Group personnel with previous night observation experience were paired with an accompanying team member from Safer New Mexico Now with experience

Data Collection and Analysis

Data collection for the 2018 nighttime survey was conducted from July 20 through July 25, 2018. One person on the team would do the actual observation while the second team member was a recorder who wrote down the information verbalized by the observer. Six observers gathered observation data over the 2018 study period with 1,261 vehicles observed and belt use notated for 1,735 occupants (see Table 4). The data sheet used for nighttime observations is included in Appendix III.

TABLE 4
Vehicles and Occupants
Observed in Official
Nighttime New Mexico
Seat Belt Surveys,
2015-2018

	2015	2016	2017	2018
Number of Observers	7	6	5	6
Total Vehicles Observed	1,142	1,588	1,452	1,261
Total Occupants Observed	1,505	2,174	1,990	1,735

Data collected by the observers in the field were examined for completeness and checked for accuracy prior to submission. Completed observation data forms were sent to Preusser Research Group for data entry using Excel and/or SPSS. Data cleaning procedures were performed included 10% entry checks to assess entry accuracy across all data entry forms completed and variable frequency counts to identify ineligible entry values or outliers.

Weighting procedures were not required for the nighttime observation data analysis.

Results

Table 5 shows the number of occupants and nighttime seat belt use by vehicle type.

TABLE 5
Seat Belt
Usage from
New Mexico
2018 Nighttime
Occupant Seat
Belt Survey

Type of Vehicle	Number of Occupants Observed	Number of Seat Belt Users	Seat Belt Use (Percent)
Car/Van/SUVs (all)	1,414	1,227	86.8%
Driver	1,020	889	87.2%
Passenger	394	338	85.8%
Pickup Trucks (all)	321	258	80.4%
Driver	241	192	79.7%
Passenger	80	66	82.5%
All Vehicles (all)	1,735	1,485	85.6%
Driver	1,261	1,081	85.7%
Passenger	474	404	85.2%

Shoulder belt use status was observed and recorded on 1,735 front seat occupants, including 1,261 drivers and 474 passengers. Drivers accounted for 72.7% of persons observed and passengers accounted for 27.3% of persons observed. New Mexico nighttime drivers and front outboard passengers had a combined unweighted seat belt use of 85.6%. Nighttime use rates for 2015, 2016 and 2017 varied (82.4%, 89.4% and 87.6% respectively). Driver usage was recorded at 85.7% and front seat outboard passenger usage at 85.2%.

Shoulder belt use status in Cars/Van/SUV categories were observed and recorded on 1,414 front seat occupants, including 1,020 drivers and 394 passengers. Drivers accounted for 72.1% of persons observed. Nighttime drivers and front outboard passengers in these vehicle categories had a combined seat belt use of 86.8%. Driver usage was recorded at 87.2% and front seat outboard passenger usage at 85.8%.

Pickup driver nighttime seat belt use for drivers and front outboard passengers combined was 80.4%. Pickup truck Driver use was recorded at 79.7% and front passenger seat belt use was recorded at 82.5%. The difference between observed truck driver seat belt use (79.7%) and Car/Van/SUV driver seat belt use (87.2%) is statistically significant ($\chi^2(1)=8.93, p<.05$).

During the 2018 nighttime survey period, 1,075 occupants were observed on Primary roads, 297 occupants were observed on Secondary roads, and 363 occupants were observed on Local roads. Table 6 illustrates observed seat belt use for Car/Van/SUV belt use and pickup truck belt use on the three road classifications.

TABLE 6
Nighttime
Surveys by Road
Classification
and Vehicle Type,
New Mexico,
2018

Road Classification	Car/Van/SUVs	
	# People Observed	Belt Use
Primary Roads	880	87.2%
Secondary Roads	228	91.2%
Local Roads	306	82.4%
Statewide Total	1,414	86.8%

Road Classification	Pickup Trucks	
	# People Observed	Belt Use
Primary Roads	195	82.6%
Secondary Roads	69	79.7%
Local Roads	57	73.7%
Statewide Total	321	80.4%

Road Classification	All Vehicles	
	# People Observed	Belt Use
Primary Roads	1,075	86.3%
Secondary Roads	297	88.6%
Local Roads	363	81.0%
Statewide Total	1,735	85.6%

As illustrated in Table 6, in 2018 Secondary roads had the highest nighttime seat belt usage at 88.6%, followed by Primary roads at 86.3%. The lowest percentage of seat belt usage was observed on Local roads at 81.0%. The percent difference in seat belt use between both Primary and Secondary roads was not significant. Belt use on Local roads was significantly lower than both Primary roads ($\chi^2(1)=6.05, p<.05$) and Secondary roads ($\chi^2(1)=7.09, p<.05$). Belt use by Car/Van/SUV occupants showed a similar pattern, with highest belt use observed on Secondary roads (91.2%), followed by Primary roads (87.2%), and Local roads (82.4%). Belt use in pickup trucks was highest on Primary roads (82.6%), followed by Secondary roads (79.7%), and lowest on Local roads (73.7%).

Discussion

A 2.2 percentage point reduction in use from 2016-2017 was followed by a two percentage point reduction again from 2017-2018. It appears that night time vehicles tend to include more local vehicles and more passengers than daytime observations. Both these groups tend to have lower belt use. Additionally, as with daytime belt use, pickup truck drivers demonstrate lower nighttime belt use. These should be considered important populations to target.



Recommendations

New Mexico's seat belt use rate has seen a consistent decline since 2015. The State is on a path to drop below 90%. Timely and effective programming should be undertaken to at the very least maintain but optimally increase the use rate in the State.

It might be advisable to identify whether programming changes from 2015 to 2018 (type or intensity of media, enforcement, etc.) might be contributing to the belt use decline. High visibility enforcement in particular is generally considered to be the best means for achieving increases in belt use. Enforcement rates are declining in much of the country.

One hypothesis about what might be contributing to the decrease in use is that an oversampling of rural sites likely occurred for the 2018 resampling. This is because the method used to sample sites in New Mexico is based primarily on the length of road segments. The use of rural sites also lead to an overall lower number of observations in 2018, likely causing higher variability, as reflected in the large confidence intervals obtained. The State may wish to consider redrawing sites again prior to the 2019 survey using the approved design or explore a full redesign. It may be that sampling based on a measure of traffic volume, versus the current length of roadway, will result in a "better" representation of actual traffic flow in the State.

As with previous years, there are areas deserving of extra efforts to continue to make New Mexico roads safer. Particularly, drivers of pickup trucks and drivers on Local roads have the lowest daytime seat belt use rates. In addition, findings from the nighttime study showed lower belt use for some subgroups (passengers, pickup truck occupants, local roads) matching the corresponding daytime seat belt use rates.



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Report Prepared by

Preusser Research Group, Inc. for the New Mexico Department of Transportation
Design by Safer New Mexico Now

Electronic version available at www.preussergroup.com and www.safernm.org

Appendix I: Weighting and Calculations

The following were taken from the New Mexico report 2014 (CITE).

A.0 Imputation, Estimation and Variance Estimation

A.1 Imputation

No imputation will be done on missing data.

A.2 Sampling Weights

The following is a summary of the notation used in this section.

h – Subscript for road segment strata
 i – Subscript for road segment
 j – Subscript for time segment
 k – Subscript for road direction
 l – Subscript for lane
 m – Subscript for vehicle
 n – Subscript for front-seat occupant

Under this stratified multistage sample design, the inclusion probability for each observed vehicle is the product of selection probabilities at all stages: π_{hi} for road segment, $\pi_{j|hi}$ for time segment, $\pi_{k|hij}$ for direction, $\pi_{l|hij}$ for lane, and $\pi_{m|hijl}$ for vehicle. So the overall vehicle inclusion probability is:

$$\pi_{hijklm} = \pi_{hi} \pi_{j|hi} \pi_{k|hij} \pi_{l|hij} \pi_{m|hijl}$$

The sampling weight (design weight) for vehicle m is:

$$w_{hijklm} = \pi_{hijklm}$$

A.3 Nonresponse Adjustment

Given the data collection protocol described in this plan, including the provision for the use of alternate observation sites, road segments with non-zero eligible volume, and yet zero observations conducted should be a rare event. Nevertheless, if eligible vehicles passed an eligible site or an alternate eligible site during the observation time but no usable data were collected for some reason, then this site will be considered as a “nonresponding site.” The weight for a nonresponding site will be distributed over other sites in the same road type.

Let:

$$w_{hi} = \pi_{hi}$$

be the road segment weight. The nonresponding site nonresponse adjustment factor:

$$f_h = \sum_{\text{responding } i} w_{hi}$$

will be multiplied to all weights of non-missing road segments in the same road type of the same county and the missing road segments will be dropped from the analysis file. However, if there were no vehicles passing the site during the selected

observation time (20 minutes) then this is simply an empty block at this site and this site will not be considered as a nonresponding site, and will not require nonresponse adjustment. In the event that the number of “unknown” seat belt use values exceeds ten percent of the total number of use data collected, observers will be sent to the sites with the largest proportions of unknown (i.e. nonresponse) values. Additional observations will be made, on the same day of the week and at the time of day as the original observations, until the total nonresponse rate is ten percent or less.

A.4 Estimators

Seat Belt Use Rate Estimators

Noting that all front-seat occupants were observed, let the driver/passenger seat belt use status be:

$$y_{hijklm} = \begin{cases} 0 & \text{otherwise} \end{cases}$$

The seat belt use rate estimator is a ratio estimator:

$$\rho = \frac{\sum_{all} y_{hijklm}}{\sum_{all} w_{hijklm}}$$

This estimator captures traffic volume and vehicle miles traveled through design weights (which will include nonresponse adjustment factors as described in section 5.3, if any) at various stages and it does not require knowledge of VMT/DVMT.

A.5 Variance Estimation

The Survey means procedure available in SAS is well suited to provide the variance for this sample design. The procedure provides options to accommodate a clustered, PPS sample with different weights based on the proportion of road segments from the different MTFCC classes.

Appendix II: Daytime Seat Belt Survey Instrument

Sheet Number ____ of ____ for this Observation Site

Official Seat Belt Observation Form JUNE 2018

OBSERVER NAME: _____

Observation Date/Time

Day of the week (Circle one)

Date of Observation: ____/____/2018

Mon Tue Wed Thur Fri Sat Sun

Time Observation Began _____ Ended _____

OBSERVATION SITE LOCATION/DESCRIPTION

Designated Site Number: _____

Sheet Number ____ of ____ for this Observation Site

City & County: _____

Roadway/Street Name: _____

Number of Travel Lanes in Observed Direction: _____

Posted Speed Limit: _____

Observed Travel Lane: (circle one) 1 2 3 4 Other: _____

OBSERVATION SURVEY

INSTRUCTIONS: For each observed vehicle start a new row. Place an "X" in the appropriate column for driver and outboard front passenger (if applicable). Passenger children are to be counted under "YES" if restrained with seat belt or car seat, or "NO" if unrestrained. For EXEMPT VEHICLES (trucks over 10,000 lbs. and cars older than 1968 model year) seatbelt information is not required.

Please use the box below to draw a diagram of the area where the survey was conducted. Include roadway design, lanes of travel, direction of lanes, road name, and lane observed for survey.

Diagram Box

Sheet Number ____ of ____ for this Observation Site

#	Vehicle Type		Driver Seat Belted			Passenger Seat Belted			#	Vehicle Type		Driver Seat Belted			Passenger Seat Belted		
	C	T	Yes	No	Unk	Yes	No	Unk		C	T	Yes	No	Unk	Yes	No	Unk
1									36								
2									37								
3									38								
4									39								
5									40								
6									41								
7									42								
8									43								
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29									64								
30									65								
31									66								
32									67								
33									68								
34									69								
35									70								
Totals									Totals								

Appendix III: Nighttime Seat Belt Survey Instrument

New Mexico Nighttime Seat Belt Observation Data Collection Form

SITE ID NUMBER: _____ CITY: _____ OBSERVER NAME: _____

LOCATION: _____
(Observed Street) (Cross Street or other landmark)

DATE: _____ - _____ - _____ DAY OF WEEK: _____ WEATHER CONDITION (circle one):
1) Clear/Sunny 2) Light Rain 3) Cloudy 4) Fog 5) Clear but wet

TRAFFIC DIRECTION (circle one): N S E W START TIME (Observation period will last exactly 45 minutes): _____ AM or PM (circle one)

DRIVER			PASSENGER		DRIVER			PASSENGER	
Vehicle Type	Sex	Use	Sex	Use	Vehicle Type	Sex	Use	Sex	Use
C = Car T = Pick Up S = SUV V = Van	M = Male F = Female U = Unsure	Y = Yes N = No	M = Male F = Female U = Unsure	Y = Yes N = No U = Unsure	C = Car T = Pick Up S = SUV V = Van	M = Male F = Female U = Unsure	Y = Yes N = No	M = Male F = Female U = Unsure	Y = Yes N = No U = Unsure
1					36				
2					37				
3					38				
4					39				
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35					70				





NM

2018

NEW MEXICO

OCCUPANT SEAT BELT OBSERVATION STUDY

DAYTIME AND
NIGHTTIME SURVEYS

STATE OF NEW MEXICO
THE HONORABLE GOVERNOR SUSANA MARTINEZ

NEW MEXICO DEPARTMENT OF TRANSPORTATION
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