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Seat Belt Use on North Dakota Rural Roads: 2015

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Disclaimer

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1. INTRODUCTION

North Dakota's rural roads provide vital social and commercial links for a widely dispersed population. The safety of these roadways is paramount in managing traffic assets to enhance the state's livability. Approximately two-thirds of the state's travel, in vehicle-miles, takes place on rural roads that interconnect small communities and join the rural geography to interstates, principal state corridors, and urban centers (NDDOT). This level of rural driving is relatively high considering only about a third of the nation's travel occurs on rural roads (U.S. DOT). From a safety perspective, this poses an inherent challenge because the risk for serious injury and death on rural roads is relatively high compared to the risk on urban roads (U.S. DOT 2005, U.S. DOT 2009a). In North Dakota, crash reports from 2010 to 2014 show that nearly 82% of fatal crashes and 89% of serious injury crashes – which includes those with fatal and disabling injuries – occurred on non-interstate rural roads (NDDOT 2015).

With the understanding that seat belts are a relatively low-cost safety device, and are an easy means of primary protection for occupants in passenger vehicles, North Dakota has chosen to continue to measure seat belt use on non-interstate rural roads. Understanding tendencies and trends in seat belt use on these rural roads is essential to wise decisions regarding efforts to encourage seat belt use in the state. The U.S. Department of Transportation does work with states to measure seat belt use through the long-standing annual National Occupant Protection Use Survey (NOPUS).

Results in this survey are a supplement to the NOPUS statewide estimate which also includes urban and interstate travel that are heavily weighted in the final seat belt use estimate. Figure 1.1 provides some insight into seat belt use based on occupant reports for crashes by road type.

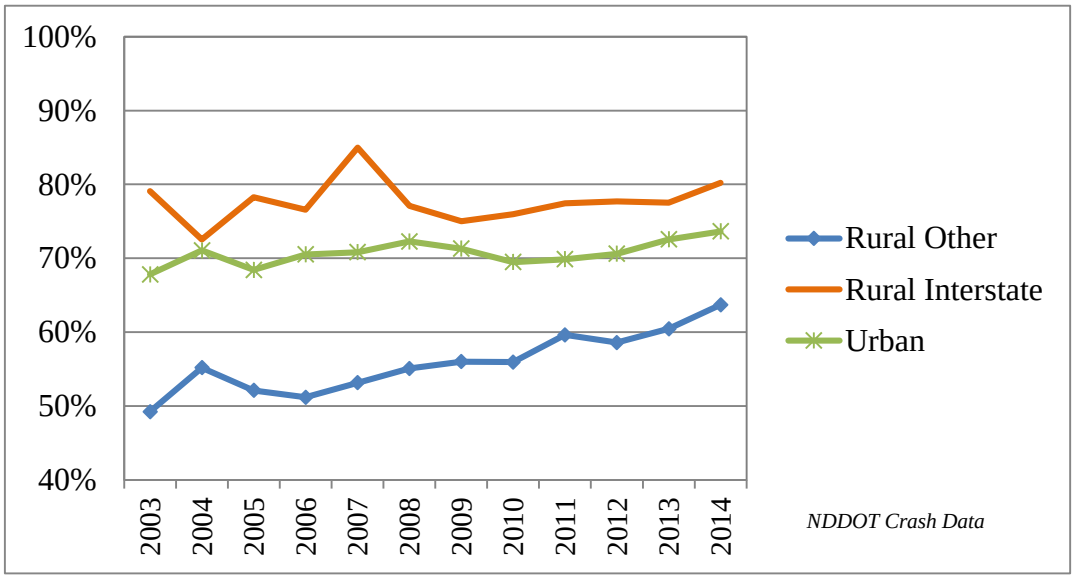

Figure 1.1 Seat Belt Use in Injury Crashes (includes Fatal Injuries), by Road Type

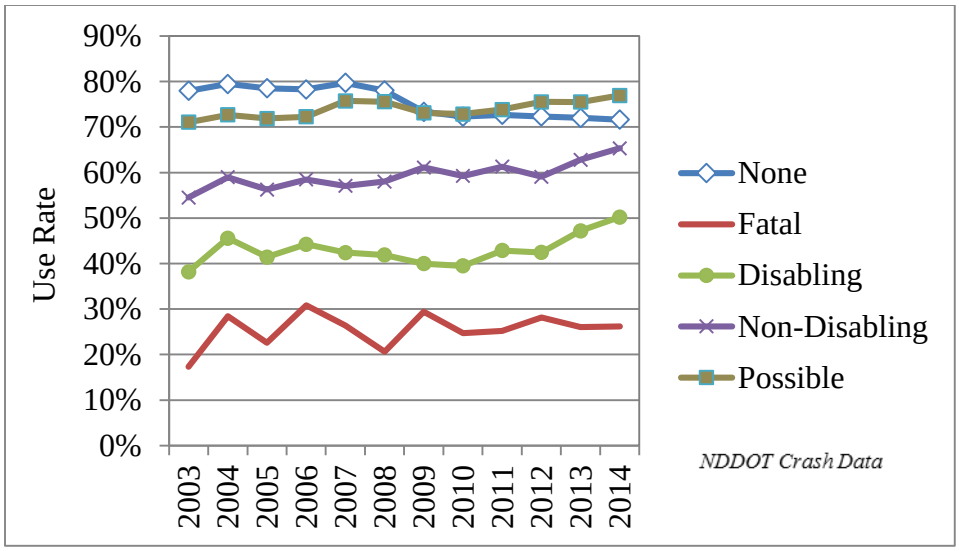

Figure 1.2 Seat Belt Use Rate in All Crashes, by Type of Injury

Although not a perfect reflection of use on the road types, trends do offer some insight for the larger occupant population. Other perspective on the traffic crashes are offered in the seat belt use rates by occupant injury outcome and crash incidence trends. The crash incidence is categorized by the most serious injury outcome of a crash event to provide additional context regarding traffic activity. The observation study of the larger occupant population reported on in this study is a continuation of efforts to measure seat belt usage for all occupants on rural roads in North Dakota.

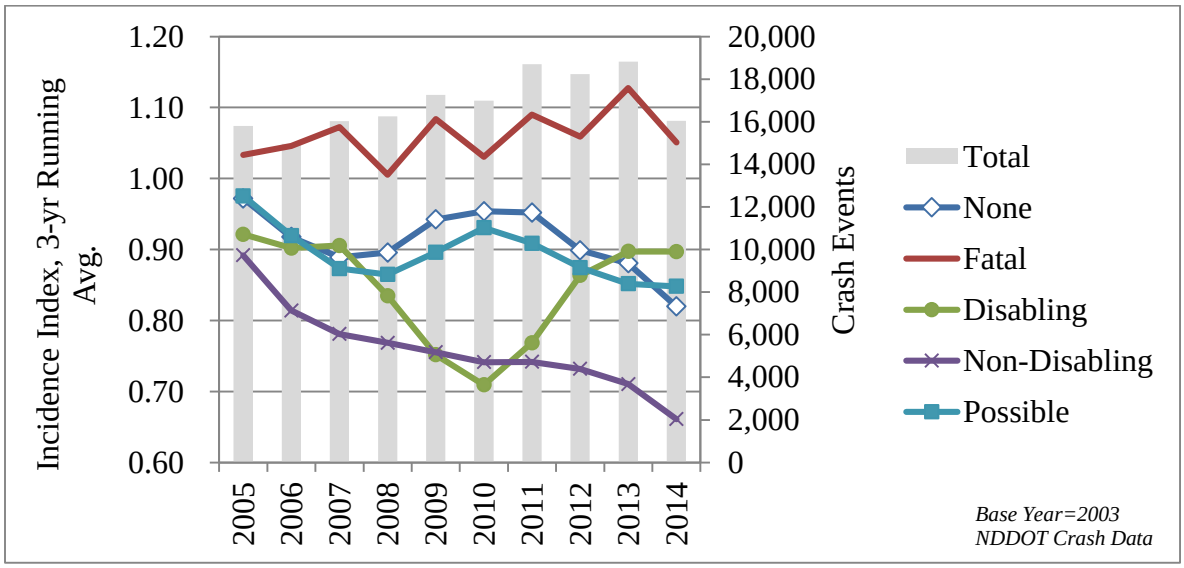

Figure 1.3 Crash Type, VMT Incidence Rate Index

2. METHODOLOGY

The method used in the 2015 survey is a continuation of a survey initiated in 2009. As with the previous surveys, a direct observation method was used. A first step in administering the survey was to define a representative and realistic survey sample. The sampling was based on rural county populations and geographic representation of counties across four quadrants of the state. Counties were used as the boundaries for the initial selection stratum in the sample because population and other demographic information for counties are readily available. The quadrants were defined based on the North Dakota Health Department administration regions (Figure 2.1). Initially, stratified random sampling was conducted with rural counties that are not part of the NOPUS survey. Due to changes that occurred with the NOPUS method for the 2012 survey, the counties in the rural survey were selected to avoid duplication of counties between the surveys.

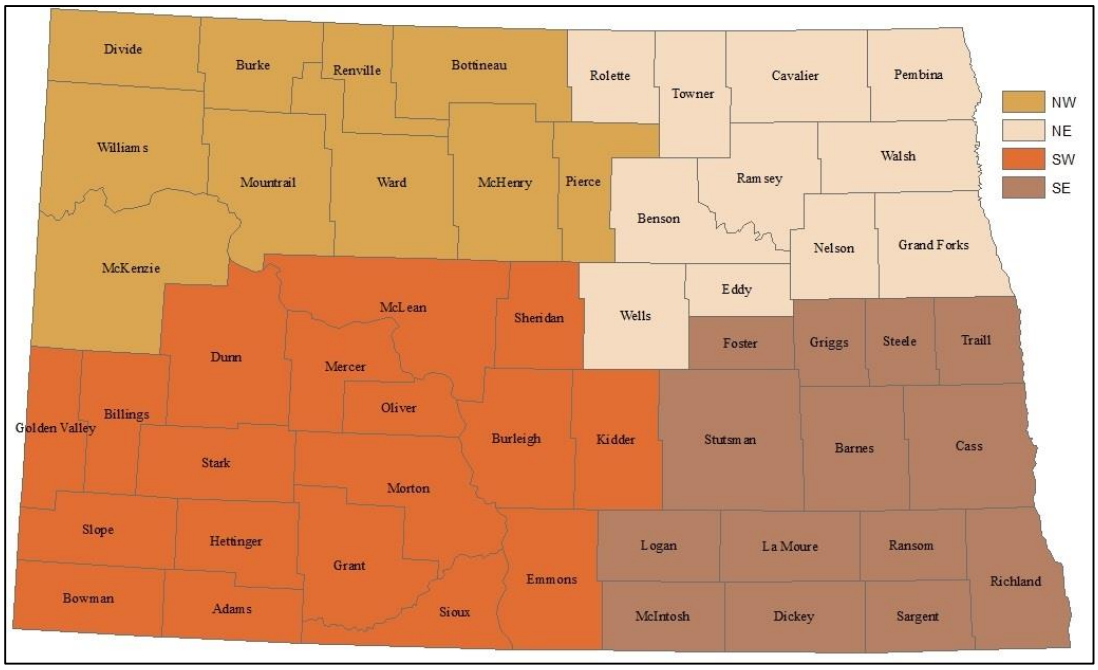

Figure 2.1 Rural Seat Belt Regions

The counties excluded from the annual statewide seat belt survey comprise the state's rural-county geography for this project. The three highest population counties in the statewide seat belt survey have approximately 62 people per square mile, compared to only 10 people per square mile for the three highest in the rural county sample. Although some counties with lower population densities are included in the statewide seat belt survey sample, the counties selected for that survey include the most populated – thus most urban – counties in the state. Twenty-four of the 37 counties not surveyed in the NOPUS survey were surveyed in this project (Figure 2.2).

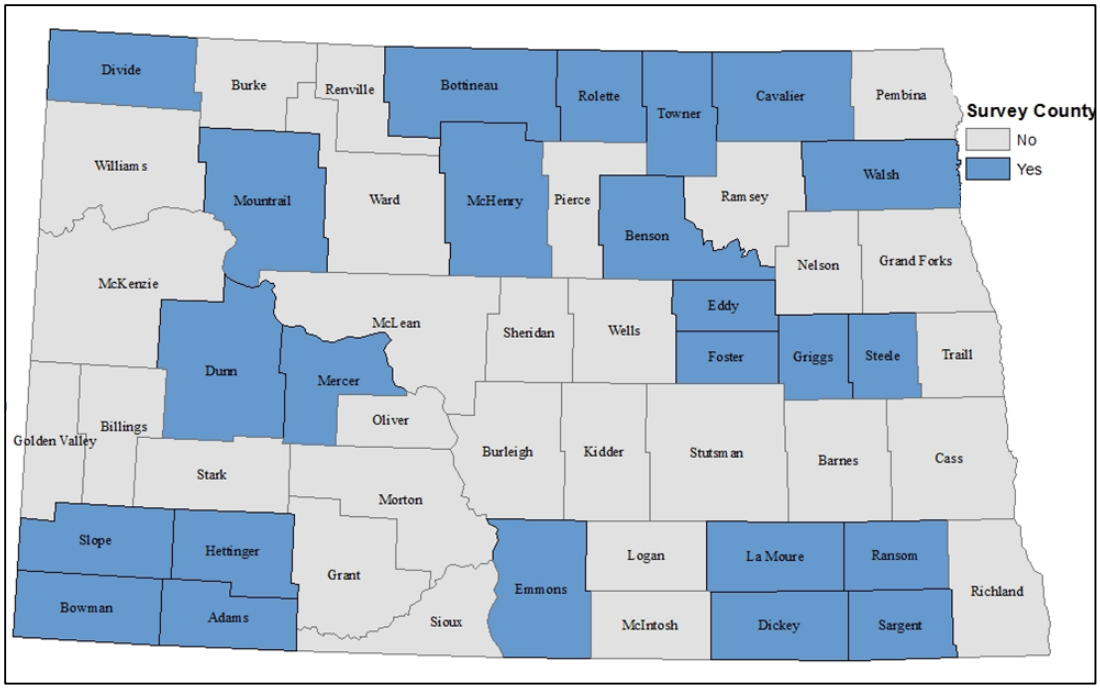

Figure 2.2 Rural Seat Belt Counties

Within the sample counties, sites selected for observation were based on local traffic knowledge because annual vehicle miles traveled, or traffic density, is not available for local roads.

Observations were conducted in July 2015. The seat belt observations were performed by experienced seat belt survey observers. Prior to conducting county observations, observers were asked to become familiar with the "Rural Seat Belt Observation Training Guide" which outlined specific procedures recommended for conducting rural seat belt observations in North Dakota, including the data collection tool (Appendix A).

The following outlines general site selection and timeline guidance provided to observers:

1. One site per town, up to two towns per county
2. Three to four "non-town" sites to cover higher traffic intersections on non-interstate/non-urban roads in the county
3. Sites chosen had to be a minimum of 20 miles away from the interstate (to minimize bias associated with urban commuter traffic)
4. Each site had to be observed for a minimum of 30 minutes, up to one hour if extra time was needed to meet the 30 observation minimum for a site. After the additional 30 minutes, the site was considered "complete" regardless if the 30 observation minimum was met or not.
5. Hours for collection were from 7 a.m. to 7 p.m.

3. RESULTS

A total of 6,145 observations of driver seat belt use were collected during surveys conducted at 144 sites across the state. This includes 159 instances where driver seat belt use could not be determined. These observations are not included when calculating driver seat belt use in this report. Passenger seat belt use was also collected when possible. The limited information on passenger use, which includes 1,487 observations, was used primarily to assess correlation with driver use. This includes 64 instances where passenger seat belt use could not be determined. These observations are not included when calculating passenger seat belt use in this report. The non-response rates – defined as the number of cases where use could not be determined – were low for both driver and occupant at 2.6% and 4.3% respectively. In addition to the observation distribution by county, the following table also includes the county populations used for weighted results highlighted in the following sections (Table 3.1).

Table 3.1 Observation Counts and Observation Site Counts by County: 2015

	Observations			Population (2014)	
County	**Count**	**% of TOTAL**	**Observation Sites Per County**	**Population**	**% of TOTAL**
Adams	325	5.3%	6	2,384	2.0%
Benson	251	4.1%	6	6,833	5.8%
Bottineau	347	5.6%	6	6,650	5.6%
Bowman	304	4.9%	6	3,247	2.8%
Cavalier	116	1.9%	6	3,855	3.3%
Dickey	218	3.5%	6	5,150	4.4%
Divide	254	4.1%	6	2,432	2.1%
Dunn	410	6.7%	6	4,399	3.7%
Eddy	226	3.7%	6	2,377	2.0%
Emmons	276	4.5%	6	3,422	2.9%
Foster	242	3.9%	6	3,362	2.9%
Griggs	116	1.9%	6	2,319	2.0%
Hettinger	255	4.1%	6	2,660	2.3%
LaMoure	205	3.3%	6	4,149	3.5%
McHenry	416	6.8%	6	5,988	5.1%
Mercer	402	6.5%	6	8,746	7.4%
Mountrail	498	8.1%	6	9,782	8.3%
Ransom	212	3.4%	6	5,446	4.6%
Rolette	144	2.3%	6	14,616	12.4%
Sargent	224	3.6%	6	3,931	3.3%
Slope	326	5.3%	6	765	0.6%
Steele	115	1.9%	6	1,955	1.7%
Towner	121	2.0%	6	2,310	2.0%
Walsh	142	2.3%	6	10,970	9.3%
TOTAL	**6,145**	**100.0%**	**144**	**117,748**	**100.0%**

3.1 Driver Rural Seat Belt Use

3.1.1 Road Type

Because the overall rural seat belt use rate may be skewed by the mix of rural highway and rural town seat belt observations – which may not truly reflect crash exposure risk – it may be more appropriate to consider the different driving environments separately. The more relevant numbers are seat belt use by road type, used here as the driving environment, because of the differing relative injury risk on the rural town and rural highway roads. The greater risk associated with travel outside of towns is evident in state crash data, which shows only about 3% of fatal crashes on rural roads occur in towns (NDDOT 2015). Therefore, rural highways are given special attention.

The observed seat belt use rate for drivers on rural highways was 67.2%. This use rate is significantly different than the use rate in rural towns at 43.0%.[1] Both use rates fall well below the NOPUS estimate of about 81%. Rural highway seat belt driver use rates had increased in the previous six years before dipping in 2015. Use in towns has ranged from 35.6% to 46.0% (Figure 3.1). Comparing 2015 to the previous three-year average to the average, highway use increased from 61.3% to 69.3% and use in town from 41.2% to 42.4%. The percentage point increase of 8.0 for highway use is a 13% increase and the 1.2 percentage point increase translates to a 3% rise in town use, respectively. With regard to the year-to-year movement, the decrease in driver use on rural highways from 2014 to 2015 is significant at the 99th percentile (χ^2=8.9258, ρ=0.003, n=6,801). The increase from 2014 to 2015 for seat belt use in towns is statistically significant at the 95th percentile (χ^2=4.9210, ρ<0.03, n=4,753).

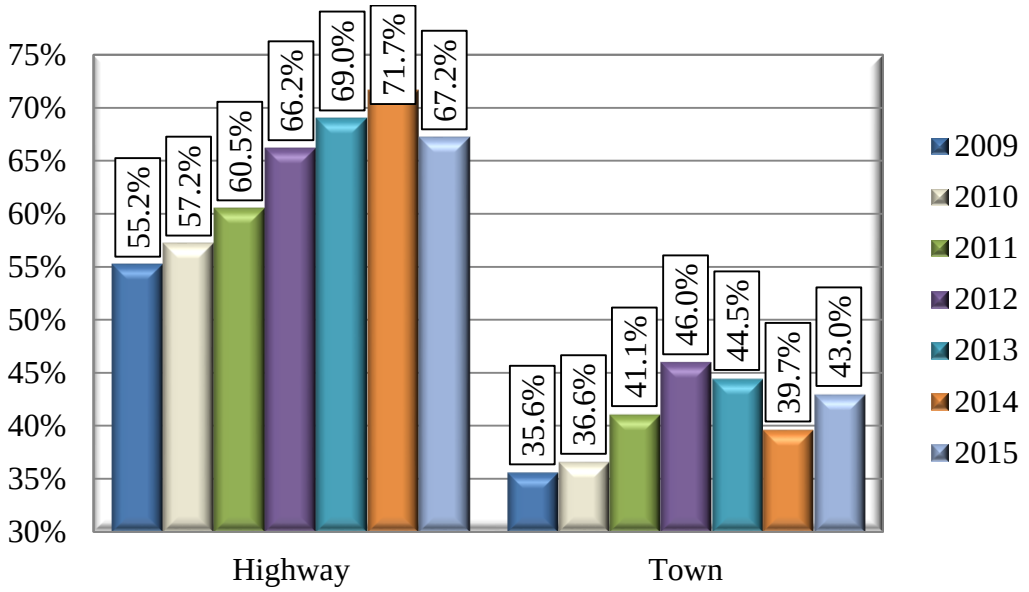

Figure 3.1 Driver Seat Belt Use by Road Type

[1]Figures reported for the seat belt use rates are observed rates weighted by county population. For regional and statewide figures, only weighted seat belt use rates are reported unless otherwise specified.

The range of highway seat belt use rates by county is large, considering an average high of 82% in Steele County and an average low of 55.7 % in Emmons County over the past three years (Figure 3.2). The range in seat belt use suggests some potential to investigate the environment and practices in the more successful counties to determine if best practices can be transferred to other areas or if there are unique cultural or travel situations surrounding the higher rates. Average seat belt use in rural towns ranges from a high of 63.9% in Slope County to a low of 22.2% in Hettinger County.

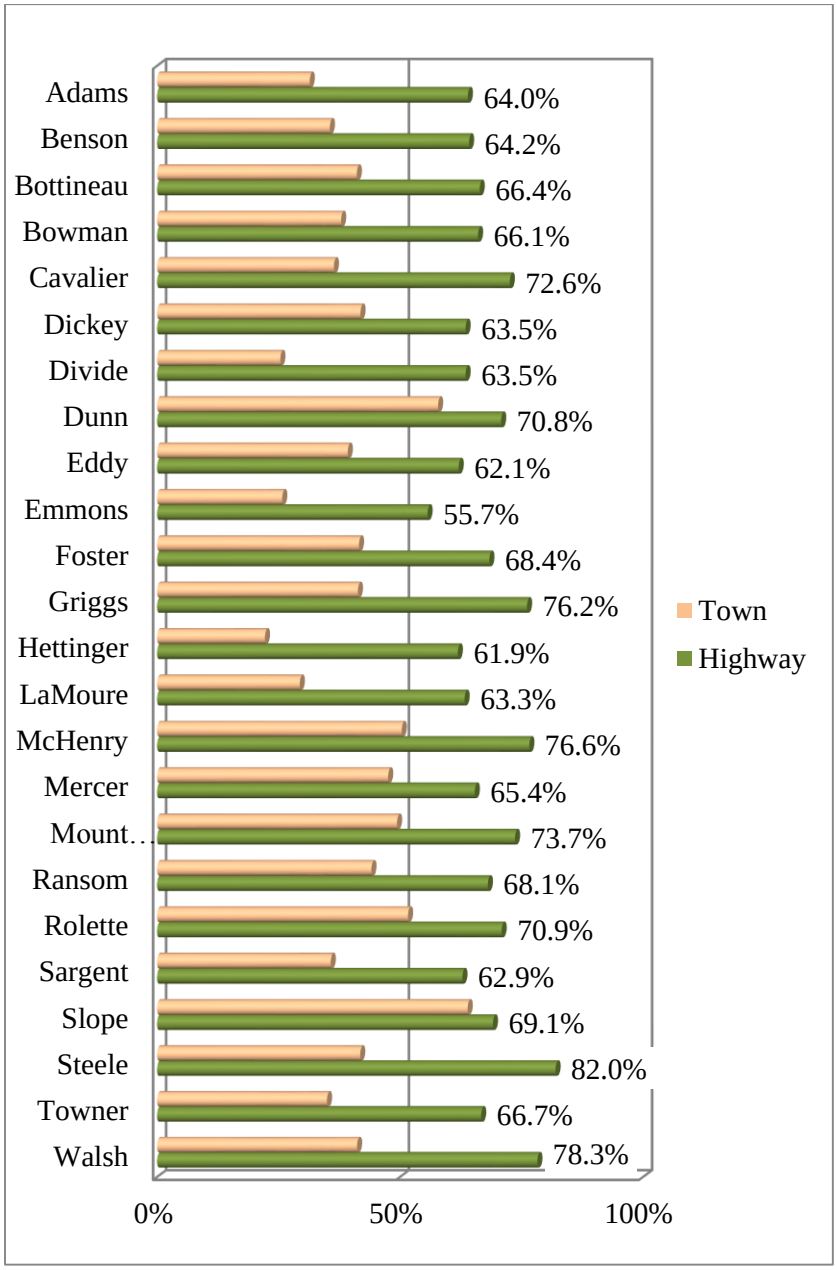

Figure 3.2 Driver Seat Belt Use by Road Type and County, Average 2013-2015

Clusters and corridors of counties can be identified in the map of seat belt use by looking at the distribution of counties by use rates (Figure 3.3). In the northwest region, McHenry and Mountrail remain in the upper quartile. Walsh, Griggs, and Steele counties are in close proximity to each other as a cluster in the northeast with high use reported. With these counties, commuter traffic and close proximity to an interstate highway may be an influence. Although attempts are made to minimize interstate traffic influences, it is likely that some counties still have effects from commuter traffic where use rates tend to be higher. Counties with the lowest highway seat belt use rates are grouped in two areas: Eddy, Benson, Towner and Bottineau counties along the northern tier and Dickey, LaMoure, and Sargent in the southern part of the state. To the central and west, Emmons, Hettinger, Bowman, and Adams counties had less than 64.4% of observed vehicle occupants using seat belts. White counties were not surveyed.

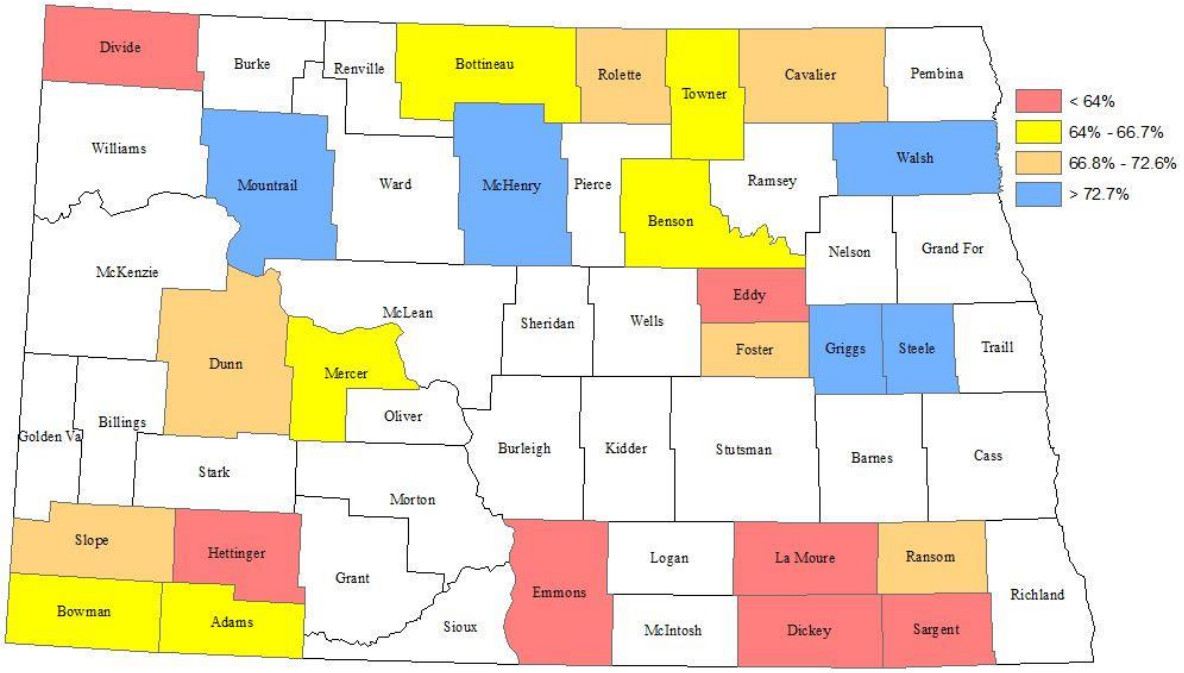

Figure 3.3 Highway Seat Belt Use by County, 2015

Of the counties that have been observed in recent years, Bowman and Dickey had the largest increases in highway seat belt use compared to the county average for the previous years' observation rates (Table 3.2). Counties with the largest declines in highway seat belt use were Dunn and Mercer. Once again, it is possible that the fluctuations in seat belt use identified here are attributable to driver behavior, but changes in driver characteristics or environmental factors have an influence.

Table 3.2 Annual Observation of Highway Seat Belt Use by County

County	2011	2012	2013	2014	2015	Percentage Point Change from Avg. Previous 3-yr Observations
Adams		66.0%	61.4%	63.7%	66.9%	3%
Benson	46.0%	73.0%	60.4%	66.9%	65.3%	-1%
Bottineau			67.7%	66.2%	65.4%	-2%
Bowman		66.9%	59.1%	64.1%	75.0%	12%
Cavalier	49.2%	70.2%	76.0%	63.0%	78.9%	9%
Dickey	41.9%	65.7%	53.2%	64.4%	73.0%	12%
Divide	51.6%	53.6%	71.4%	60.1%	58.5%	-3%
Dunn		61.0%	77.0%	74.2%	61.3%	-9%
Eddy		65.6%	57.6%	64.3%	64.3%	2%
Emmons	57.8%		53.2%	57.2%	56.6%	1%
Foster	65.8%	67.9%	69.7%	73.5%	62.0%	-8%
Griggs	58.7%	71.2%	74.8%	81.7%	72.0%	-4%
Hettinger	62.8%	67.9%	51.3%	71.1%	63.4%	0%
LaMoure		66.9%	54.9%	70.8%	64.2%	0%
McHenry		63.4%	81.6%	77.2%	71.1%	-3%
Mercer			70.6%	67.1%	58.5%	-10%
Mountrail			74.1%	78.7%	68.2%	-8%
Ransom	59.5%	67.4%	65.1%	68.0%	71.2%	4%
Rolette		62.2%	73.6%	76.5%	62.6%	-8%
Sargent	64.9%	61.9%	60.7%	65.4%	62.5%	0%
Slope		78.2%	72.1%	68.4%	67.0%	-6%
Steele	72.9%	63.5%	84.5%	81.3%	80.2%	4%
Towner	45.7%	52.7%	58.9%	71.4%	69.8%	9%
Walsh	77.0%	81.8%	82.7%	74.4%	77.7%	-2%

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3.1.2 Region

Based on the regions defined in the methodology section, seat belt use among drivers is presented as trend lines in Figure 3.4. Seat belt use by drivers in all regions declined slightly in 2015. The eastern regions are slightly above the northwest in seat belt use. These regions were similar with use rates of around 68%. The northwest had the largest percentage decline in seat belt use, 8.1%, among all regions. The decline may be related to a change in the driver group composition related to declining oil industry activity. The southwest had a smaller change with a 2.4% decline in use.

The northwest region, at 67.2%, fell below the northeast and southeast in seat belt use on rural highways. The northeast rate of 69.1% seems to have leveled off relative to previous years. The lowest use among regions was reported for the southwest at 62.3%. All regions experienced decreases in highway seat belt use from 2013 to 2014. The changes in the seat belt use rates are statistically significant compared to last year for the northwest (χ^2=12.8309, ρ<0.001, n=1,363) and southwest (χ^2=5.1857, ρ=0.03, n=2,511) regions at the 95th percentile.

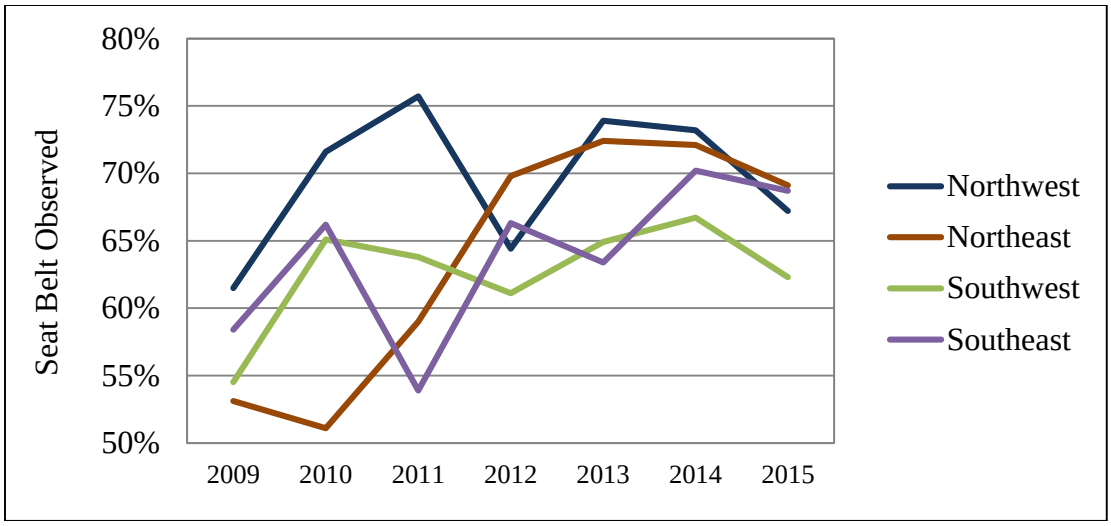

Figure 3.4 Highway Driver Seat Belt Use by Region: 2009-2015

3.1.3 Driver Gender

Males were present at a ratio of about 2.3 to 1 in the driver population for the rural road seat belt observations. Of the 6,119 drivers observed where gender could be determined, 4,279 were male. Females made up a smaller share of the driver population both on highways and in towns, with the share higher in town at 35.7% compared to 26.6% on the highways. The smaller share on highways is substantially lower than 2014 when it was 32.7%. It is similar to the 2013 share of 26.3%. Female share in towns was similar compared to previous years. Gender is a common topic in seat belt use research because of the relatively low-cost and ease with which the information can be collected. The lower propensity for males to use seat belts found in this study is consistent with other research (Groetzke and Islam 2015, Strinea et. al, 2010, U.S. DOT 2008, Gross et al. 2007, Vivida et al 2007, McCartt and Northrup 2004). Driver seat belt use does vary significantly between the genders (χ^2=63.3037, p=<0.001, n=6,145).

With regard to driver use rates by gender for road type, female use on rural highways was at 76.9% compared to 63.2% for males (Figure 3.5). In rural towns, the use rates are 51.8% for female drivers and 38.6% for males. While seat belt use did increase for female and male drivers in towns, drivers' seat belt use on rural highways decreased. The decrease in seat belt use by females (χ^2=5.45, p=0.02, n=1,860) and males (χ^2=4.2373, p=0.04, n=4,959) on rural highways is significant at the 95th percentile compared to the previous year. Changes in the other road type and driver categories were not statistically significant.

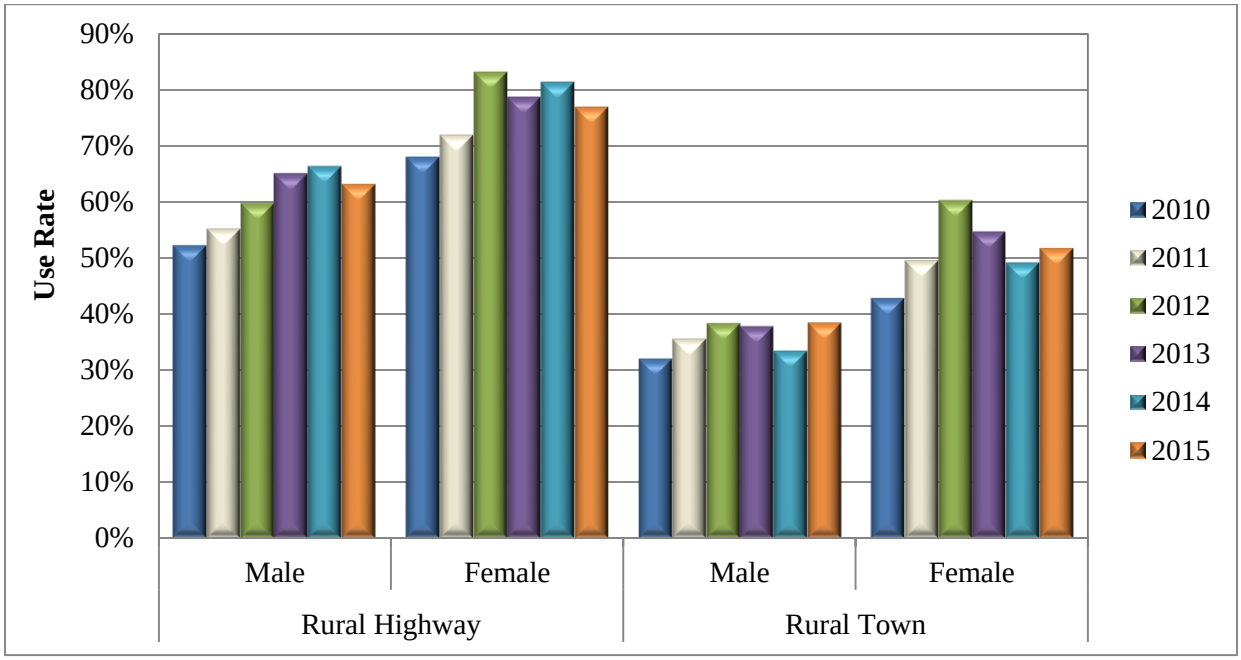

Figure 3.5 Driver Seat Belt Use by Gender and Road Type: 2010-2015

Table 3.3 shows county-level seat belt use rates on rural highways and in rural towns by gender. The county information shows the highest female use rates for 2015, above 85%, on rural highways are in Steele, Cavalier, and Bowman counties. The lowest rates seen among female drivers, with rates under 70%, were in Foster, Mercer, Benson and Mountrail counties. Steele, Cavalier and Bowman counties had the highest use rates among male drivers on rural highways, with rates from 71% to 77%. The lowest seat belt use rates among male drivers, with rates under 57%, were in Divide, Hettinger, and Emmons counties.

Male driver seat belt use in towns was highest in Slope County at 64%. The use within this driver group was lowest, under 20%, in Hettinger and Emmons counties. Among female drivers, use was under 30% in Hettinger, Towner and Divide counties. The highest rate for females, 79%, was reported in Griggs County. Divide County had the lowest rate in town with only 9% of female drivers observed using seat belts.

County-level seat belt use figures should be used with caution because of factors which may affect the figures relative to other counties and year-to-year changes. These factors may include commuter traffic, observation site proximity to highways, community events, local economic activity, and observation counts. The information is offered as additional insight, but should be used sparingly as the sole factor in resource decisions. Used in conjunction with expanded information from this survey or other seat belt use studies, the additional information may be useful in targeting education and enforcement activities.

Table 3.3 County Driver Seat Belt Use, by Road Type and Gender

	Average 2012-2014				2015			
	Rural Highway		Rural Town		Rural Highway		Rural Town	
County	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Adams	57%	79%	30%	50%	65%	71%	25%	42%
Benson	61%	80%	34%	42%	66%	65%	26%	40%
Bottineau	63%	77%	35%	54%	61%	79%	33%	59%
Bowman	59%	81%	30%	58%	71%	87%	43%	50%
Cavalier	65%	84%	25%	38%	76%	88%	43%	57%
Dickey	56%	72%	34%	51%	70%	81%	43%	55%
Divide	58%	88%	33%	27%	55%	79%	21%	9%
Dunn	71%	73%	55%	66%	59%	74%	57%	68%
Eddy	59%	73%	45%	51%	59%	80%	21%	38%
Emmons	48%	80%	20%	34%	48%	77%	15%	46%
Foster	66%	82%	34%	52%	63%	59%	30%	48%
Griggs	71%	85%	27%	50%	65%	85%	30%	79%
Hettinger	48%	80%	21%	39%	54%	78%	11%	28%
LaMoure	60%	75%	28%	40%	57%	76%	26%	49%
McHenry	71%	83%	38%	63%	66%	82%	53%	72%
Mercer	64%	84%	37%	53%	57%	63%	49%	67%
Mountrail	75%	86%	48%	58%	69%	67%	42%	61%
Ransom	59%	79%	32%	53%	67%	79%	29%	49%
Rolette	64%	83%	38%	62%	59%	70%	61%	47%
Sargent	58%	73%	28%	49%	59%	70%	21%	41%
Slope	70%	83%	65%	63%	63%	83%	64%	72%
Steele	73%	84%	31%	41%	77%	94%	55%	50%
Towner	56%	74%	39%	51%	66%	79%	38%	25%
Walsh	75%	88%	35%	58%	65%	79%	29%	50%

3.1.4 Vehicle Type

As with gender, vehicle type is also commonly considered in seat belt surveys. Both offer potentially useful information for greater efficacy in directing education and enforcement outlays toward a driver group (U.S. DOT 2009b). For example, a nationwide study of fatal crashes showed that pickup truck occupants had the highest percent of unrestrained fatalities among all passenger vehicle types (U.S. DOT 2012). Similar use patterns for this vehicle type were found here, with male pickup truck drivers having the lowest use rates among the gender-fleet mix.

The rural seat belt observations included more pickup trucks than cars (2,883 and 1,376, respectively), along with 1,368 sport utility vehicles (SUVs), and 412 vans (Figure 3.6). The motorcycle figure varies substantially year-to-year based on weather conditions. For example, the count in 2015 was relatively high at 106 compared to 57 in 2014. The fleet composition for the seat belt observation, by vehicle type, is similar to 2014 with a slight increase in the share of SUVs.

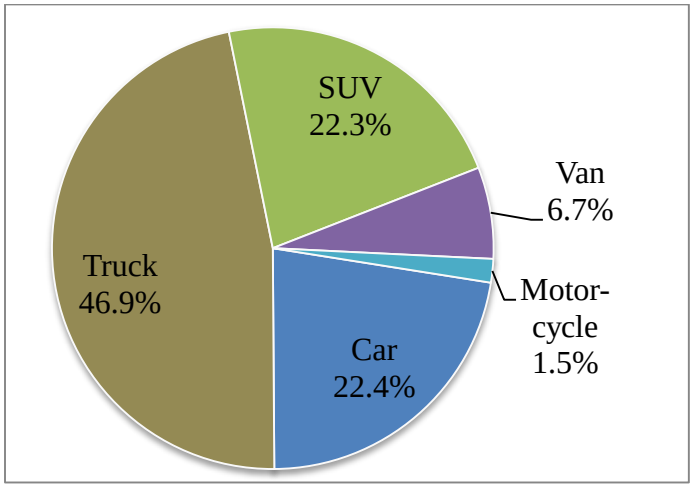

Figure 3.6 Observed Rural Road Passenger Vehicle Fleet, by Vehicle Type

A significant variation in seat belt use is found across passenger vehicle types on rural roads (χ^2=118.5169, p<0.0001, n=5,986). In 2015, driver seat belt use in cars on rural roads was 59.1% compared to 51.6% for pickup truck drivers (Figure 3.7). Use by pickup truck drivers on rural highways increased slightly compared to 2014 while use by car drivers decreased by 4.0 percentage points. Sport utility vehicle drivers also had a slightly lower observed use rate in 2015 at 67.2%. Seat belt use by van drivers increased by 7.6 percentage points in 2015 compared to 2014. The changes between 2014 and 2015 by vehicle type, for rural roads, were not statistically significant.

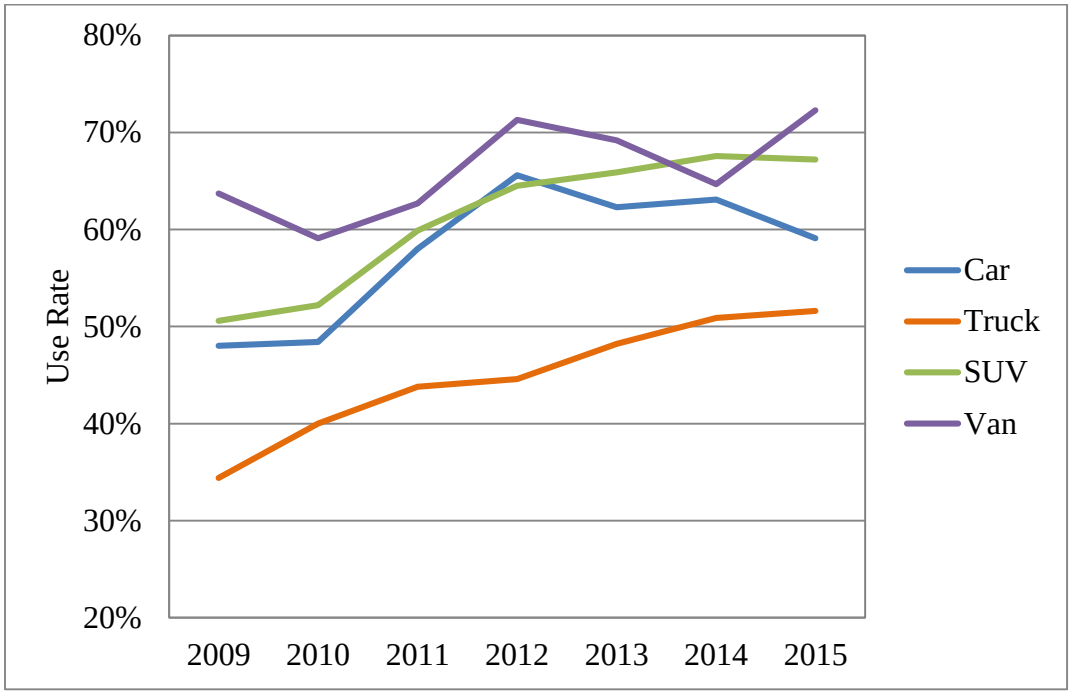

Figure 3.7 Driver Seat Belt Use by Vehicle Type

Further stratification for gender shows that female drivers have higher seat belt use rates among all vehicle classes on all roads, ranging from 60.1% for pickups to 76.1% for vans (Table 3.4). Males, in comparison, used seat belts only 50.6% of the time in pickup trucks and 70.4% of the time in vans. Seat belt use in pickup trucks increased for both genders when comparing rates in 2015 to those in 2014. A decline is statistically significant at the 95th percentile for male car drivers, with use rates falling from 60.2% in 2014 to 55.7% in 2015 (χ^2=9.7591, ρ=0.002, n=870).

Table 3.4 Driver Seat Belt Use by Vehicle Type and Gender

	2012		2013		2014		2015	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Car	59.6%	72.4%	60.8%	65.0%	60.2%	65.2%	55.7%	63.2%
SUV	63.4%	66.0%	65.5%	66.3%	65.8%	70.8%	60.6%	70.8%
Pickup	41.9%	68.5%	46.7%	63.6%	45.6%	53.7%	50.6%	60.1%
Van	66.3%	81.6%	60.8%	77.3%	63.8%	74.0%	70.4%	76.1%

When also considering the road environment, the highest use rate was among females driving vans on rural highways. Seat belts were in use for 93.5% of drivers observed in this group (Table 3.5). The lowest use rate, 34.1%, was again among males driving pickups in rural towns. Seat belt use decreased for males and females driving cars and SUVs on both road groups comparing 2015 to the previous three-year average with the exception of female drivers in towns. Use rates for males and females increased among pickup and van drivers on both road groups with the exception of female drivers in towns. The largest decrease in use rates, considering gender, road and vehicle mix, was for male car drivers on highways in comparing 2015 to the previous three-year average.

Table 3.5 Driver Seat Belt Use by Vehicle Type, Gender, and Road Type

	Average, 2011-2014				2015			
	Rural Highway		Rural Town		Rural Highway		Rural Town	
	Male	Female	Male	Female	Male	Female	Male	Female
Car	72.8%	76.4%	47.3%	53.4%	61.8%	72.4%	44.9%	49.5%
SUV	76.8%	82.8%	44.5%	52.7%	72.0%	81.6%	40.3%	56.3%
Pickup	57.6%	71.7%	33.0%	43.1%	59.7%	73.2%	34.1%	49.9%
Van	74.8%	91.0%	40.6%	62.7%	77.2%	93.5%	58.6%	55.6%

3.2 Passenger Rural Seat Belt Use

As previously mentioned, passenger observations were collected when traffic flow and field of vision allowed observers to collect information in addition to the driver seat belt use (Figure 3.8). Passenger seat belt use was 79.7% on rural highways and 59.7% in rural towns. The highway use reflects a decrease and town use is an increase compared to 2014. Neither change is statistically significant. Unlike the driver population, a majority of passengers were female, comprising 57.1% of the group.

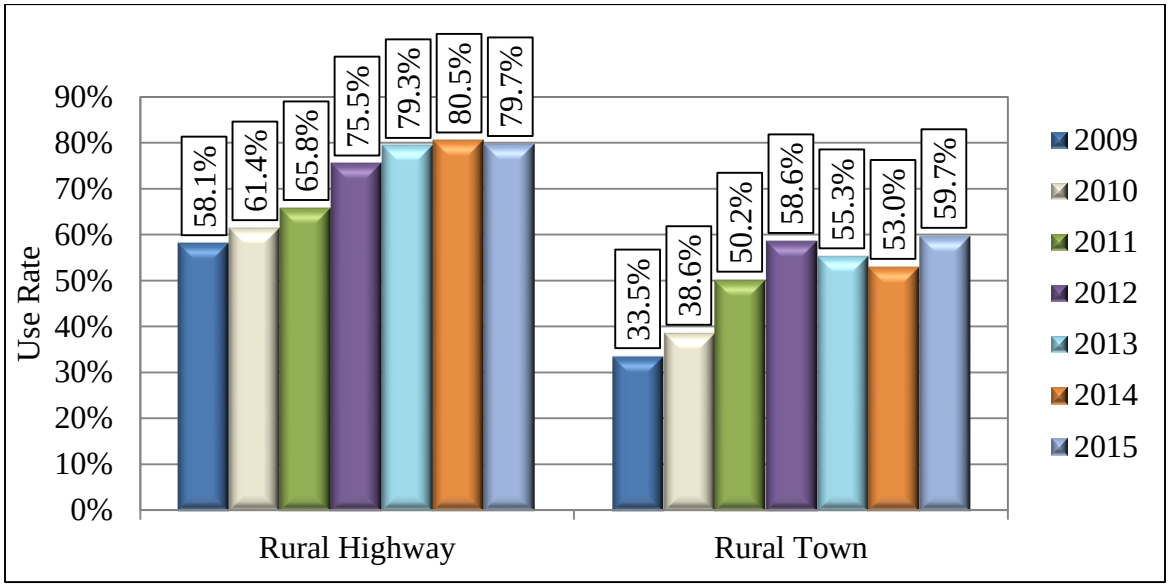

Figure 3.8 Seat Belt Use in Passenger Observation Cases

As with driver observations, gender was a significant characteristic in passenger seat belt use (χ^2=67.9530, p<0.001, n=1,394). Recall that the effects of the road type mix in the passenger gender trends may skew these overall figures considering the stark difference between highway and town usage. Consequently, use rates are presented in the context of the road type (Figure 3.9). Figures by gender and road type show an increase for male passengers on rural highways. Both male and female passenger use increased slightly in rural towns. Although it is a small change, the decrease in female passenger seat belt use on rural highways is significant (χ^2=5.9775, p<0.02, n=1,051). The increase in male seat belt use in towns is also significant at the 95th percentile (χ^2=4.5751, p<0.04, n=424).

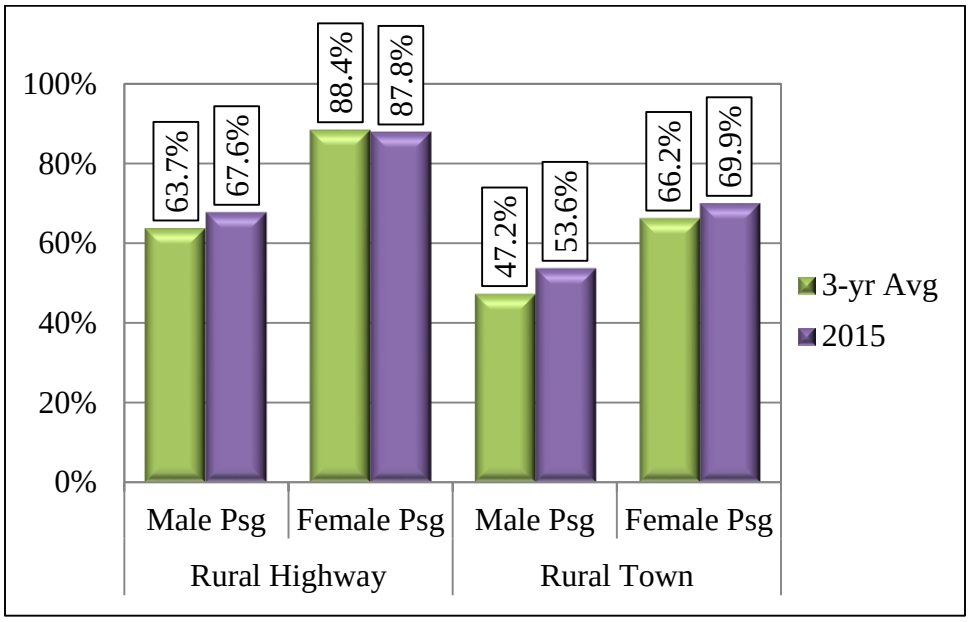

Figure 3.9 Passenger Seat Belt Use by Road Type and Gender, Previous 3-Year Average and Current Year

Driver and passenger seat belt use rates were correlated in cases where passenger use could be recorded (Pearson's Corr.=0.68, p<.0001, n=1,396). This relationship is slightly weaker than in 2014. The findings are consistent with earlier research (Nambisan and Vasudevan 2007). In 64.8% of observations, both the driver and passenger were belted (Figure 3.10). Neither passenger nor driver was belted in 22.1% of the observations. This share is smaller than in previous years. The driver was belted and passenger unbelted in 4.4% of observations, while the passenger was belted and the driver unbelted 8.7% of the time. The share of observations where only the passenger is belted is the highest in the seven years the survey has been conducted. The share with neither belted in the lowest in the survey history. Males were driving in a majority of the cases where passenger gender and belt use was recorded, representing 68.8% of the drivers. Passenger seat belt use was not significantly related to driver gender.

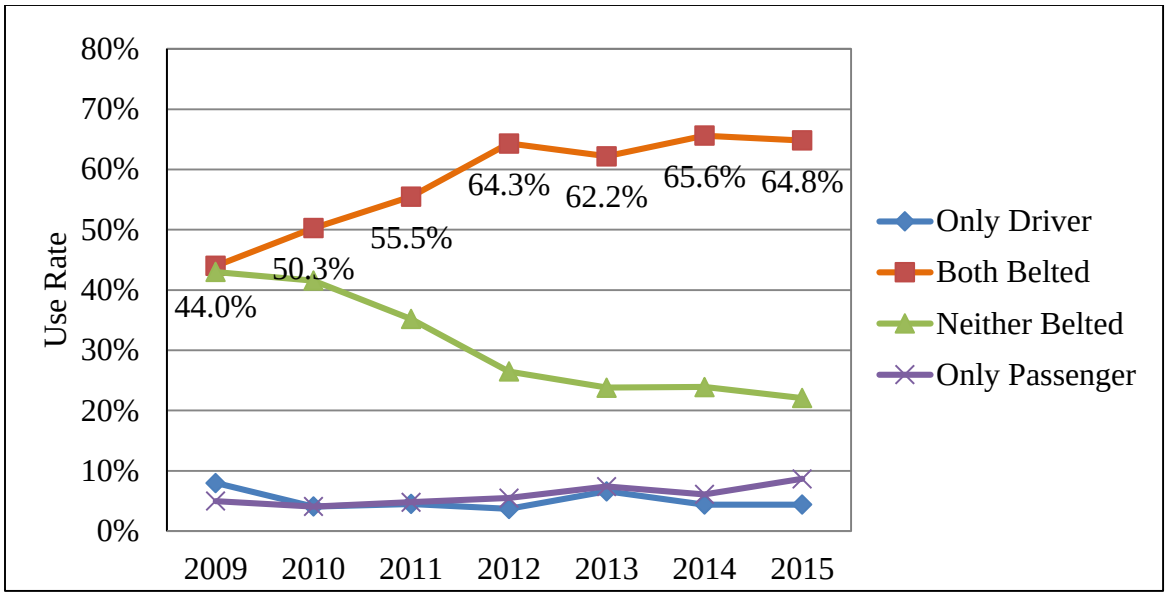

Figure 3.10 Passenger Seat Belt Use by Road Type

Stratifying the passenger seat belt cases by road type shows that passengers were consistently more likely to be belted on rural highways than in rural towns over the past seven years (Figure 3.11). Unbelted passengers were found most frequently in rural towns, with use on these roads slipping between 2013 and 2014 before increasing slightly in 2015. The continued positive trend by passengers observed on rural highways is a key gain in traffic safety as the likelihood for serious injury crash outcomes is greater on these roads because of factors such as higher speeds and greater distance to emergency services. Neither the slight decline in use on rural highways nor the increase in towns, from 2014 to 2015, is statistically significant.

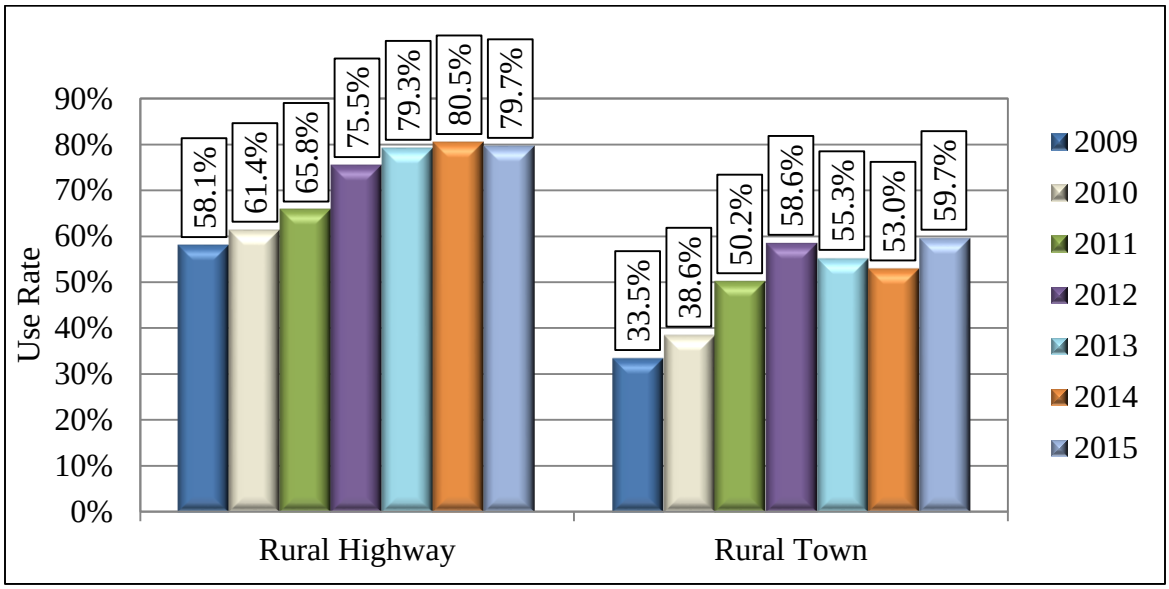

Figure 3.11 Passenger Observation Cases by Road Type

3.3 Motorcycle Helmet Use

Although the primary target for this occupant use survey is drivers of passenger vehicles, observers were also asked to collect information about motorcycle driver helmet use when traffic allowed. During the 2015 survey, 106 motorcycle observations were collected. Statistics are reported, but because of the very small number of observations, caution should be used in making generalizations about the larger motorcycle driver population.

Males were drivers in 102 of the 106 cases. Helmet use on rural highways was estimated at 56.1% and 71.4% in towns (Figure 3.12). The rural highway helmet use is above 2014, but there is a large variation across time likely related to limited observations. Consequently, the figures should be used with caution in representing the population. Only 14 observations were collected for rural towns, so the figure is not statistically robust. Passenger helmet use was collected for 27 observations. The majority were on highways with 19 of 26 passengers wearing helmets. The single passenger observed in town was not wearing a helmet. All passengers were female.

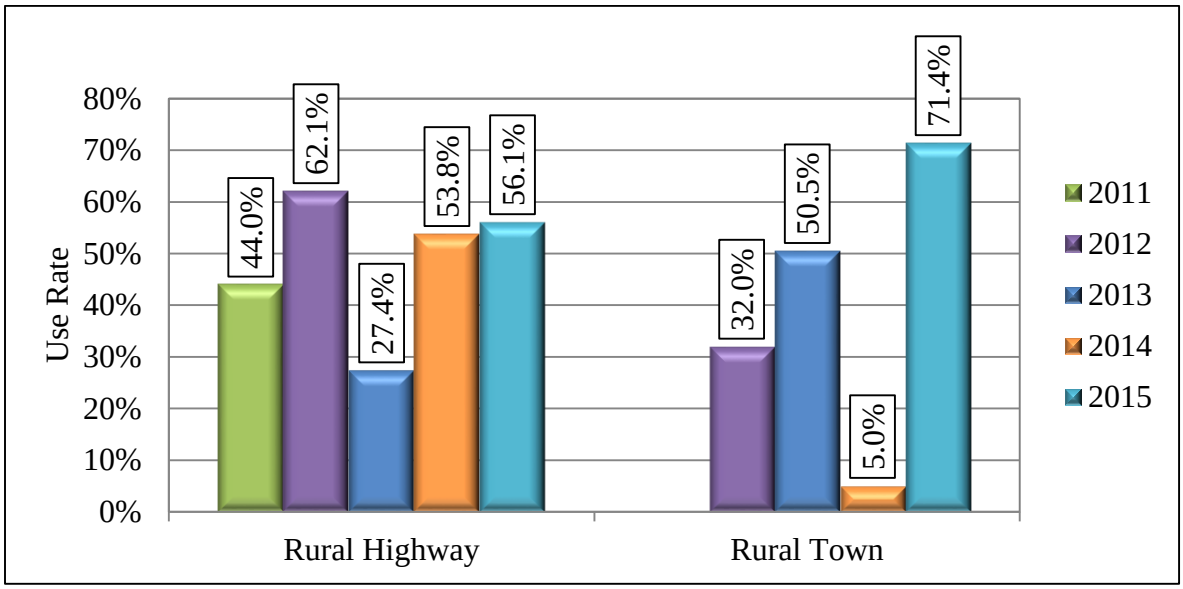

Figure 3.12 Driver Helmet Use by Road Type

The largest gender-road driver group for motorcycles has been males on rural highways. Limited observations show a slight increase in helmet use by male motorcycle drivers on rural highways (Figure 3.13). With the exception of a very low use rate in 2013, the rate has averaged about 57% since 2012.

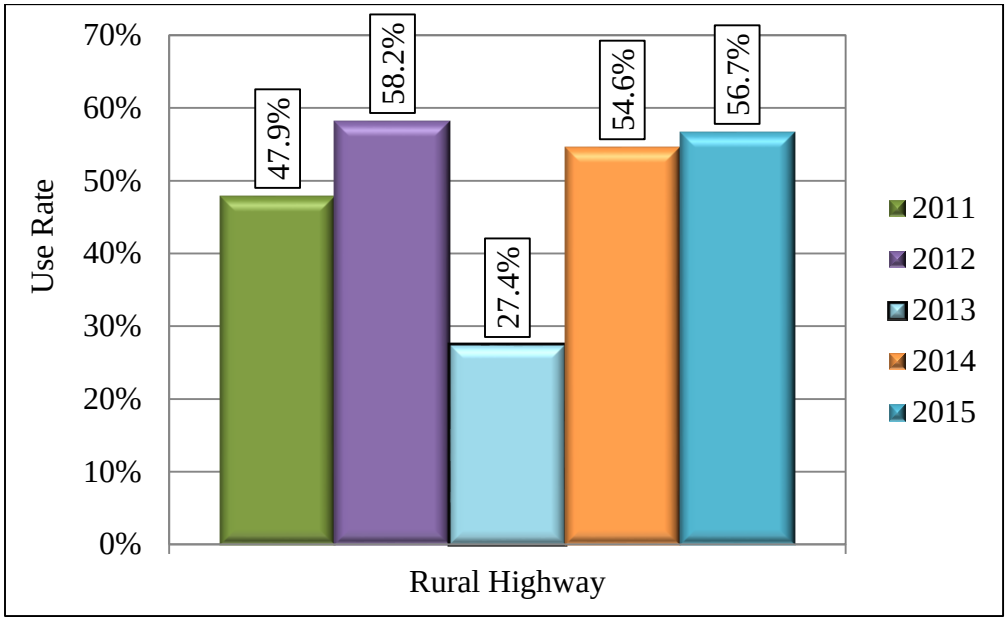

Figure 3.13 Driver Helmet Use, Males on Rural Highways

Only 13 observations were collected for males in rural towns during the 2015 survey with 57.1% wearing helmets. Three female riders were observed on rural highways – one was wearing a helmet. The single female motorcycle driver observed in town was not wearing a helmet. All motorcycle helmet use figures should be used with caution because of the limited observations.

4. DISCUSSION

North Dakota's roads provide vital economic and social connections for residents and visitors. These roads are a relatively high-risk travel environment. Rural roads account for 75% of annual travel and nearly 82% of fatal crashes and 89% of serious injury crashes. While there are many important aspects of road safety, interest here is in measuring seat belt use for managing it as a safety priority.

A total of 6,145 driver observations were collected at 144 sites across 24 rural counties. Highway seat belt use decreased from 71.7% in 2014 to 67.2% in 2015. The survey has measured an 8.0 percentage point increase in rural highway seat belt use comparing average use between 2013 and 2015 to the previous three-year average. Similar to previous findings, seat belt use was found to be significantly different on rural highways and in rural towns. Average observed highway use rates ranged from 55.7% to 82.0% on rural highways in individual counties and from 22.2% to 63.9% in rural towns between 2013 and 2015. The large ranges are similar to previous studies. In addition to statewide media efforts, local programs focusing on education and high visibility seat belt enforcement (such as the *Click It Or Ticket* campaign), individual agency campaigns, and multi-agency enforcement efforts, have contributed to the increase. The lower rate of seat belt use on rural highways may be due to a greater share of males, who tend to have a lower use rate, in the 2015 sample. In addition, the observed female use did decline compared to the previous three years.

A significant decrease in use by male drivers on highways was measured. Female driver seat belt use on highways fell from 81.4% in 2014 to 76.9% in 2015. Female driver seat belt use on rural highways remained higher than the male driver use rate of 63.2%. The declines in the male and female use rates were significant. It is the second decline in the female driver seat belt use rate that had previously trended upward. Based on year-to-year movements in the trend, it appears that a specific education or enforcement campaign triggered a larger than "normal" increase in this user group in 2012. It appears the large gain was not sustained in 2013. The rate was up again in 2014, but fell below the 2013 use rate in 2015. Male seat belt use on highways also fell below the 2013 rate.

Seat belt use rates on highways were also found to vary significantly by vehicle type. Pickup truck drivers had the lowest propensity to use seat belts, at 51.6%, and van drivers had the highest use rate at 72.3%. Stratification for gender and vehicle shows that female drivers have higher seat belt use rates among all vehicle classes. As with previous surveys, comparable town seat belt use rates were lower than highway use rates across all gender and vehicle strata.

Results also continued to show a correlation between driver and passenger seat belt use. Where observations were collected in driver and passenger shared seat belt behavior, both were belted in 64.8% of cases, a decrease from 65.6% in 2013. Neither was belted in 22.1% of observations, the smallest share in the seven year survey history.

The limited number of motorcycle helmet use observations that were collected shows an increase in usage on rural highways. A few observations were collected in towns but figures were not statistically useful.

The seat belt use rate on the state's rural roads was found to be lower than the commonly reported NOPUS use rate collected in the annual statewide seat belt survey. The relative risk and significant difference in use rates between rural highways and towns should continue to be considered in research related to rural seat belt use. In addition, results indicate a need for continued assessment of programs to increase local seat belt enforcement or awareness on rural roads.

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APPENDIX: SEAT BELT OBSERVATION TRAINING GUIDE

SEAT BELT OBSERVATION TRAINING GUIDE

Purpose

The purpose of this training guide is to outline procedures recommended for conducting rural seat belt observations in North Dakota.

Site Selection

- Please observe at 1-2 sites WITHIN towns and 3-4 sites OUTSIDE of towns. This will result in 4-6 total observation sites.
- Select sites which are a minimum of 20 miles away from any interstate (I-29, I-94).

Collection Form

Observers will document seat belt use of drivers and front seat **outboard** passengers on a seat belt survey form. A sample form is found in Appendix A. Helmet use is recorded for motorcycle drivers and passengers on the same form.

- On each form observers will record the date, county, observer name, page number, start time, end time, site location description, vehicle type, driver gender, driver protection, passenger gender, and passenger protection.
- Eligible vehicles include cars, pickup trucks, SUVs (including crossover vehicles), vans, and motorcycles.

  DO NOT count large trucks (semi or large box trucks), commercial vehicles (taxi cabs, delivery vans, city vehicles), emergency vehicles (police/fire vehicles), or RVs/motor homes.

QUICK REFERENCE

- *Eligible vehicles include:*
  - *Cars*
  - *Pickups*
  - *SUVs (including crossover vehicles)*
  - *Vans*
  - *Motorcycles (helmet use)*

- Children riding in the front seat (NOT in a child car seat) are counted the same as other front seat passengers.
- Your observations should include all eligible vehicles regardless of state of origin, i.e. count both in-state and out-of-state vehicles.

Time

- Observers will observe between 7am and 7pm.

Observation Methods

Observers will record seat belt use for eligible occupants in cars, pickups, SUVs, and vans, as well as helmet use for motorcycle occupants. Eligible occupants are the driver of the vehicle and the outboard front seat passenger. (Example: If there are three passengers in the front seat of the vehicle, only count the driver and outermost passenger.)

QUICK REFERENCE

- *Observers must attempt to record all vehicles they view. If observers cannot determine SB use, the vehicle must still be recorded on the observation survey form. If traffic is too busy to record all vehicles, observers should stop to catch up then resume as soon as possible, waiting no longer than 1 minute to continue. Once an observer's eyes are locked on a vehicle, a count of that vehicle must be recorded.*

- Observers will be supplied with observation forms, and site descriptions from the previous year.
- There will be 1 observer per site. If traffic is too heavy to observe all vehicles, stop/catch up, and resume recording seat belt observations as soon as possible; waiting no longer than 1 minute to resume.
- Position vehicle so observations can be conducted safely and without distraction to other vehicle drivers. Where possible, observers should remain in their vehicles to record seat belt use. If it is not possible to observe from a vehicle vantage point, the observer may leave the vehicle but must remain off the roadside.
- **Each observer will observe for a minimum of 30 minutes. If a minimum of 30 observations cannot be recorded in 30 minutes, the observer will continue observing up to an hour. If 30 observations still cannot be recorded after an hour of observing, the observation should be considered complete.**
- Do not record observations of vehicles with windows that are excessively tinted because accuracy may be compromised.
- Only properly worn seat belts are recorded as using protection. Incorrect seat belt use is recorded as no seat belt (Example: shoulder strap under arm, behind the back, lap belt only).
- If observations at a site are terminated due to inclement weather or observer safety issues etc., record the time and reason that observations halted, and move to an alternate location.

Safety

Safety of the observers and vehicle occupants is paramount in conducting the seat belt use survey.

- Observations can be made from the observer's vehicle. To ensure the safety of the observers and other vehicle occupants, observers' vehicles must not hinder traffic flow. Park off the road away from the pavement's edge.
- When observations from inside a vehicle are not possible, observers should ensure they do not stand on the roadway when recording seat belt use. Always practice safety when crossing roads.
- Observers must not distract drivers of vehicles they are observing.
- When in their vehicle, observers must always wear seat belts.
- Observers must stay alert at all times. Do not work while under the influence of alcohol, drugs, or prescription medications.
- Dress appropriately for the weather.
- Do not bring children or pets with you to the observation sites.

Conclusion

Dress for the work. A hat, sunscreen and sun glasses are essential.

Be thoroughly familiar with all the procedures in this manual. Accurate information is of paramount importance.

Each observer is ultimately responsible for his/her work, as well as safety. Remember, observation requires that are within close proximity to traffic. Stay alert and be ready to react.

Seat Belt Survey Form

Page # _____ of_____

Start Time: _____ AM/PM

Date_____

End Time: _____ AM/PM

County:_____

Observer Name:_____

Site Location Description:

_____

Obs	Vehicle Type					Driver					Passenger				
						Gender		Protection			Gender		Protection		
1	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
2	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
3	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
4	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
5	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
6	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
7	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
8	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
9	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
10	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
11	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
12	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
13	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
14	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
15	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
16	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
17	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
18	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
19	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
20	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
21	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
22	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
23	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
24	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
25	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
26	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
27	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK