2013 New Mexico Occupant Seat Belt Observation Study

State of New Mexico
Governor
The Honorable Susana Martinez

New Mexico Department of Transportation
Cabinet Secretary
Tom Church
Cabinet Secretary, Designate
Traffic Safety Bureau
Robert Archuleta
Traffic Safety Bureau Chief
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Executive Summary

Study Purpose
The New Mexico Department of Transportation (NMDOT), Traffic Safety Bureau (TSB) contracted with Davis Innovations, Inc.™ (DI) to conduct the 2013 New Mexico Occupant Seat Belt Observation Study. The purpose of the study is to improve occupant protection programs and increase the occupant protection usage. The performance goal is to monitor progress in New Mexico’s overall seat belt use with the goal of increasing it from 91.4% in 2012 to 91.5% by the end of FY13.

In order to evaluate progress in New Mexico for increasing the front seat occupant rate, DI staff compiled a team of three seasoned and trained personnel to conduct the official New Mexico Occupant Seat Belt Observation Study during two periods in spring 2013. The first observation period, conducted in April, preceded the annual May awareness and enforcement campaign. The second observation period, conducted in June, followed the awareness and enforcement campaign.

2013 New Mexico Occupant Seat Belt Observation Pre-Enforcement (All Vehicles)
Data collection for the 2013 New Mexico Occupant Seat Belt Observation Pre-Enforcement Survey was conducted between Monday, April 1, 2013 and Tuesday, April 30, 2013. A total of 4,999 vehicles, including 805 exempt vehicles and 1,334 trucks, passed through the 94 study sites. Observations were made on all 4,999 eligible vehicles. Shoulder belt use status was observed and recorded on 6,387 front seat occupants, including 4,999 drivers and 1,388 passengers. Drivers accounted for 78.3% of persons observed and passengers accounted for 21.7% of persons observed.

During the pre-enforcement period, New Mexico drivers and front outboard passengers had a combined weighted seat belt use of 90.3%. Driver usage was recorded at 91.2% and front seat outboard passenger usage at 87.9%. There is a statistically significant difference (p < 0.05) between the percentage of belted drivers and the percentage of belted passengers during the pre-enforcement period.

2013 New Mexico Occupant Seat Belt Observation Pre-Enforcement (Pickup Trucks)
A total of 1,334 pickup trucks passed through the observation sites during April 2013; seat belt observation was made for all 1,334 pickup trucks. Shoulder belt use status was observed and recorded for 1,671 front seat pickup truck occupants, including 1,334 drivers and 337 passengers. Drivers accounted for 79.8% of persons observed in pickup trucks and passengers accounted for 20.2% of the persons observed in pickup trucks.

During the pre-enforcement period, New Mexico pickup truck drivers and front outboard passengers had a combined weighted seat belt use of 89.8%. Pickup driver seat belt use was recorded at 89.5% and front passenger seat belt use was recorded at 91.7%.

In spite of the lower percentage of belted pickup truck drivers compared to passengers, there is not a statistically significant difference (p > 0.05) between the percentage of belted pickup truck drivers and the percentage of belted passengers in trucks. However, there is a statistically significant (p < 0.05) difference between pickup truck driver seat belt use and all vehicle driver seat belt use during the pre-enforcement observation. Pickup truck driver seat belt use was 89.5%, whereas all vehicle driver seat belt use was 91.2%.
2013 New Mexico Occupant Seat Belt Observation Post-Enforcement Study (All Vehicles)

During May 2013, the annual awareness and enforcement campaign was executed. Following this, the 2013 New Mexico Occupant Seat Belt Observation Official Survey was conducted between Saturday, June 1, 2013 and Sunday, June 30, 2013. A total of 5,215 vehicles passed through the 94 study sites during the observation period, including 800 exempt vehicles. Observations were made on all 5,215 vehicles.

Shoulder belt use status was observed and recorded on a total of 6,874 front seat occupants, including 5,215 drivers and 1,659 passengers. Drivers accounted for 75.9% of persons observed and passengers accounted for 24.1% of persons observed.

During the official observation period, New Mexico drivers and front outboard passengers had a combined weighted seat belt use of 92.0%. This demonstrates an increase in overall seat belt use between the pre-enforcement and official observation periods, that is 90.3% compared to 92.0%, respectively. The increase in seat belt use between the pre-enforcement and post-enforcement periods is statistically significant (p < 0.05).

Acheiving 92.0% seat belt usage during the official observation period shows that the NMDOT surpassed its goal of increasing seat belt use to 91.5% by the end of FY13. Driver seat belt use was recorded at 92.1% and front seat passenger seat belt use at 91.2%. The difference between the percentage of belted drivers and the percentage of belted passengers is just within statistical significance.

2013 New Mexico Occupant Seat Belt Observation Post-Enforcement Study (Pickup Trucks)

A total of 1,481 pickup trucks passed through the 94 study sites during the official observation period; seat belt observation was made for all 1,481 pickup trucks.

Shoulder belt use status was observed and recorded on a total of 1,894 pickup truck front seat occupants, including 1,481 drivers and 413 passengers. Drivers accounted for 78.2% of the persons observed in pickup trucks and passengers accounted for 21.8% of the persons observed in pickup trucks.

During the official observation period, New Mexico pickup truck drivers and front outboard passengers had a combined weighted seat belt use of 86.2%. This demonstrates a decrease in overall seat belt use between pre-enforcement and the official observation period, that is 89.8% compared to 86.2%, respectively. This decrease in truck seat belt use between the pre-enforcement and post-enforcement periods is statistically significant (p < 0.05).

Driver seat belt use was recorded at 85.9% and front seat passenger seat belt use at 87.6%. There is not a statistically significant difference (p > 0.05) between the percentage of belted pickup truck drivers and the percentage of belted passengers in pickup trucks. However, there is a statistically significant (p < 0.05) difference between pickup truck driver seat belt use and all vehicle driver seat belt use during the official observation period. Pickup truck driver seat belt use was recorded at 85.9% whereas all vehicle driver seat belt use was 92.0%.
Recommendations

The recommendations set forth in this report are based on the 2013 New Mexico Occupant Seat Belt Observation Official Study.

1. Enforcement: Increase the enforcement of seat belt use by all drivers and passengers statewide.
   a. Pickup Trucks: In general, target prevention activities toward pickup truck occupants, because seat belt use by pickup truck occupants is lower than other vehicles. Specifically target pickup truck drivers, however, as seat belt use by pickup truck drivers is lower than pickup truck passengers and significantly lower than the overall occupant usage for all vehicles.
   b. Local Roads: Give special attention to enforcement on local roads, as local roads have the lowest overall occupant seat belt usage.

2. Awareness: Determine how the annual May awareness and enforcement campaign can be modified to further enhance seat belt use, particularly for pickup trucks and for local roads, as local roads exhibited lower seat belt use than both primary and secondary roads, and observed seat belt use for pickup truck occupants dropped between the pre- and post-enforcement surveys.

3. Study Improvement:
   a. Standard Error: The standard error levels in the 2013 New Mexico Annual Seat Belt Use Study data are high. Therefore, either increase the sample size and total number of vehicles observed, as used in previous years’ studies, or, where standard error is found to be greater than 2.5%, ensure that more data is collected from sites having the fewest observations, until the 2.5% standard error level is achieved, as directed in the Revised Plan (Seat Belt Use Survey Design for New Mexico – Sampling, Data Collection and Estimation Plan in Appendix I, part 2).
   b. Road Selection: Eight of the 94 sites observed (~7.5%) in the official 2013 New Mexico Annual Seat Belt Use Study had no data (no vehicles observed): two primary road sites, one secondary road site, and five local road sites. Similarly, in the pre-enforcement survey, one secondary road and seven local roads had no data. The presence of “no data” sites lowers the sample size, the overall percentage of observed seat belt use, as well as the accuracy of the results. To improve the 2014 Study, ensure that the roads selected have sufficient traffic for seat belt use observations.

4. Raise public awareness about driver’s license penalty points and fines that are associated with traffic citations given for non-use of seat belts or child safety restraints.

5. Provide the public with information on the effectiveness of seat belt use in preventing injuries and saving lives.
Methodology

Study Purpose
The New Mexico Department of Transportation (NMDOT), Traffic Safety Bureau (TSB) contracted with Davis Innovations, Inc.™ (DI) to conduct the 2013 New Mexico Occupant Seat Belt Observation Study. The purpose of the study is to improve occupant protection programs and increase occupant protection (seat belt) usage. The performance goal is to monitor progress in New Mexico’s overall seat belt use with the goal of increasing it from 91.4% in 2012 to 91.5% by the end of FY13.

In order to evaluate progress in New Mexico for increasing the front seat occupant seat belt use rate, DI staff compiled a team of three seasoned and trained personnel to conduct the official New Mexico Occupant Seat Belt Observation Study during two periods in spring 2013. The first observation period, conducted in April, preceded the annual May awareness and enforcement campaign. The second observation period, conducted in June, followed the awareness and enforcement campaign.

Study Design
New Mexico is comprised of 33 counties; 19 of which account for about 85.4% of the passenger vehicle crash-related fatalities according to Fatality Analysis Reporting System (FARS) data averages for the period 2005 to 2009. Road segments from these 19 counties were sampled for inclusion in the survey. The 19 counties and their percentage of the average annual fatalities for the five-year period are shown in Table 1 of the Seat Belt Use Survey Design for New Mexico – Sampling, Data Collection and Estimation Plan (Appendix I, part 2).

The NMDOT, Traffic Safety Division, obtained a file of road segments from NHTSA containing 2010 TIGER data developed by the U.S. Census Bureau. TIGER (Topologically Integrated Geographic Encoding and Referencing) is a format used by the U.S. Census Bureau to describe various land attributes, including roads. Using the MAF/TIGER Feature Class Code (MTFCC), the U.S. Census Bureau has divided these road segments into primarily three classifications: 1) Primary Roads, 2) Secondary Roads, and 3) Local Roads (See Table 2 in Appendix I, Part 2 for detailed definitions). In addition, the listings include segment length as determined by TIGER. This descriptive information allowed for stratification of road segments by MTFCC. A systematic probability proportional to size (PPS) sample with no certainty sites was employed to select the road segments to be used as observation sites.

All passenger vehicles (cars, pickups, 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 children harnessed in child safety seats) of these vehicles which travel on public roads between the hours of 7 AM and 6 PM. The observation period for each selected road segment was twenty minutes.

Data collection was conducted by single observers who were trained, and in most or all instances, experienced in observations of this type, having served as observers in previous seat belt surveys. The NMDOT plan also describes methods to be used when scheduled data collection sites are not available due to temporary or permanent circumstances.

The approaches to data weighting and belt use estimation and variance estimation comply with the Uniform Criteria and stipulate procedures to be followed when data quality goals (e.g., item response rates) are not met.
Study Background

New Mexico began tracking seat belt use in 1982. New Mexico’s seat belt observation methodology has changed and has been refined several times since the first surveys in 1982. Therefore, the results from different survey periods should be compared with caution.

The first surveys were conducted by the TSB from 1982-1984 to promote usage before the New Mexico Child Restraint Act was passed in 1983 and to track its impact thereafter. More rigorous observations of seat belt use began in 1985 when Zia Research conducted the surveys and the University of New Mexico’s Division of Government Research (DGR) performed the statistical analysis. During this period, the vehicle type (e.g., car, truck and/or pickup) was recorded as part of data collection.

From 1985-1993, the New Mexico seat belt survey was conducted annually in five cities: Albuquerque, Farmington, Las Cruces, Roswell, and Santa Fe. In December 1993, TSB expanded the number of geographic locations from five to seventeen cities. The following cities were added to the sample: Alamogordo, Carlsbad, Clovis, Española, Gallup, Hobbs, Las Vegas, Los Alamos, Los Lunas, Raton, Rio Rancho and Silver City. The sites were selected based on population density. The intent was to conduct observations in geographic locations where the majority of the state’s population resides. The limitation of this method was that sparsely populated rural areas were not included and statistical estimates of variation could not be calculated.

From 1993 through 1997, a revised methodology was developed and adopted by the New Mexico Department of Health, Injury Epidemiology Unit. The methodology was administered by the Safer New Mexico Now organization. In 1993, eighteen observers were trained to collect data for Operation Buckle Down (OBD). This approach continued to be used in subsequent years. However, in 1995, the number of observers was reduced from eighteen to five. The frequency of surveys conducted per year was also decreased from eight in 1994 to two per year since 1998.

Between 1993 and 2010, TSB contracted with the New Mexico Department of Health, Epidemiology and Response Division, Office of Injury Prevention to conduct observational studies of motor vehicle seat belt use. In both 2012 and 2013, TSB contracted with Davis Innovations, Inc. (DI) to conduct the study. Despite the change in the contractor, the same protocols and procedures approved by the National Highway Traffic Safety Administration (NHTSA) in 1998 were used in 2012, and as revised in the Seat Belt Use Survey Design for New Mexico – Sampling, Data Collection and Estimation Plan (Revised 10/12/12) (Appendix I, Part 2) in 2013. Moreover, two out of the three people recruited to serve as observers had previously served. While one observer was new, all three received the same training and all three were seasoned, prior law enforcement officers. DI staff required observers to use the same seat belt observation form that was used in previous years. The Seat Belt Observation Form is attached in Appendix C, contained within Appendix I, Part 2.

In 2011 the National Highway Traffic Safety Administration (NHTSA) issued new Uniform Criteria for State Observational Surveys of Seat Belt Use, with the final rule published in Federal Register Vol. 76 No. 63, April 1, 2011, Rules and Regulations, pp. 18042-18059. The Seat Belt Use Survey Design for New Mexico – Sampling, Data Collection and Estimation Plan (Appendix I, Part 2) represents New Mexico’s response to the requirement to submit to NHTSA a study and data collection protocol for an annual state survey to estimate passenger vehicle occupant restraint use. New Mexico’s response plan is

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1 2011 Annual New Mexico Official Seat belt Observation Survey, Office of Injury Prevention, Epidemiology & Response Division, NMDOH
modeled on the “Model Plan V2” provided by NHTSA. The particulars are unique to New Mexico, but to the extent that the Model Plan was compatible with the former New Mexico Plan, the language of the Model Plan was preserved to expedite the review and approval process. The resulting plan is fully compliant with the Uniform Criteria and has been used for the implementation of New Mexico’s 2013 seat belt surveys.

Details of the New Mexico current methodology are provided in the Seat Belt Use Survey Design for New Mexico – Sampling, Data Collection and Estimation Plan (Appendix I, Part 2). This plan is based upon the Seat Belt Observation Sampling Plan for New Mexico (Appendix I, part 3) which received NHTSA approval in September 1998 and was implemented in late fall of that year. The current plan was developed in 2011, then revised on October 12, 2012.

**Sampling**

The current sampling methodology was implemented in 1998 and has been used as a basis for all subsequent Official New Mexico Occupant Seat Belt Observation Surveys, with updates/revisions by NMDOT made as needed.

Beginning in 1998, NHTSA required all states to perform an annual safety belt survey in accordance with federal guidelines [63 F.R. 46389]. The criteria included drawing the observation sites with a random sampling method that permits estimation of sampling error. Since that time, 95% confidence intervals have been calculated for the seat belt use rates. To meet these requirements, the University of New Mexico, Division of Government Research (DGR) and the New Mexico Department of Health, Office of Injury Prevention, designed a sampling plan. The sample was drawn from a set of road segments defined for all state and federal roads in the state. The proportion of total traffic volume on the segment determined probability of inclusion.

From 1998 through 2012, the same 108 road segments had been used for observation. Historically, these 108 observation sites yielded a sample size of approximately 150 vehicles per observation site and 16,200 vehicles overall. In 2013, the number of road segments used was reduced to 94 as follows: 28 on primary highways, and 33 each on secondary and local roads. Appendix I, Part 2, Appendix D, presents the selected road segments within each county and their probabilities of selection.

In addition to lowering the number of road segments, the number of vehicles per site observed was reduced to 20 per road segment, yielding a sample size of 1,880 vehicles overall. Given that this smaller sample size is only about 12 percent of that used in previous years, the standard error is expected to be less than 2.5%. In the event there is a standard error greater than 2.5%, more data is collected from existing road segments.

Every attempt is made to conduct the surveys on the same day of the week at the same time of day. To avoid visibility problems associated with darkness early and late in the day, the official observation period is scheduled in June. The road segments vary in length permitting the observer to adjust for vantage point in case of unsafe conditions at the usual observation location. Observations have always been limited to the driver and the front outboard passenger (sitting by the right door). Seat belt use by the middle front seat passenger could not be captured because this position does not have a three point shoulder belt that can be observed.

Since 2004, TSB has funded an additional pre-enforcement data collection period each year prior to the May enforcement campaign. The state’s annual official post-enforcement

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\(^2\text{Ibid}\)
survey continues to be conducted in June. The observers conduct both surveys using the official approved protocol and procedures. Each observer is assigned a set of approximately 24 to 36 sites and conducts observations at those locations for both the pre-enforcement and official post-enforcement surveys.

The NHTSA standard does not require collecting information on safety belt use for pickup trucks and cars separately. Consequently, such partitioning was dropped from the New Mexico survey in 1998. However, in 2004, pickup trucks (defined as a small truck with a bed) were again identified and reported as a separate category in the state survey.

Observer Selection, Training, and On-site Procedures

Three observers and at least one quality control monitor were used. The observers are all retired police officers and meet the New Mexico-established criteria for observers. They have a demonstrated ability to observe seat belt use in moving vehicles and in high traffic areas, an ability to work safely in the roadside environment, and extensive knowledge of the exempt vehicle classes. In previous years, the observers worked under contract with the Office of Injury Prevention to perform the annual pre-enforcement and official surveys. In both 2012 and 2013, they worked under contract with DI.

In 2013, the observers participated in a four-hour refresher training. The training was held in Albuquerque on March 22, 2013. Karl Wiese, one of the more experienced observers who served as the lead observer and coordinator, facilitated the training. On March 22, 2013, the observers completed ten practice surveys. They submitted these practice surveys to Karl Wiese at the training. During the training, checks for inter-observer consistency were performed. Observers were required to stand in the location of a major arterial boulevard and observe all vehicles passing on the curbside lane in time intervals of various lengths ranging from two to ten minutes. Following this, the observers compared their observations. The training facilitator counted the number of eligible cars that went through the observation point while the observers noted and recorded seat belt use. These numbers were compared among the entire group to assess total counts and consistency in recording seat belt use. At the conclusion of the training, each observer received site assignments and survey forms. Unlike previous years, no signs or other notice alerting motorists of the survey event in progress were displayed during the 2013 event.

During the actual site survey, the observer:

- Observed as many lanes of traffic as he could comfortably monitor while obtaining data on 99% of the vehicles. Only one direction of traffic was to be observed at any given site. This traffic direction was pre-determined (the observed direction of travel and the time of day were randomly assigned for each road segment). If the time of day selected for a particular site prevented observation (e.g., the sun was directly in the eyes of the observer), the opposite direction could be used, and this was noted on the observation form.
- 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. The only right front seat occupants excluded from the study were child passengers traveling in child “car seats” with harness straps.
- Recorded belt use by marking the form appropriately for each person in each vehicle, with no marks made for absent passengers, and a tally kept of exempt vehicles. Occupants were recorded as:

\[3\text{ Ibid}\]
- “Belted” if the shoulder belt is in front of the person’s shoulder.
- “Unbelted” if the shoulder belt is not in front of the person’s shoulder.
- “Unknown” if it cannot reasonably be determined whether the driver or right front passenger is belted.

• Entered all data requested and observed on the data collection form (Appendix II), heeding all instructions therein.

One or more quality control monitors made random, unannounced visits to at least 5 percent of the observation sites. During these visits, the quality control monitor(s):

• Were provided with the schedule for the data collection, with the observation time at each observation site.

• First evaluated the observer’s performance from a distance, whenever possible, then worked alongside the observer.

• Ensured that the observer followed 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.

• Prepared a site visit report highlighting any problems with data collection site locations and observer performance.

• Served as a point of contact for questions from the observer during the data collection.

When a site was temporarily unavailable due to a crash or inclement weather, data collection was rescheduled for a similar time of day and day of the week. In the event the site was permanently unworkable, such as located within a gated community, then an alternate site, selected as part of the reserve sample, was used as a permanent replacement. An alternate was selected to be the first available reserve site having the same MTFCC as the unworkable site.

The same day and time was used, and, if possible, the same direction of traffic. If the reserve site segment traffic ran in a different direction, then the data collector (observer) selected a random direction. If the selected reserve was also permanently unworkable, then the data collector selected the next available reserve site with the same MTFCC, unless all reserve sites are exhausted. Historically, sites being permanently unavailable have not been an issue.

After the March 22, 2013 training but before the study began, two of four observers withdrew from the study. One individual was replaced with a new observer who met the New Mexico-established criteria for observers. He participated in an individual training with veteran observer and lead trainer, Karl Wiese; Mr. Wiese then worked with the new observer to ensure he was fully prepared to complete the surveys at his assigned sites. The second observer who withdrew was not replaced. Instead, the other three observers decided to absorb his site assignments and complete the survey with just three observers.

Data Collection

Data collection for the 2013 New Mexico Occupant Seat Belt Observation Pre-Enforcement Survey was conducted between Monday, April 1, 2013 and Tuesday, April 30, 2013. During the month of May, the annual awareness and enforcement campaign was executed. Data collection for the 2013 New Mexico Occupant Seat Belt Observation Official Survey began on Saturday, June 1, 2013 and continued until Sunday, June 30, 2013.

The three observers worked the same set of sites for both the pre-enforcement and the official post-enforcement surveys. All observers used audiotape recorders to record observations in high traffic volume segments and then transcribed them to the data collection form (Appendix II). In low volume areas, observers marked the forms during the observation period.
Sample

During the 2013 New Mexico Occupant Seat Belt Observation Official Survey, 5,215 vehicles passed through the observation sites. This included 5,032 eligible vehicles; 183 vehicles that were treated as “unknown” and excluded because seat belt use could not be observed for technical reasons, such as dark-tinted windows or glare; and 800 “exempt” vehicles that did not meet the vehicle inclusion criteria. Overall, 6,874 occupants were observed during the official survey. The total number of vehicles observed and the total number of occupants observed are less than in previous years due to the 2011 change in the Survey Design. Moreover, the number of “unknown” vehicles is quite low compared to prior years. The variation of numbers in the “unknown” vehicle category has ranged annually from 358 in 2006 and 2012 to 627 in 2011, and 183 in 2013.

Exclusions (Exempt Vehicles)

Trucks over 10,000 pounds and passenger vehicles and pickup trucks built before 1968, that is before three-point shoulder belts were standard front seat equipment, have never been included in the New Mexico surveys. They are referred to as exempt vehicles. In the 2013 official seat belt survey, 800 exempt vehicles passed through the observation points.

Data Analysis

Completed observation data forms were faxed or hand delivered to Marcie Davis, President of DI. A DI Research Assistant tallied the checks on the observation forms and performed data entry using SurveyMonkey. During this process, the DI Research Assistant both informally double-checked her work, and performed a formal quality control check regarding tallies and data entry. During the quality control check, she re-tallied all of the numbers to check for accuracy. Overall, 8 corrections were made on the pre-enforcement forms and 5 corrections were made on the post-enforcement forms.

The DI Research Assistant also cross-referenced the key-entered data against the original data forms. Data entry quality control checks were conducted on 8 randomly picked sites from each observer for both the pre-enforcement and the post-enforcement surveys. A total of 13 individual datum errors were discovered (8 pre- and 5 post-) in the data, which were corrected immediately. The data was further reviewed by another DI Research Associate for numbers that appeared to be outliers and empty spaces (no vehicles observed) where data should have been located. A total of 7 out of the 94 sites observed gave no data (no vehicles observed); all these “null” sites were on local (less-travelled) roads.
The DI Assistant then transferred the raw data into Excel spreadsheets for weighting and calculation of 95% confidence intervals. She then conducted reliability checks on the data by making comparisons between the pre-enforcement and official post-enforcement observations by each observer. This year, there was no benchmark set [in the Revised Plan] for acceptable variation between the pre and post enforcement periods (in 2012 it was 5%).

In 2013, all but one observer was within the 2012 5% benchmark range for both the “all vehicle” and “pickup truck” categories. The one who was out of the 2012 5% benchmark range was out by 1.2 percentage points (6.2% variation). This 6.2% variation is directly attributable to two segments of secondary strata roads (S33 and S9) which both exhibited observed seat belt use below 80% in the pre-enforcement surveys, yet exhibited observed seat belt use at 85% and 100%, respectively, in the official surveys (see Appendix III).

All spreadsheets for both the pre-enforcement and post-enforcement (official) surveys were reviewed and approved by the Principal Investigator.

### Table 2. Exempt Vehicles Observed in Official Study by Highway Type
New Mexico, 2009-2013

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<th>2009 #</th>
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<th>2011 #</th>
<th>2011 %</th>
<th>2012 #</th>
<th>2012 %</th>
<th>2013 #</th>
<th>2013 %</th>
</tr>
</thead>
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<tr>
<td>Interstate Highways</td>
<td>1046 66.9%</td>
<td>653 51.1%</td>
<td>845 65.5%</td>
<td>794 63.5%</td>
<td>739 92.4%</td>
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<tr>
<td>Other Roadways</td>
<td>517 33.1%</td>
<td>625 48.9%</td>
<td>446 34.5%</td>
<td>457 36.5%</td>
<td>61 7.6%</td>
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<td>Total</td>
<td>1,563 100.0%</td>
<td>1,278 100.0%</td>
<td>1,291 100.0%</td>
<td>1,251 100.0%</td>
<td>800 100%</td>
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### Report

This report summarizes the results of the 2013 New Mexico Occupant Seat Belt Observation Pre-Enforcement Survey and the 2013 New Mexico Occupant Seat Belt Observation Official Survey. The report is divided into five sections: 1) Executive Summary; 2) Methodology; 3) Summary of Results; 4) Discussion; and 5) Recommendations.

The Summary of Results provides an overview of the key findings in the following areas: 2013 All Vehicles Pre-enforcement; 2013 Pickup Trucks Pre-enforcement; 2013 All Vehicles Post-enforcement; and 2013 Pickup Trucks Post-enforcement.

In the Discussion section, New Mexico’s seat belt use is compared with other states, as well as with the national rate. Recommendations based on the findings are presented in Section 4. The sampling plan, observation form, and raw and weighted data are provided in the appendices.

Please note that the survey conducted in June is referred to as both the post-enforcement survey and the official survey throughout this report.
Summary of Results

2013 New Mexico Occupant Seat Belt Observation Pre-Enforcement (All Vehicles)

Data collection for the 2013 New Mexico Occupant Seat Belt Observation Pre-Enforcement survey was conducted between Monday, April 1, 2013 and Tuesday, April 30, 2013. A total of 4,999 vehicles, including 805 exempt vehicles and 1,334 trucks passed through the 94 study sites. Observations were made on a total of all 4,999 eligible vehicles. Shoulder belt use status was observed and recorded on 6,387 front seat occupants, including 4,999 drivers and 1,388 passengers. Drivers accounted for 78.3% of persons observed and passengers accounted for 21.7% of persons observed.

During the pre-enforcement period, New Mexico drivers and front outboard passengers had a combined weighted seat belt use of 90.3%. Driver usage was recorded at 91.2% and front seat outboard passenger usage at 87.9%. There is a statistically significant difference (p < 0.05) between the percentage of belted drivers and the percentage of belted passengers during the pre-enforcement period.

2013 New Mexico Occupant Seat Belt Observation Pre-Enforcement (Pickup Trucks)

A total of 1,334 pickup trucks passed through the observation sites during April 2013; seat belt observation was made for all 1,334 pickup trucks. Shoulder belt use status was observed and recorded for 1,671 front seat pickup truck occupants, including 1,334 drivers and 337 passengers. Drivers accounted for 79.8% of persons observed in pickup trucks and passengers accounted for 20.2% of the persons observed in pickup trucks.

During the pre-enforcement period, New Mexico pickup truck drivers and front outboard passengers had a combined weighted seat belt use of 89.8%. Pickup truck driver seat belt use was recorded at 89.5% and front passenger seat belt use was recorded at 91.7%.

In spite of the lower percentage of belted pickup truck drivers compared to passengers, there is not a statistically significant difference (p > 0.05) between the percentage of belted pickup truck drivers and the percentage of belted passengers in trucks. However, there is a statistically

<table>
<thead>
<tr>
<th>Type of Vehicle</th>
<th>Pre-enforcement Results*</th>
<th>Post-enforcement Results**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Occupants Observed</td>
<td>Seat Belt Use Percent</td>
</tr>
<tr>
<td>All Vehicles</td>
<td>6,387</td>
<td>90.3%</td>
</tr>
<tr>
<td>Driver</td>
<td>4,999</td>
<td>91.2%</td>
</tr>
<tr>
<td>Passenger</td>
<td>1,388</td>
<td>87.9%</td>
</tr>
<tr>
<td>Pickup Truck Front Occupants</td>
<td>1,671</td>
<td>89.8%</td>
</tr>
<tr>
<td>Driver</td>
<td>1,334</td>
<td>89.5%</td>
</tr>
<tr>
<td>Passenger</td>
<td>337</td>
<td>91.7%</td>
</tr>
</tbody>
</table>

Note: Seat belt use is established with a weighted percent calculated from observations taken at a randomly selected sample of public roadway locations.

*Pre-enforcement surveys were conducted from April 1, 2013 to April 30, 2013.

**Post-enforcement surveys were conducted from June 1, 2013 to June 30, 2013. During this period, as in 2010, 2011 and 2012, New Mexico again operated its special enforcement program, “Click It or Ticket.”
significant \( (p < 0.05) \) difference between pickup truck driver seat belt use and all vehicle driver seat belt use during the pre-enforcement observation period. Pickup truck driver seat belt use was 89.5\%, whereas all vehicle driver seat belt use was 91.2\%.

**2013 New Mexico Occupant Seat Belt Observation Post-Enforcement Study (All Vehicles)**

During May 2013, the annual awareness and enforcement campaign was executed. Following this, the 2013 New Mexico Occupant Seat Belt Observation Official Survey was conducted between Saturday, June 1, 2013 and Sunday June 30, 2013. A total of 5,215 vehicles passed through the 94 study sites during the observation period, including 800 exempt vehicles. Observations were made on all 5,215 vehicles. Shoulder belt use status was observed and recorded on a total of 6,874 front seat occupants, including 5,215 drivers and 1,659 passengers. Drivers accounted for 75.9\% of persons observed and passengers accounted for 24.1\% of persons observed.

During the official observation period, New Mexico drivers and front outboard passengers had a combined weighted seat belt use of 92.0\%. This demonstrates an increase in overall seat belt use between the pre-enforcement period and the official observation periods, that is 90.3\% compared to 92.0\%, respectively. The increase in seat belt use between the pre-enforcement and post-enforcement periods is statistically significant \( (p < 0.05) \). Achieving 92.0\% seat belt usage during the official observation period shows that the NMDOT surpassed its goal of increasing seat belt use to 91.5\% by the end of FY13.

Driver seat belt use was recorded at 92.1\% and front seat passenger seat belt use at 91.2\%. The difference between the percentage of belted drivers and the percentage of belted passengers is just within statistical significance.

As illustrated by Chart 1, driver seat belt use has remained relatively consistent between 2008 and 2012, hovering between 91\% and 92\%. However, in 2013, driver seat belt use edged just above 92\% to 92.1\%. There was not a statistically significant change \( (p > 0.05) \) between 2012 and 2013. On the other hand, front passenger seat belt use dropped from 88\% in 2007 and 2008 to

---

**Chart 1. Official Observed All Vehicles Seat Belt Use New Mexico, 1998-2013**

![Chart showing seat belt use from 1998 to 2013](chart.png)

*Sources: 2012 Annual New Mexico Official Seat Belt Observation Survey; 2013 Annual New Mexico Official Seat Belt Observation Survey; percentages rounded to nearest whole number.*
86% in 2009, 87% in 2011, and 88.5% in 2012. The percentage increased to 91.2% of front seat passengers who used seat belts during the official observation period in 2013. This rise in front passenger seat belt use between 2012 and 2013 was statistically significant (p < 0.05).

**2013 New Mexico Occupant Seat Belt Observation Post-Enforcement Study (Pickup Trucks)**

A total of 1,481 pickup trucks passed through the 94 study sites during the official observation period; seat belt observation was made for all 1,481 pickup trucks. Shoulder belt use status was observed and recorded on a total of 1,894 pickup truck front seat occupants, including 1,481 drivers and 413 passengers. Drivers accounted for 78.2% of the persons observed in pickup trucks and passengers accounted for 21.8% of the persons observed in pickup trucks.

During the official observation period, New Mexico pickup truck drivers and front outboard passengers had a combined weighted seat belt use of 86.2%. This demonstrates a decrease in overall seat belt use between the pre-enforcement period and the official observation period, that is 89.8% compared to 86.2%, respectively. This decrease in truck seat belt use between the pre-enforcement and the post-enforcement periods is statistically significant (p < 0.05). Driver seat belt use was recorded at 85.9% and front seat passenger seat belt use at 87.6%.

There is not a statistically significant difference (p > 0.05) between the percentage of belted pickup truck drivers and the percentage of belted passengers in pickup trucks. However, there is a statistically significant (p < 0.05) difference between pickup truck driver seat belt use and all vehicle driver seat belt use during the official observation period. Pickup truck driver seat belt use was recorded at 85.9% whereas all vehicle driver seat belt use was 92.1%.

As illustrated by Chart 2, both pickup truck driver seat belt use and front seat passenger seat belt use increased in 2012 compared to previous years. In 2010 and 2011, pickup truck driver seat belt use was recorded at approximately 87% and in 2012 it was 90%. However, in 2013, pickup truck driver seat belt use dropped down...
to 85.9%. Pickup truck front seat passenger use was recorded at 83% in 2010, 84% in 2011, 87% in 2012, and 87.6% (shown as 88% in Chart 2) in 2013. This represents a rising trend, although not as steep in 2013 as in the previous two years.

2013 New Mexico Occupant Seat Belt Observation Pre-Enforcement and Official Study (All Vehicles) – Summary by MTFCC Road Classification

The New Mexico seat belt sample is drawn from the 19 counties in New Mexico which account for 85.4% of the passenger vehicle crash-related fatalities, according to Fatality Analysis Reporting System (FARS) data averages for the period 2005 to 2009. The roads within these counties were divided into three primary classifications: Primary, Secondary, and Local roads.

During the 2013 New Mexico Occupant Seat Belt Observation Official Study, 5,130 occupants were observed on Primary roads, 1,359 occupants were observed on Secondary roads, and 385 occupants were observed on Local roads.

Comparing the “all vehicles” usage between the pre-enforcement and official periods shows an increases in weighted percent seat belt use for all three road classifications: from 91.7% pre- to 94.0% post- for Primary roads, 91.9% pre- to 93.8% post- for Secondary, and 89.5% to 91.1% post- for Local roads. All three classifications show a statistically significant change (p < 0.05) in seat belt use between the pre-enforcement and post-enforcement (official) periods.

For pickup trucks, usage between the pre-enforcement and post-enforcement periods increased on Primary roads (88.8% to 92.1%) but decreased on both Secondary (88.5% to 88.3%) and Local (90.4% to 84.9%) roads. The changes on both Primary and Local roads were statistically significant (p < 0.05), whereas the change on Secondary roads was not statistically significant (p > 0.05).

2013 New Mexico Occupant Seat Belt Observation Official Study (All Vehicles) – Summary by Road Classification

As illustrated in Table 4, in 2013 Primary roads had the highest seat belt usage at 94.0%. The lowest percentage of seat belt usage was observed with Local roads at 91.1%. The percent difference in seat belt use on Primary and Local roads is statistically significant (p < 0.05).

<table>
<thead>
<tr>
<th>Sampling Region</th>
<th>Pre-enforcement</th>
<th>Official</th>
<th>Pre-enforcement</th>
<th>Official</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># People Observed</td>
<td>Weighted % Belt use</td>
<td># People Observed</td>
<td>Weighted % Belt use</td>
</tr>
<tr>
<td>Primary</td>
<td>4,724</td>
<td>91.7%</td>
<td>5,130</td>
<td>94.0%</td>
</tr>
<tr>
<td>Secondary</td>
<td>1,131</td>
<td>91.9%</td>
<td>1,359</td>
<td>93.8%</td>
</tr>
<tr>
<td>Local</td>
<td>532</td>
<td>89.5%</td>
<td>385</td>
<td>91.1%</td>
</tr>
<tr>
<td>Statewide Total</td>
<td>6,387</td>
<td>90.3%</td>
<td>6,874</td>
<td>92.0%</td>
</tr>
</tbody>
</table>

Note: # People observed are the combined driver and front outboard seat occupants on which seat belt use observations were made. The observation sites within each stratum were drawn in accordance with the NHTSA-approved randomized sampling plan for New Mexico.
Chart 3. Pre-Enforcement and Official Survey Comparison by Road Classification
New Mexico, 2013 – All Vehicles

<table>
<thead>
<tr>
<th>Road Classification</th>
<th>Official Survey</th>
<th>Pre-Enforcement Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Roads</td>
<td>94.03%</td>
<td>91.71%</td>
</tr>
<tr>
<td>Secondary Roads</td>
<td>93.79%</td>
<td>91.85%</td>
</tr>
<tr>
<td>Local Roads</td>
<td>91.09%</td>
<td>89.49%</td>
</tr>
</tbody>
</table>

Source: 2013 Annual New Mexico Official Seat Belt Observation Survey.

Chart 4. Pre-Enforcement and Official Survey Comparison by Road Classification
New Mexico, 2013 – Pickup Trucks

<table>
<thead>
<tr>
<th>Road Classification</th>
<th>Official Survey</th>
<th>Pre-Enforcement Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Roads</td>
<td>92.08%</td>
<td>88.86%</td>
</tr>
<tr>
<td>Secondary Roads</td>
<td>88.29%</td>
<td>88.59%</td>
</tr>
<tr>
<td>Local Roads</td>
<td>84.84%</td>
<td>90.41%</td>
</tr>
</tbody>
</table>

Source: 2013 Annual New Mexico Official Seat Belt Observation Survey.
Evaluation
In 2013, each observer collected data on the same set of observation sites during the April pre-enforcement and the June “official,” post-enforcement surveys. For evaluation purposes, raw use percentages from the two periods were compared to review consistency among the observers.

As illustrated in Table 5, for all vehicles, the raw seat belt usage increased between the pre-enforcement and the post-enforcement surveys for two out of the three observers. For pickup trucks, the raw seat belt usage decreased for all three observers. Seat belt use changes between pre- and post-enforcement ranged from -1.0 percentage points to +6.2 percentage points for all vehicles. For pickup trucks, the range was from -4.7 percentage points to -0.07 percentage points. In 2013, there was no benchmark set (in the Revised Plan) for acceptable variation between the pre- and post-enforcement periods (in 2012 it was 5%).

In 2013, all but one observer fell within the 2012 5% benchmark range for the “all vehicle” category; all observers were within the 2012 5% benchmark range for the “pickup truck” category. The only observer who was outside the 2012 5% benchmark range was out by 1.2 percentage points (6.2% variation). This 6.2% variation is directly attributable to two segments of secondary strata roads (S33 and S9) which both exhibited observed seat belt use below 80% in the pre-enforcement surveys, yet exhibited observed seat belt use at 85% and 100%, respectively, in the official surveys (see Appendix III).

The mix of road types in the sites assigned to each observer varied considerably. To further examine variation among observers, the differences between each observer’s raw use percents were compared with the overall raw percentage for each observation period. The raw seat belt use percentages for the “all vehicles” pre-enforcement and the official survey periods were 91.0% and 93.0%, respectively; for trucks the raw use was 89.2% and 88.4% for the pre-enforcement and official surveys, respectively. The percent difference in usage recorded by each observer for “all vehicles” between observation periods showed differences ranging from -1.0% to +6.2% (Table 5). During the post-enforcement period for “all vehicles,” differences between the observers’ raw average use percents and the overall raw percentage ranged between -6.4 to +3.2 percentage points (Appendix V, Table A).

The percent difference in usage recorded by each observer for pickup trucks between observation periods, showed differences ranging from -4.7% to -0.7% (Table 5), whereas on the post-enforcement survey for pickup trucks, differences between the observers’ raw average use percents and the overall raw percentage ranged between -6.3 to +5.4 percentage points (Appendix V, Table B).

For both vehicle categories, more vehicles were observed in the official post-enforcement observation period than in the initial pre-enforcement period: 216 more vehicles in the “all vehicles” category and 147 more pickup trucks were observed in the post-enforcement surveys than in the pre-enforcement period. On an individual observer basis, the difference in vehicles observed ranged from +26 to +151 for all vehicles (Appendix V, Table A), and -8 to +86 for pickup trucks (Appendix V, Table B).
### Table 5. Comparisons between Pre-enforcement and Official Survey Seat Belt Use Observations by Observer for All Vehicle Occupants and Truck Occupants, New Mexico, 2013

<table>
<thead>
<tr>
<th>Evaluation Factors</th>
<th>Total Raw Average %</th>
<th>Observers</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Vehicles</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-enforcement Raw Average Percent Use</td>
<td>91.0%</td>
<td>84.6%</td>
<td>94.2%</td>
<td>89.8%</td>
<td></td>
</tr>
<tr>
<td>Official Raw Average Percent Use</td>
<td>93.0%</td>
<td>90.8%</td>
<td>96.6%</td>
<td>88.8%</td>
<td></td>
</tr>
<tr>
<td>Percent Difference in Usage Between Observation Periods</td>
<td>+6.2%</td>
<td>+2.4%</td>
<td>-1.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pickup Trucks Only</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-enforcement Raw Average Percent Use*</td>
<td>89.2%</td>
<td>86.8%</td>
<td>94.5%</td>
<td>84.0%</td>
<td></td>
</tr>
<tr>
<td>Official Raw Average Percent Use*</td>
<td>88.4%</td>
<td>82.1%</td>
<td>93.8%</td>
<td>82.8%</td>
<td></td>
</tr>
<tr>
<td>Percent Difference in Usage Between Observation Periods</td>
<td>- 4.7%</td>
<td>-0.7%</td>
<td>-1.2%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Raw Average Percent use is raw percent from the sites assigned to each observer: an average of each of the three road classifications’ raw percent belt use for each observer. These vary slightly from the final usage rates produced by weighting the raw rates to factor in roadway volume.

Note: Each observer was assigned between 24 and 36 sites. They conducted observations on each of their sites during the Pre-enforcement Survey (April 1-30, 2013) and again during the Official Survey (June 1-30, 2013)
Chart 5. Official Observed Seat Belt Use, 1985-2013

Source: NHTSA Traffic Safety Facts, July 2011 and July 2013; Annual New Mexico Official Seat Belt Observation Survey, Office of Injury Prevention, Epidemiology & Response Division, NMDOH.

NOTE: New Mexico's first child restraint law was enacted in June 1983.
US 2011 and 2012 data not available.

Chart 6. Seat Belt Violation Citations in Operation Buckledown Cities, New Mexico, 1994-2010

Source: Annual New Mexico Official Seat Belt Observation Survey, Office of Injury Prevention, Epidemiology & Response Division, NMDOH.
Discussion

Trends in Observed Seat Belt Usage

New Mexico has been promoting occupant protection in motor vehicles for over twenty-five years, and documenting seat belt usage with observational studies. This is evidenced by the state’s ability to surpass its goal of increasing seat belt use in both FY12 and FY13, to 91.2% by the end of FY12, and to 91.5% by the end of FY13. The official seat belt usage in 2013 is 92.0%.

As illustrated by Chart 5, a progressive increase in seat belt use has been tracked since the state started collecting data on seat belt use in 1982. The only exception was a dip in observed seat belt use in 1998 when the current sampling methodology was implemented. In that year, the survey was conducted in October and November, which was later than the typical summer observation period. New Mexico achieved seat belt use in the 90% range after the revised restraint laws were passed in June 2001. In 2013, the observed seat belt use increased slightly from previous years to 92.0%.

Supporting Data\(^4\)

In the past, secondary data sources, such as the Behavioral Risk Factor Surveillance System (BRFSS) and Operation Buckle Down Program (OBD), have been compared with the New Mexico Occupant Seat Belt Observation Official Study. Although, these secondary data sources do not provide data for 2011, 2012, or 2013, the 2010 data is presented below.

BRFSS\(^5\), a household telephone interview survey of persons 18 years and older on health risks and behaviors, found that 90.0% of respondents reported always using a seat belt in 2010. This self-reported seat belt use was the same as the observed seat belt use in 2010.

Operation Buckle Down (OBD)\(^6\), initiated in 1994, supports seat belt use enforcement by police in participating communities. OBD is monitored by documenting adult seat belt citations issued by police. As illustrated in Chart 6, reported seat belt non-use citations exhibit a pattern in which years characterized by a high number of citations (1994 and 1995, 1999 and 2000, and 2004) are followed by several years with far fewer citations. In 2004, 20,662 tickets were written for a 28.0% increase over 2003. Since 2004, the number of citations issued declined steadily through 2008 when 15,939 citations were issued. However, in 2009, there was a significant reduction as only 3,890 citations were issued for non-seat belt use. In 2010, the number of citations issued was further reduced to a total of 3,124.

Comparisons with Other States

Secondary sources have also been used to compare New Mexico with other states to determine how it performs both regionally and nationally. Although current data is not available, according to the NHTSA, in 2010 New Mexico’s front seat belt use was relatively high (90%) when compared to its neighboring states of Utah, Texas, Arizona, Oklahoma and Colorado. The only neighboring state to have a higher percent of seat belt use in 2010 was Texas (94%). The percentages of seat belt use for New Mexico and its neighboring states are presented in Table 6 and Chart 7 (following page).

Overall, New Mexico ranked 17th nationwide for seat belt use in 2010 with 89.8% seat belt usage. The nationwide rate in 2010 was 85.0%. During this period, seventeen states achieved seat belt use levels at or above 90% following a national campaign that began in 2003. Washington and

\(^4\)2011 Annual New Mexico Official Seat Belt Observation Survey, Office of Injury Prevention, Epidemiology & Response Division, NMDOH
\(^5\)2010 Behavioral Risk Factor Surveillance System
\(^6\)Operation Buckle Down, Safer New Mexico Now, Office of Injury Prevention, Epidemiology and Response Division, NMDOH
Table 6. Front Seat Belt Use in New Mexico and Neighboring States, 2001-2010

<table>
<thead>
<tr>
<th>Year</th>
<th>New Mexico*</th>
<th>Utah</th>
<th>Texas*</th>
<th>Arizona</th>
<th>Oklahoma*</th>
<th>Colorado</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>88%</td>
<td>78%</td>
<td>76%</td>
<td>74%</td>
<td>68%</td>
<td>72%</td>
</tr>
<tr>
<td>2002</td>
<td>88%</td>
<td>80%</td>
<td>81%</td>
<td>74%</td>
<td>70%</td>
<td>73%</td>
</tr>
<tr>
<td>2003</td>
<td>87%</td>
<td>85%</td>
<td>84%</td>
<td>86%</td>
<td>77%</td>
<td>78%</td>
</tr>
<tr>
<td>2004</td>
<td>90%</td>
<td>86%</td>
<td>83%</td>
<td>95%</td>
<td>80%</td>
<td>79%</td>
</tr>
<tr>
<td>2005</td>
<td>90%</td>
<td>87%</td>
<td>90%</td>
<td>94%</td>
<td>83%</td>
<td>79%</td>
</tr>
<tr>
<td>2006</td>
<td>90%</td>
<td>89%</td>
<td>90%</td>
<td>79%</td>
<td>84%</td>
<td>80%</td>
</tr>
<tr>
<td>2007</td>
<td>92%</td>
<td>87%</td>
<td>92%</td>
<td>81%</td>
<td>83%</td>
<td>81%</td>
</tr>
<tr>
<td>2008</td>
<td>91%</td>
<td>86%</td>
<td>91%</td>
<td>80%</td>
<td>84%</td>
<td>82%</td>
</tr>
<tr>
<td>2009</td>
<td>90%</td>
<td>86%</td>
<td>93%</td>
<td>81%</td>
<td>84%</td>
<td>81%</td>
</tr>
<tr>
<td>2010</td>
<td>90%</td>
<td>89%</td>
<td>94%</td>
<td>82%</td>
<td>86%</td>
<td>83%</td>
</tr>
</tbody>
</table>

*States with primary seat belt laws

Source: NHTSA, Traffic Safety Facts Published July 2011; Table: Seat Belt Use in U.S. Territories and Nationwide, 2001-July 2010; percentages rounded to nearest whole number.

Chart 7. Official Observed Seat Belt Use: Arizona, Colorado, New Mexico, Oklahoma, Texas and Utah, 2006-2010

Source: NMTSA, Traffic Safety Facts, Published July 2011; percentages rounded to nearest whole number.
Hawaii were ranked the highest in terms of seat belt use in 2010 with 97.6%. In contrast, New Hampshire had the lowest percentage of seat belt use (72.2%) in the nation.

According to the U.S. Department of Transportation, jurisdictions with stronger seat belt enforcement laws tend to exhibit higher rates of seat belt use than states with weaker laws. In line with this, sustained state and national high-visibility law enforcement activities coordinated with media campaigns and public education programs appeared to be likely reasons for increases in seat belt use.7

Figure 1. U.S. Safety Belt Use, 2010

United States Average: 85%


7NHTSA, Traffic Safety Facts Published July 2011
Recommendations

The recommendations listed below are based on the 2013 New Mexico Occupant Seat Belt Observation Official Study.

1. **Enforcement**: Increase the enforcement of seat belt use by all drivers and passengers statewide.
   
a. **Pickup Trucks**: In general, target prevention activities toward pickup truck occupants, because seat belt use by truck occupants is lower than other vehicles. Specifically, target pickup truck drivers, however, as seat belt use by pickup truck drivers is lower than pickup truck passengers, and significantly lower than the overall occupant usage for all vehicles.

b. **Local Roads**: Give special attention to enforcement on local roads, as local roads have the lowest overall occupant usage.

2. **Awareness**: Determine how the annual May awareness and enforcement campaign can be modified to further enhance seat belt use, particularly in pickup trucks on local roads, as local roads exhibited lower seat belt use than both primary and secondary roads, and observed seat belt use for pickup truck occupants dropped between the pre- and post-enforcement surveys.

3. **Study Improvement**:
   
a. **Standard Error**: The standard error levels in the 2013 New Mexico Annual Seat Belt Use Study data is high. Therefore, either increase the sample size and total number of vehicles observed, as used in previous years’ studies, or where standard error is found to be greater than 2.5%, ensure that more data is collected from sites having the fewest observations, until the 2.5% standard error level is achieved, as directed in the Revised Plan (Seat Belt Use Survey Design for New Mexico – Sampling, Data Collection and Estimation Plan in Appendix I, Part 2).

b. **Road Selection**: Eight of the 94 sites observed (~7.5%) in the official 2013 New Mexico Annual Seat Belt Use Study had no data (no vehicles observed): two primary road sites, one secondary road site, and five local road sites. Similarly, in the pre-enforcement survey, one secondary road and seven local roads had no data. The presence of “no data” sites lowers the sample size and the overall percentage of observed seat belt use, as well as the accuracy of the results. To improve the 2014 Study, ensure that the roads selected have sufficient traffic for seat belt use observations.

4. **Raise public awareness** about driver’s license penalty points and fines that are associated with traffic citations given for non-use of seat belts or child safety restraints.

5. **Provide the public with information** on the effectiveness of seat belt use in preventing injuries.

This report was prepared for the New Mexico Department of Transportation, Traffic Safety Bureau, under Project Agreement Number 12-OP-05-P01. Please call Marcie Davis at (505) 424-6631 or e-mail at mdavis@davisinnovations.com with any questions or comments.
Appendix I

National Highway Traffic Safety Administration
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October 18, 2012

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Dear New Mexico,

The review of your most recent seat belt use survey plan has been completed, and the final review is enclosed. All the design requirements listed in 1340.10 of the Final Rule were evaluated. We are pleased to inform you that your survey plan is fully compliant with the Uniform Criteria for State Observational Surveys of Seat Belt Use. Congratulations!

Sincerely,

NHTSA
Appendix I, Part 2

Seat Belt Use Survey Design for New Mexico

Sampling, Data Collection and Estimation Plan

Revised October 12th 2012

Submitted to:
National Highway Traffic Safety Administration
Traffic Safety Programs
1200 New Jersey Avenue SE
Washington, DC 20590

By:
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PO Box 1149
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       and Number of Segments Selected (N)
### Table 1 - New Mexico Average Motor Vehicle Crash-Related Fatalities by County 2005-2009*

<table>
<thead>
<tr>
<th>County</th>
<th>Average Annual Fatalities</th>
<th>Fatality % within the State</th>
<th>Cumulative Fatality%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bernalillo</td>
<td>67.4</td>
<td>15.8%</td>
<td>15.8%</td>
</tr>
<tr>
<td>McKinley</td>
<td>40.8</td>
<td>9.5%</td>
<td>25.3%</td>
</tr>
<tr>
<td>San Juan</td>
<td>33.0</td>
<td>7.7%</td>
<td>33.0%</td>
</tr>
<tr>
<td>Santa Fe</td>
<td>24.6</td>
<td>5.8%</td>
<td>38.8%</td>
</tr>
<tr>
<td>Doña Ana</td>
<td>24.4</td>
<td>5.7%</td>
<td>44.5%</td>
</tr>
<tr>
<td>Sandoval</td>
<td>20.6</td>
<td>4.8%</td>
<td>49.3%</td>
</tr>
<tr>
<td>Lea</td>
<td>16.8</td>
<td>3.9%</td>
<td>53.2%</td>
</tr>
<tr>
<td>Rio Arriba</td>
<td>15.2</td>
<td>3.6%</td>
<td>56.8%</td>
</tr>
<tr>
<td>Luna</td>
<td>13.8</td>
<td>3.2%</td>
<td>60.0%</td>
</tr>
<tr>
<td>Chaves</td>
<td>13.0</td>
<td>3.0%</td>
<td>63.1%</td>
</tr>
<tr>
<td>Eddy</td>
<td>12.6</td>
<td>2.9%</td>
<td>66.0%</td>
</tr>
<tr>
<td>Socorro</td>
<td>12.0</td>
<td>2.8%</td>
<td>68.8%</td>
</tr>
<tr>
<td>Cibola</td>
<td>11.2</td>
<td>2.6%</td>
<td>71.4%</td>
</tr>
<tr>
<td>Torrance</td>
<td>11.0</td>
<td>2.6%</td>
<td>74.0%</td>
</tr>
<tr>
<td>Valencia</td>
<td>11.0</td>
<td>2.6%</td>
<td>76.6%</td>
</tr>
<tr>
<td>Guadalupe</td>
<td>9.8</td>
<td>2.3%</td>
<td>78.9%</td>
</tr>
<tr>
<td>Taos</td>
<td>9.8</td>
<td>2.3%</td>
<td>81.2%</td>
</tr>
<tr>
<td>Otero</td>
<td>9.2</td>
<td>2.2%</td>
<td>83.3%</td>
</tr>
<tr>
<td>San Miguel</td>
<td>8.8</td>
<td>2.1%</td>
<td>85.4%</td>
</tr>
</tbody>
</table>

*Fatality data from the Fatality Analysis Reporting System (FARS) 2005-2009

### Table 2 - New Mexico MTFCC Codes Included by Default in the Road Segment File

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1100</td>
<td>Primary Road</td>
<td>Primary roads are generally divided, limited-access highways within the interstate highway system or under state management, and are distinguished by the presence of interchanges. These highways are accessible by ramps and may include some toll highways.</td>
</tr>
<tr>
<td>S1200</td>
<td>Secondary Road</td>
<td>Secondary roads are main arteries, usually in the U.S. Highway, State Highway or County Highway system. These roads have one or more lanes of traffic in each direction, may or may not be divided, and usually have at-grade intersections with many other roads and driveways. They often have both a local name and a route number.</td>
</tr>
<tr>
<td>S1400</td>
<td>Local Neighborhood Road, Rural Road, City Street</td>
<td>These are generally paved non-arterial streets, roads, or byways that usually have a single lane of traffic in each direction. Roads in this feature class may be privately or publicly maintained. Scenic park roads would be included in this feature class, as would (depending on the region of the country) some unpaved roads.</td>
</tr>
</tbody>
</table>
1.0 Introduction

The National Highway Traffic Safety Administration (NHTSA) has issued new Uniform Criteria for State Observational Surveys of Seat Belt Use. The final rule was published in Federal Register Vol. 76 No. 63, April 1, 2011, Rules and Regulations, pp. 18042 – 18059. This survey plan represents New Mexico’s response to the requirement to submit to NHTSA a study and data collection protocol for an annual state survey to estimate passenger vehicle occupant restraint use. This plan is modeled on the “Model Plan V2” provided by NHTSA. The particulars are unique to New Mexico, but to the extent that the Model Plan was compatible with the New Mexico Plan the language of the Model Plan is preserved to expedite the review and approval process. This plan is fully compliant with the Uniform Criteria and will be used for the implementation of New Mexico’s 2012 seat belt survey, upon approval.

2.0 Study Design

New Mexico is composed of 33 counties; 19 of which account for about 85.4% of the passenger vehicle crash-related fatalities according to Fatality Analysis Reporting System (FARS) data averages for the period 2005 to 2009. Therefore, we propose to sample road segments from these 19 counties for inclusion in the survey. The 19 counties and their percentage of the average annual fatalities for the five-year period are shown in Table 1.

We obtained a file of road segments from NHTSA containing 2010 TIGER data developed by the U.S. Census Bureau. These have been classified by the U.S. Census Bureau using the MAF/TIGER Feature Class Code (MTFCC). There are primarily three classifications: 1) Primary Roads, 2) Secondary Roads, and 3) Local Roads (See Table 3 for detailed definitions). In addition, the listings include segment length as determined by TIGER. This descriptive information allowed for stratification of road segments by MTFCC. A systematic probability proportional to size (PPS) sample with no certainty sites was employed to select the road segments to be used as observation sites.

All passenger vehicles (cars, pickups, and SUVs) with a gross vehicle weight up to 10,000 pounds will be observed in the survey. This includes small commercial vehicles. The target population is all drivers and right front seat passengers (excluding children harnessed in child safety seats) of these vehicles who travel on public roads between the hours of 7 AM and 6 PM. The observation period for each selected road segment will be twenty minutes.

Data collection will be conducted by single observers who will be trained, and in most or all instances, experienced in observations of this type having served as observers in previous seat belt surveys. Our plan also describes methods to be used when scheduled data collection sites are not available due to temporary or permanent circumstances.

The approaches to data weighting and belt use estimation and variance estimation comply with the Uniform Criteria and stipulate procedures to be followed when data quality goals (e.g. item response rates) are not met.

3.0 Sample Design

Our research design conforms to the requirements of the Uniform Criteria and will generate annual estimates of occupant restraint use for adults and children using booster seats in the front seats of passenger vehicles. New Mexico intends to update the sample of data collection sites every five years in order to have survey results that reflect geographic areas with more than 85% of crash-related...
fatalities. The sample design was developed for New Mexico under contract by Keith Smith, Research Scientist at the University of New Mexico (see Appendix A for personal qualifications). The design approach includes a stratified systematic PPS sample of data collection sites and as described below:

1. All 33 counties in New Mexico were listed in descending order of the average number of motor vehicle crash-related fatalities for the period of 2005 to 2009. Fatality Analysis Reporting System (FARS) data were used to determine the average number of crash-related fatalities per county. It was determined that 19 counties accounted for at least 85% of New Mexico’s total crash-related fatalities. These 19 counties comprise the sample frame and segments will be selected from these counties. See Table 1 for the 19 counties.

2. Road segments were selected randomly and with PPS from all segments in the sampled counties. The road segments were stratified by MTFCC (see Table 3). To achieve the required standard error (also addressed in item 3 below) a sample of at least 1,848 vehicles is required. We conservatively estimate 20 vehicles per site per 20-minute observation period requiring a total of 94 observation sites as follows: 28 on primary highways, and 33 each on secondary and local roads. A random, systematic sample of 94 road segments was selected PPS to road segment length from all segments in the 19 counties. Additional sites were also selected to use as alternates.

3. Historically, using 108 observation sites yielded a sample size of approximately 150 vehicles per observation site and 17,000 vehicles overall based on past experience with the New Mexico Annual Seat Belt Use Study. Given that our sample is designed assuming only 13 percent of this value, the standard error is expected to be less than 2.5%. In the event there is a standard error greater than 2.5%, more data will be collected from existing sites.

4. Divided roads were randomly assigned a direction of travel for observation, as appropriate under the Uniform Criteria, as described in Section 4.1.

3.1 Sample Size and Precision

A standard error of less than 2.5% for the seat belt use estimates is required by the Final Rule. Since 1999, New Mexico has conducted the New Mexico Annual Seat Belt Use Study, and has historically obtained standard errors below this threshold (e.g. .45% in 2011) via observed sample sizes of approximately 17,000. These observed sample sizes have been obtained from previous sample designs using 108 observation sites distributed as 27 sites in each of four geographically stratified groups of counties. Therefore, since the proposed design is expected to yield a standard error meeting the requirement of 2.5% assuming a sample size of 1,848 observations (20 observations per site x 94 sites), the precision objective should be achieved. In the event that the precision objective is not met, additional observations will be taken starting with sites having the fewest observations. New data will be added to existing data until the desired precision is achieved.

3.2 County Selection

Table 1 lists the counties and their average number of motor vehicle crash-related fatalities for the period 2005-2009 as reported in the Fatality Analysis Reporting System (FARS). With the 33 counties ordered by percent of total fatalities for the period, 19 counties accounted for 85.4% of the total fatalities and represented the first stage of sampling.
3.3 Road Segment Selection

A total of 94 road segments were selected with PPS from within each county. New Mexico employed the Census TIGER data for the selection of road segments. New Mexico exercised the available exclusion option and removed rural local roads in counties that are not within Metropolitan Statistical Areas (MSAs), and other non public roads, unnamed roads, unpaved roads, vehicular trails, access ramps, cul-de-sacs, traffic circles, and service drives from the dataset.

Road segments within each county were first stratified by MTFCC (Primary, Secondary and Local). The list of eligible road segments was expanded so that divided segments were duplicated, appearing once for each direction of travel. Segments were sorted by a random value to obtain a randomly ordered list. No road segments were selected with certainty. A sampling interval (I) was calculated as the total length across all road segments within the MTFCC divided by the number of road segments to select within each MTFCC. Since the segments were randomly ordered, the first segment was selected as the starting point, and the first segment of the sample for that MTFCC. Subsequent road segments selected were determined by adding multiples of I to identify target length locations. The lengths of the segments were accumulated, and the segment with a start point closest to, but not exceeding the next target length location. Since the target lengths were based on the total length of roadway within a given MTFCC, the final segment was always near the bottom of the random list.

Appendix D presents the selected road segments within each county and their probabilities of selection.

Table 3 - Roadway Functional Strata, Road Segments Population (N), Length, and Number of Segments Selected (n)

<table>
<thead>
<tr>
<th>MTFCC Strata</th>
<th>Primary</th>
<th>Secondary</th>
<th>Local</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>3438</td>
<td>33416</td>
<td>128958</td>
<td>165,812</td>
</tr>
<tr>
<td>Length</td>
<td>1085.46</td>
<td>6112.04</td>
<td>14,712.56</td>
<td>21910.06</td>
</tr>
<tr>
<td>n</td>
<td>28</td>
<td>33</td>
<td>33</td>
<td>94</td>
</tr>
</tbody>
</table>

3.4 Reserve Sample

In the event that an original road segment is permanently unavailable, a reserve road segment will be used. The reserve road segment sample consists of an additional 20 percent of road segments per MTFCC. These reserve segments were identified and selected as the along with the original sample, and the interval I was calculated including the reserve segments. The probabilities of selection for both primary and reserve segments were calculated according to Replacement Sample – A Two Phase Sampling Approach developed for the seat belt use survey in Mississippi and provided by NHTSA.

4.0 Data Collection

4.1 Site Selection

Road segments were provided with the latitude and longitude of their midpoints. The selected road segment was identified by an intersection or interchange that occurred within or just beyond the segment. If no intersection or interchange occurred within the segment, then any point on that road could be used for observation. For interstate highways, data collection will occur on a ramp carrying traffic that is exiting the highway. The observed direction of travel and time of day were randomly assigned for each road segment, except that if the time of day selected for a particular site prevented
observation (e.g. sun directly in the eyes of the observer) the opposite direction may be used, and this will be noted on the observation form.

4.2 Observer Selection, Training, and On-site Procedures

Observers and at least one quality control monitor will be used. We anticipate use of four experienced observers. One observer started in 1998, two in 2002 and the other one in 2003. The same observers have conducted the surveys since 2003. They work under contract with the Office of Injury Prevention to do annual pre-enforcement and official surveys. All are retired police officers. They meet the New Mexico-established criteria of a) demonstrated ability to observe seat belt use in moving vehicles and in high traffic areas, b) ability to work safely in the roadside environment, and c) have extensive knowledge of the exempt vehicle classes. All returning observers participate in a four-hour refresher training. The training outline is in Appendix B. The training previously has conducted by the Office of Injury Prevention staff prior to the first survey period of the year. Prior to the training, the observers complete three practice surveys using the data collection form and 3 of their assigned sites and submit these in to the Office of Injury Prevention. During the training class, checks for inter-observer consistency are performed by having all observers stand in the same location of a major arterial boulevard and observe all vehicles passing on the curbside lane in time intervals of various lengths ranging from 2-10 minutes, and then comparing their observations. One trainer counts the number of eligible cars that go through the observation point while the observers note and record seat belt use. These numbers are compared among the entire group for total counts and consistency in recording seat belt use. At the review class each observer receives site assignments and survey forms. Unlike previous surveys, no signs or other notice of the survey event will be displayed. Data from all sites are recorded on the standard form (Appendix C).

In 2011, observers worked the same set of sites for both the pre-enforcement and the official post-enforcement surveys. All observers will use audiotape recorders to record observations in high traffic volume segments and then transcribe them to the data collection form. In low volume areas observers may mark the forms directly during the observation period.

4.3 Observation Periods and Quality Control

All seat belt and booster seat use observations will be conducted during weekdays and weekends between 7 a.m. and 6:00 p.m. All start times are randomly assigned.

Maps showing the location of all observation sites and Site Assignment Sheets will be provided to the observers. These will indicate 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 will be assigned as data collection clusters. The first site within each cluster may be assigned a random day and time for completion. Next, all other sites within a cluster will be assigned to the same day in order to minimize travel costs. They will be scheduled by geographic proximity to minimize travel within the cluster. One or more quality control monitors will make random, unannounced visits to at least 5 percent of the observation sites. During these visits, the quality control monitor will first evaluate the observer’s performance from a distance (if possible), and then work alongside the observer. The quality control monitor(s) will be provided with the schedule for the data collection with the observation time at each observation site. The quality control monitor will ensure that the observer is 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 will prepare a site visit report highlighting any problems with data collection site locations and observer performance. The quality control monitor also serve as a point of contact during the data collection should the observers have a question arising during this time.

**Data Collection**

All passenger vehicles, including commercial vehicles weighing less than 10,000 pounds, will be eligible for observation. The data collection cover sheet and observation form are shown as Appendix C. The cover sheet was designed to allow for documentation of descriptive site information, including: date, site location, site number, alternative site data, assigned traffic flow, number of lanes available and observed, start and end times for observations, and weather conditions. This cover form will be completed by the Data Collector at each site.

The observation form will be used to record seat belt use by drivers and front seat passengers. Additional observation forms can be used when more than 40 vehicles are observed at a site. The forms will be labeled as 1 of 2, and 2 of 2, etc.

The data collector will observe as many lanes of traffic as s/he can comfortably monitor while obtaining data on 99% of the vehicles. Only one direction of traffic will be observed at any given site. This direction is pre-determined (see Section 4.1).

Observations will be made of all drivers and right front seat occupants. This includes children riding in booster seats. The only right front seat occupants excluded from this study are child passengers who are traveling in child seats with harness straps. The form in Appendix C will be used to record seat belt use. Belt use will be recorded by marking the form appropriately for each person in each vehicle, with no marks made for absent passengers, and a tally kept of exempt vehicles. Neither a vacancy for the right front passenger nor a child, restrained in a car seat with harnesses would be coded since we only observe children in booster seats, not in car seats in this study. If a right front passenger is present some indication of belt use, or “unknown” must be recorded. Observers shall record a person as–

1. “Belted” if the shoulder belt is in front of the person’s shoulder;
2. “Unbelted” if the shoulder belt is not in front of the person’s shoulder;
3. “Unknown”: if it cannot reasonably be determined whether the driver or right front passenger is belted.

**Alternate Sites and Rescheduling**

When a site is temporarily unavailable due to a crash or inclement weather, data collection will be rescheduled for a similar time of day and type of day of week. In the event that the site is permanently unworkable, such as located within a gated community, then an alternate site, selected as part of the reserve sample, will be used as a permanent replacement. The alternate will be the first available reserve site having the same MTFCC as the unworkable site. The same day and time shall be used, and, if possible, the same direction. If the reserve site segment runs in a different direction, then the data collector will select a random direction. If the selected reserve is also permanently unworkable, then the Data Collector will next available reserve site in with the same MTFCC unless all reserve sites are exhausted. Historically, sites being permanently unavailable have not been an issue, therefore the provision of 20 percent additional sites is anticipated to be sufficient.
5.0 Imputation, Estimation and Variance Estimation

5.1 Imputation

No imputation will be done on missing data.

5.2 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: \(\pi_h\) 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:

\[
\pi_{hijklm} = \pi_h \pi_{j|hi} \pi_{k|hij} \pi_{l|hij} \pi_{m|hijl}
\]

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

\[
w_{hijklm} = \frac{1}{\pi_{hijklm}}
\]

5.3 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 non-responding site will be distributed over other sites in the same road type. Let:

\[
w_{hi} = \frac{1}{\pi_h}
\]

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

\[
f_h = \frac{\sum_{i} W_{hi}}{\sum_{responding\ i} W_{hi}}
\]

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 10 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 10 percent or less.

5.4 Estimators

**Seat Belt Use Rate Estimators**

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

\[ y_{ijk} = \begin{cases} 1 & \text{if belt used} \\ 0 & \text{otherwise} \end{cases} \]

The seat belt use rate estimator is a ratio estimator:

\[ \rho = \frac{\sum_{all \, ijk} w_{ijk} y_{ijk}}{\sum_{all \, ijk} w_{ijk}} \]

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.

5.5 Variance Estimation

The Surveymeans 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 A: Personnel

Keith Smith

Summary
Mr. Smith is a Research Scientist at the University of New Mexico with more than 25 years of experience in traffic safety data analysis. He holds a degree in Political Science with a minor in research methodology, and an MBA which included coursework in statistical modeling and sample design, and additional coursework in and statistical quality control. He has more than 30 years’ experience using SAS to analyze traffic crash and other data. He has been certified as a SAS Programming Professional.

Education
M.B.A., University of New Mexico, 2010
B.A. Political Science (Minor: Research Methodology), University of New Mexico, 1988

Professional Associations
Association of Transportation Safety Information Professionals

Computer Skills
SAS Certified Base Programmer, 1992
Operation Systems: Windows, UNIX, Linux, TSO, MVS
Programming Language: C#
Software: SAS, Microsoft Office

Relevant Project Experience
New Mexico University (1981 to Present)
Traffic Safety Data Analysis, Division of Government Research, University of New Mexico, under contract from the New Mexico Department of Transportation, Traffic Safety Bureau– This recurring contract over the course of more than 30 years provided for traffic safety data analysis and reporting by the Division for the Bureau. This includes ETL of the crash report data, and merging and analysis of crash data, DWI citation data, driver history and conviction data, and other ancillary data to identify, prioritize and evaluate traffic safety efforts in New Mexico.
Appendix B: Observer Training Outline

New Mexico Observer Training Outline

Welcome and introductions

Survey Packet overview

Data collection techniques
  Definitions of belt/booster seat use, passenger vehicles
  Observation protocol
  Weather conditions
  Duration at each site

Scheduling and rescheduling
  Site Assignment Sheet
  Temporary impediments such as weather
  Permanent impediments at data collection sites

Site locations
  Locating assigned sites
  Interstate ramps and surface streets
  Direction of travel/number of observed lanes
  Alternate site selection

Data collection forms
  Cover sheet
  Recording observations
  Recording alternate site information

Assembling forms for shipment

Safety and security

Timesheet and expense reports

Field practice at ramps and surface streets
Appendix C: Observer Instructions

Official New Mexico Safety Belt Observation Study Protocol 2011

- On every cover letter of the seat belt observation forms for your site number location is space to draw a map of exactly where you are standing, direction of traffic you observe and number of lanes you are observing. This assures that the site is observed at the same location each year.

- Choose a location in your assigned site where you are safe to observe vehicles through the front windshield. Observations through the front windshield do not depend on visual inspection through side or rear windows because they are frequently too tinted to allow inspection. If you miss through the front windshield, make an attempt to see if you can see the strap through the back window as he proceeds.

- Record an observation for every vehicle which passes the observation point during the continuous 20 minute period.
  - If the vehicle is prior to 1968 and does not have shoulder straps, mark as an exempt vehicle. If it’s a truck 10,000 pounds and over also mark this as an exempt vehicle.
  - Count restraint use for both driver and front outboard passengers. Do not count passengers in the middle front seat or rear seats.
  - If a driver is observed with the shoulder belt behind the back, or other improper location, that should be recorded as NSB
  - Mark children as SB, NSB, or UNK, depending on whether or not they are in a child restraint device. Do not attempt to determine correct or incorrect child seat use.

- Be sure to observe every vehicle passing your observation point. Do not let yourself selectively seek out those vehicles in which you can see a safety belt. If you are not able to observe seat belt use, mark it as unknown.

- When observing, recording or transcribing the actual site observations use a highlighter pen such as yellow, light green or other light colors to indicate seat belt use or non use.

- Once you have selected an observation location in the site assigned to you, plan to repeat all future observations at the same location, same day and same time of the week. Make changes only in the event of construction or inclement weather, but only in the stretch of road which the site number is assigned, such as from “Wyoming from Phoenix to Comanche.”

- Some sites, especially those with high volume traffic, will require observations to be recorded into a recorder and later be transcribed to the official form. Others with less traffic can be recorded directly on the form.

- Count front passenger children as using, or not using restraints (Safety Belts).
SUMMER 2012
OFFICIAL APRIL 2012
SEAT BELT OBSERVATION FORM

City_____________________   County______________   Date __________________________

Day of Week ____________________________   Time __________________________

Location ____________________________   Site Number ____________________________

Lane Observed_____________________ # Lanes __________   Direction ____________________________
(Curbside, median, Center)   (North, South, East, West)

Observer ____________________________   Speed Limit ____________________________

PLEASE DESCRIBE YOUR OBSERVATION LOCATION, LANE OF TRAFFIC BEING OBSERVED, AND INDICATE DIRECTION OF TRAFFIC FLOW BELOW:

KEY:   SB = SEAT BELT   NSB = NO SEAT BELT

UNK = Use UNKNOWN □ for older vehicles or poor visibility due to windshield tinting.

TRUCK = a Pickup truck with a bed, not an SUV

EXEMPT VEHICLES = Trucks 10,000 lbs. and over and cars prior to 1968 models. Mark a hatch on the right side of the form such as “#### IIII”, 4 slashes and 1 crossing them indicate a total of 5 vehicles.

Please Hi light usage or non-usage for driver and front outboard passenger with a light colored hi-light pen.

Note: Count front passenger children as using, or not using restraints (that is a Seat Belt).
<table>
<thead>
<tr>
<th>Location</th>
<th>Observer</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TRUCK</th>
<th>DRIVER</th>
<th>FRONT PASSENGER</th>
<th>EXEMPT</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SB NSB UNK</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>T</td>
<td>SB NSB UNK</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>T</td>
<td>SB NSB UNK</td>
<td></td>
</tr>
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<td>T</td>
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</tr>
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<td>T</td>
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<td></td>
</tr>
<tr>
<td>8</td>
<td>T</td>
<td>SB NSB UNK</td>
<td></td>
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Total Exempt _______________

1 hatch mark per vehicle
### Appendix D: List of Sampled Road Segments by MTFCC

#### Primary Roads

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<th>Longitude</th>
<th>Start time</th>
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<td>Latitude</td>
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</table>
Appendix I, Part 3

Seat Belt Observation Sampling Plan for New Mexico

James W. Davis
Division of Government Research
University of New Mexico

for the
Traffic Safety Bureau
Transportation Programs Division
New Mexico State Highway and Transportation Department

9/8/98
(Edited 9/14/2010)
(Edited 8/12/2012 by Davis Innovations, Inc.)
1. All observation sites will be within the 14 counties that make up 86.3% of New Mexico’s population, as shown below.

<table>
<thead>
<tr>
<th>County</th>
<th>2008 Pop</th>
<th>% Pop</th>
<th>%VMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bernalillo</td>
<td>651,612</td>
<td>31.3%</td>
<td>23.4%</td>
</tr>
<tr>
<td>Doña Ana</td>
<td>209,224</td>
<td>10.1%</td>
<td>9.2%</td>
</tr>
<tr>
<td>Santa Fe</td>
<td>147,869</td>
<td>7.1%</td>
<td>6.9%</td>
</tr>
<tr>
<td>San Juan</td>
<td>130,093</td>
<td>6.2%</td>
<td>5.7%</td>
</tr>
<tr>
<td>Sandoval</td>
<td>127,928</td>
<td>6.1%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Mckinley</td>
<td>80,387</td>
<td>3.9%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Chaves</td>
<td>77,545</td>
<td>3.7%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Valencia</td>
<td>67,472</td>
<td>3.2%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Lea</td>
<td>64,087</td>
<td>3.1%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Otero</td>
<td>59,711</td>
<td>3.3%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Eddy</td>
<td>52,903</td>
<td>2.5%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Curry</td>
<td>48,005</td>
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<td>1.6%</td>
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<td>Arriba</td>
<td>44,167</td>
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<tr>
<td>Luna</td>
<td>28,319</td>
<td>1.4%</td>
<td>3.1%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,789,322</td>
<td>86.3%</td>
<td>74.4%</td>
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</table>

2. Road segments (sampling units) eligible for sampling will be those classified as collector and above for which volume data is available from the Consolidated Highway Database maintained by the State Highway and Transportation Department. These segments account for approximately 60% of all vehicle miles traveled (measure of size) in New Mexico. The CHDB contains all state roads and those local roads and streets that were built with Federal funds. This includes most urban arterials and many urban collector routes. Volume data on a segment basis does not exist in any central location for the roads not included in the CHDB. Estimates of total statewide VMT include aggregate travel on roads not included in the CHDB. Contiguous segments with similar characteristics will be combined. Segments with an annual average daily traffic of less than 300 vehicles per day will be excluded. These segments account for 0.5% of total VMT in the CHDB. To the extent possible, rural segments will be defined to have an endpoint in a place of at least 4,000 population, where traffic should be slow enough to permit observation.

3. Counties will be divided into 4 groups: Central (Bernalillo, Sandoval, Valencia), Northwest (Santa Fe, San Juan, McKinley, Rio Arriba), Southeast (Chaves, Eddy, Lea, Curry), and South Central (Doña Ana, Otero, Luna). The sample will be stratified by county group yielding four strata. The strata are intended to guarantee representation of each area of the state and to simplify the process of selecting specific observation sites. There will be 27 sample segments per stratum, for a total of 108 observation sites.

<table>
<thead>
<tr>
<th>Stratum</th>
<th>Total Segments</th>
<th>% Statewide VMT</th>
<th>% CHDB VMT</th>
<th>Sample Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>693</td>
<td>26.6%</td>
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<td>27</td>
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<td>Northwest</td>
<td>453</td>
<td>21.7%</td>
<td>19.4%</td>
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<td>South Central</td>
<td>313</td>
<td>13.3%</td>
<td>12.9%</td>
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<td>South East</td>
<td>294</td>
<td>10.3%</td>
<td>7.9%</td>
<td>27</td>
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<tr>
<td>TOTAL</td>
<td>1,753</td>
<td>71.9%</td>
<td>74.8%</td>
<td>108</td>
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</table>
Within each stratum, a sample of segments will be drawn with probability proportional to VMT. In operational terms, each segment will get one chance of selection for each 1,000 daily vehicle miles. In each stratum, additional alternate segments will be drawn to allow for the rejection of unsafe or unusable sample sites. The list of segments will be presented in random order within strata to minimize any bias that may be introduced by site rejection (see 6, below).

Each segment selected above will be randomly assigned a day of week, time of day, and direction of travel to be observed. All daylight hours during the week will be eligible for selection. It appears that observations will be done in the late summer and fall, so the hours of 7am through 7pm will be considered daylight hours. The assigned time will be the beginning of the hour, so start times between 7am and 6pm will be assigned.

Observers will select the specific observation site on each segment, taking into account safety and ease of observation. If no suitable site exists on a segment, the segment may be rejected and the first available alternate used. Observers may change the direction of travel to be observed if lighting conditions or safety dictate [observing Eastbound traffic at sunset is likely to produce poor results]. Some alterations of day of week or time of day will be allowed to improve the efficiency of data collection, especially in outlying areas. These changes must be approved by the agency responsible for data collection and analysis. Observers will document the exact site location and any changes in direction, day of week, or time of day. The documentation will include the number of through lanes in the observed direction.

Once these initial adjustments have been made, the same sites, directions and times will be used for subsequent surveys. In the event of unavailability of a site (due to construction, etc.), a similar site on the same segment may be used. Scheduled observations that cannot be completed due to weather or other temporary obstacles will be rescheduled for the same day of week and time of day as soon as reasonably possible. If a site becomes permanently unavailable and no similar site exists on the segment, the next available alternate segment will be used. All changes in observation sites will be documented.

All vehicles under 10,000 pounds are subject to the New Mexico Safety Belt Use Act. All passenger vehicles (cars, vans, pickups, and sport utilities) will be observed. At each site, observers will record every vehicle that passes in 20 minutes. Observers will record belt use for the driver and outboard front passenger separately. If traffic is too heavy or too fast to observe every vehicle, the observer will observe only the nearest through lane, and note this fact on the data collection sheet. Observers will use tape recorders to avoid having to look away from the traffic stream. Experienced observers report that it is possible to record every vehicle in a single lane even in very heavy or very fast traffic.

Written instructions covering site selection, clustering and observation have been prepared.
8. The statewide usage rate will be computed as follows:
   [Column and Cell references are to the Excel spreadsheet used for analysis - detail sheet
   See the summary sheet for overall estimates and notes.]

   The state is divided into four strata \((r)\) and in each stratum there are 27 sample segments \((i)\).

   Let:
   \(V_r = \text{the total Vehicle Miles of Travel in stratum } r\).
   \(V_{Cr} = \text{the total Vehicle Miles of Travel in stratum } r \text{ represented in the CHDB}\)
   \(V_{ri} = \text{the total Vehicle Miles of Travel on segment } i \text{ determined from the CHDB}\)

   The probability of selection is approximately \((V_{ri} \div V_{Cr}) \times 27\)

   \(S_{ri} = \text{sampling weight for segment } i \text{ in stratum } r = V_{Cr} \div (V_{ri} \times 27)\)
   [one over the probability of selection][Column U]

   \(O_{ri} = \text{the number of occupants observed on segment } i \text{ in stratum } r.\)
   [Column R plus Column S]

   \(B_{ri} = \text{the number of belted occupants observed on segment } i \text{ in stratum } r.\)
   [Column R]

   \(L_{ri} = \text{the lane weight for segment } i \text{ in stratum } r = (\text{total lanes}) \div (\text{observed lanes}).\)
   [Column M over Column L]

   \(P_{r} = \text{the usage rate estimate for stratum } r = 3(S_{ri} \times L_{ri} \times B_{ri}) \div 3(S_{ri} \times L_{ri} \times O_{ri})\)
   [the sums are over all sites \(i\) in stratum \(r\)]
   [Weighted totals for each site in Columns V and W, lane weight computed in formula]
   [Stratum estimates are Cells X33, X64, X95, X126]

   \(W_r = \text{the weight for each stratum } = V_r \div 3(V_r)\)

   \(P = \text{the statewide usage rate estimate} = 3(W_r \times P_r)\)
   [Cell Y1, weights incorporated in formula]

   The variance of \(P\) will be estimated with the jackknife method:

   Let \(P_{ri}^* = P \text{ above computed excluding segment } i \text{ in stratum } r\)
   \(P_{ri} = 108(P) - 107(P_{ri}^*) \text{ Jacknife estimate}\)
   \([P_{ri}^* \text{ in Column Z, } P_{ri} \text{ in Column AA}]\)

   The sample variance of the \(P_{ri}\) will be used to estimate the variance of \(P\).
   [Standard deviation in Cell AB1, Standard error in Cell AC1 = SD/\sqrt{N},
   \(N\) is in cell AD1, Standard Error as a percentage of the estimate in Cell AC2,
   Overall estimate re-expressed as a percentage is in Cell AC3, 95% confidence limits
   In AC11 and AC12 – These cells are copied to the summary sheet]

   The statewide usage rate estimate from the current survey is 88%. The current survey uses a
   convenience sample, so generalization is hazardous, but the overall usage rate estimate is not expected
to change greatly. The current survey collects about 5,200 observations in 17 urban areas twice per
year. The results have been quite stable over time, and correlate well with injury probabilities derived
from crash data.
9. Observer training, quality control, data entry, data analyses and reporting has been contracted from the Highway and Transportation Department, Traffic Safety Bureau to the NM Department of Health, Public Health Division, Office of Epidemiology.

Observer training: For the 1998 survey only five experienced observers will be utilized.

Prior to commencement of the survey, all observers will be required to attend a one day training session. This protocol will be carefully reviewed, observers will then conduct an observation of a predetermined roadway (all observers will observe the same vehicles). Following the observation, the class will review their results and discuss any discrepancies. Steps will be taken to correct any major differences among observers.

Quality Control: Data forms submitted by observers will be carefully reviewed by DI staff and problems will be discussed with the observers.

Data Entry: Entry will be performed using SurveyMonkey.

Data Analyses: Analyses will be performed using an Excel spreadsheet.

Report: A written report will be produced for each survey. Use rates will be shown for each observation site. Data will be aggregated by geographic strata, or area, and a statewide total. When possible, data will be aggregated by metropolitan area. Use rates for driver, front passenger and front seat occupant will be shown. Both raw counts and weighted rates will be presented.
Appendix II

Official New Mexico Safety Belt Observation Study Protocol 2013

- On every cover letter of the seat belt observation forms for your site number location is space to draw a map of exactly where you are standing, direction of traffic you observe and number of lanes you are observing. This assures that the site is observed at the same location each year.

- Choose a location in your assigned site where you are safe to observe vehicles through the front windshield. Observations through the front windshield do not depend on visual inspection through side or rear windows because they are frequently too tinted to allow inspection. If you miss through the front windshield, make an attempt to see if you can see the strap through the back window as he proceeds.

- Record an observation for every vehicle which passes the observation point during the continuous 20 minute period.
  
  a. If the vehicle is prior to 1968 and does not have shoulder straps, mark as an exempt vehicle. If it’s a truck 10,000 pounds and over also mark this as an exempt vehicle.
  
  b. Count restraint use for both driver and front outboard passengers. Do not count passengers in the middle front seat or rear seats.
  
  c. If a driver is observed with the shoulder belt behind the back, or other improper location, that should be recorded as NSB
  
  d. Mark children as SB, NSB, or UNK, depending on whether or not they are in a child restraint device. Do not attempt to determine correct or incorrect child seat use.

- Be sure to observe every vehicle passing your observation point. Do not let yourself selectively seek out those vehicles in which you can see a safety belt. If you are not able to observe seat belt use, mark it as unknown.

- When observing, recording or transcribing the actual site observations use a highlighter pen such as yellow, light green or other light colors to indicate seat belt use or non use.

- Once you have selected an observation location in the site assigned to you, plan to repeat all future observations at the same location, same day and same time of the week. Make changes only in the event of construction or inclement weather, but only in the stretch of road which the site number is assigned, such as from “Wyoming from Phoenix to Comanche.”

- Some sites, especially those with high volume traffic, will require observations to be recorded into a recorder and later be transcribed to the official form. Others with less traffic can be recorded directly on the form.

- Count front passenger children as using, or not using restraints (Safety Belts).
SUMMER 2013
OFFICIAL APRIL 2013
SEAT BELT OBSERVATION FORM

City_____________________ County______________ Date __________________________

Day of Week ___________________________ Time __________________________

Location ___________________________ Site Number __________________________

Lane Observed_________________ # Lanes _______ Direction __________________________
(Curbside, median, Center) (North, South, East, West)

Observer ___________________________ Speed Limit __________________________

PLEASE DESCRIBE YOUR OBSERVATION LOCATION, LANE OF TRAFFIC BEING
OBSERVED, AND INDICATE DIRECTION OF TRAFFIC FLOW BELOW:

KEY:   SB  =  SEAT BELT  NSB  =  NO SEAT BELT

UNK = Use UNKNOWN □ for older vehicles or poor visibility due to windshield tinting.

TRUCK = a Pickup truck with a bed, not an SUV

EXEMPT VEHICLES = Trucks 10,000 lbs. and over and cars prior to 1968 models. Mark a hatch on the
right side of the form such as “///// I///”, 4 slashes and 1 crossing them indicate a total of 5 vehicles.
Please Hi light usage or non-usage for driver and front outboard passenger with a light colored hi-light pen.

Note: Count front passenger children as using, or not using restraints (that is a Seat Belt).
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<tr>
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<th>Observer</th>
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1 hatch mark per vehicle
Total Exempt ______________
### Appendix III

**PRE-ENFORCEMENT Seat Belt Survey, New Mexico, April 2013: Site results ALL VEHICLES**

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<th>Belted Passengers</th>
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<th>Number Belted</th>
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## PRE-ENFORCEMENT Seat Belt Survey, New Mexico, April 2013: Site results ALL VEHICLES

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3. Secondary 

2013 New Mexico Occupant Seat Belt Observation Study
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### POST-ENFORCEMENT Seat Belt Survey, New Mexico, June 2013: Site results PICKUP TRUCKS

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Appendix IV

NM Post-Enforcement Seat Belt Observation Survey

ALL VEHICLES

Observations done June 2013

Total Sites Observed 94

6,874 Overall - drivers and front passengers
   91.99% Overall Usage
   3.96 Standard Error (in %)
   4.30% Relative Error
   84.24% Lower Bound 95% Confidence Interval
   99.74% Upper Bound

5,215 Drivers
   92.14% Driver Usage
   4.60 Standard Error (in %)
   4.99% Relative Error
   83.12% Lower Bound 95% Confidence Interval
   101.15% Upper Bound

1,659 Passengers
   91.18% Passenger Usage
   2.88 Standard Error (in %)
   3.16% Relative Error
   85.53% Lower Bound 95% Confidence Interval
   96.82% Upper Bound
NM Pre-Enforcement Official Seat Belt Observation Survey

ALL VEHICLES

Observations done April 2013
Total Sites Observed 94

6,387 Overall - drivers and front passengers
  90.26% Overall Usage
  2.85 Standard Error (in %)
  3.15% Relative Error
  84.68% Lower Bound 95% Confidence Interval
  95.83% Upper Bound

4,999 Drivers
  91.15% Driver Usage
  4.00 Standard Error (in %)
  4.39% Relative Error
  83.31% Lower Bound 95% Confidence Interval
  98.99% Upper Bound

1,388 Passengers
  87.88% Passenger Usage
  2.11 Standard Error (in %)
  2.40% Relative Error
  83.74% Lower Bound 95% Confidence Interval
  92.02% Upper Bound
NM Post-Enforcement Seat Belt Observation Survey
PICKUP TRUCKS

Observations done June 2013
Total Sites Observed 94

1,894 Overall - drivers and front passengers
  86.16% Overall Usage
  8.56 Standard Error (in %)
  9.93% Relative Error
  69.39% Lower Bound 95% Confidence Interval
  102.94% Upper Bound

1,481 Drivers
  85.89% Driver Usage
  7.73 Standard Error (in %)
  9.00% Relative Error
  70.75% Lower Bound 95% Confidence Interval
  101.04% Upper Bound

413 Passengers
  87.59% Passenger Usage
  18.20 Standard Error (in %)
  20.78% Relative Error
  51.91% Lower Bound 95% Confidence Interval
  123.27% Upper Bound
PICKUP TRUCKS

Observations done April 2013
Total Sites Observed 94

1,671 Overall - drivers and front passengers
  89.78% Overall Usage
  6.91 Standard Error (in %)
  7.70% Relative Error
  76.23% Lower Bound 95% Confidence Interval
  103.33% Upper Bound

1,334 Drivers
  89.45% Driver Usage
  5.98 Standard Error (in %)
  6.69% Relative Error
  77.73% Lower Bound 95% Confidence Interval
  101.17% Upper Bound

337 Passengers
  91.73% Passenger Usage
  13.20 Standard Error (in %)
  14.39% Relative Error
  65.87% Lower Bound 95% Confidence Interval
  117.60% Upper Bound
### Appendix V

Table A. Comparisons between Pre-Enforcement and Official Survey Seat Belt Use By Observer for All Vehicles, New Mexico, 2013

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<th>Total Raw Percent*</th>
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<td>Post-Enforcement Official - All Occupants</td>
<td>93.0%</td>
<td>90.8%</td>
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<tr>
<td>Observer difference from raw percent use</td>
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<td>+3.6%</td>
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**Comparison within observers between the observation periods**

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<th>Official</th>
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<tr>
<td>Percent difference in usage between observation periods</td>
<td>+6.8%</td>
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**Comparison of number of eligible** vehicles between the observation periods

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<td>Percent difference in number of vehicles between observation periods</td>
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Note: Each observer was assigned from 24 up to 36 sites and conducted observations on each of their sites during the Pre-enforcement survey (April 1-30, 2013) and again during the Official survey (June 1-30, 2013)

*Percent use is raw percent from the sites assigned to each observer

**Eligible vehicles on which observations were made**
Table B. Comparison between Pre-Enforcement and Official Survey Seat Belt Use by Observer for Pickup Trucks, New Mexico, 2013

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<tr>
<td>Raw average percent use*</td>
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<tr>
<td>Observer difference from total raw percent use</td>
<td>-2.4%</td>
<td>+5.3%</td>
</tr>
<tr>
<td><strong>Official-All Truck Occupants</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw Percentage Use*</td>
<td>88.4%</td>
<td>82.1%</td>
</tr>
<tr>
<td>Observer difference from raw percent use</td>
<td>-6.3%</td>
<td>+5.4%</td>
</tr>
<tr>
<td><strong>Comparison within observers between the observation periods</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute difference in percent usage between observation periods for each observer</td>
<td>-4.7%</td>
<td>-0.7%</td>
</tr>
<tr>
<td>Percent difference in usage between observation periods</td>
<td>-5.3%</td>
<td>-0.8%</td>
</tr>
<tr>
<td>Vehicles observed</td>
<td>Total</td>
<td>1,334</td>
</tr>
<tr>
<td>Pre-enforcement</td>
<td>1,481</td>
<td>566</td>
</tr>
<tr>
<td>Absolute difference in number of vehicles between observation periods</td>
<td>+147</td>
<td>+86</td>
</tr>
<tr>
<td>Percent difference in number of vehicles between observation periods</td>
<td>+11.0%</td>
<td>+17.9%</td>
</tr>
</tbody>
</table>

Note: Each observer was assigned between 24 and 36 sites and conducted observations on each of their sites during the Pre-enforcement survey (April 1-30, 2013) and again during the Official survey (June 1-30, 2013).
Acknowledgements

The difficult and important task of making the observations was accomplished by Greg Spain, Bill Rehm and Karl Wiese. We appreciate their ongoing efforts and support by continuing to provide the data to make this report possible. Special thanks to Jim Allison for his ongoing guidance and assistance.