Seat Belt Use on North Dakota Rural Roads: 2010

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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 55% of the state's travel, in vehicle-miles, takes place on rural roads that interconnect small communities and join the rural geography to interstate corridors and urban centers. This level of rural driving is relatively high considering only about 26% of the nation's travel is attributed to rural roads (U.S. Department of Transportation [DOT] 2007). From a safety perspective, this poses an inherent challenge because the risk for serious injury and death on these roads is relatively high compared to their urban counterparts (U.S. DOT 2005, U.S. DOT 2009a). For North Dakota, the danger is even more pronounced, as fatal crash reports from 2003 to 2007 show that 89% of serious injuries, including fatal and disabling injuries, occurred on rural roads (U.S. DOT 2009a).

With the understanding that seat belts are a relatively low-cost safety device, and are an easy primary protection for occupants in passenger vehicles, North Dakota has chosen to continue work to measure rural roads seat belt use. The U.S. Department of Transportation works with states to measure seat belt use through the annual National Occupant Passenger Use Survey (NOPUS). However, NOPUS does not include observation sites on local rural roads –the location for 1 in every 3 fatal crashes during the past five years (NDDOT 2008).

In 2009, a pilot project was initiated to develop a more rigorous and consistent metric for measuring rural seat belt use in North Dakota (Vachal et al. 2009). This study is a follow-up to the 2009 project, replicating the previous methodology to measure North Dakota rural seat belt use for 2010.

2. METHODOLOGY

A direct observation survey method was used for this study. A first step in administering the survey was to define a representative and realistic survey sample. In 2009, stratified random sampling of the rural counties, or non-NOPUS counties, was conducted based on rural county populations and geographic representation of counties across four quadrants of the state. The quadrants were defined based on 2009 ND Safe Communities (NDSC) regions (now ND Community Traffic Safety Program regions), which closely align to the North Dakota Health Department administration regions, and are shown in Figure 2.1.

Figure 2.1 North Dakota Community Traffic Safety Program Regions: 2010

Counties were used as the boundaries for the initial selection stratum in the sample because population and other demographic information are readily available.

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

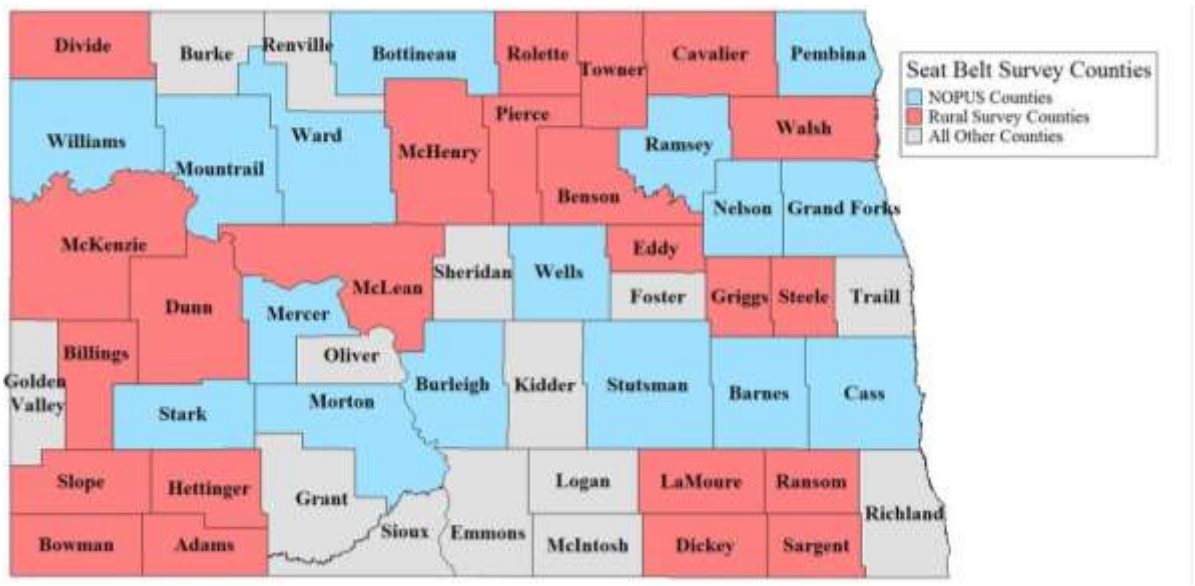


Figure 2.2 County Seat Belt Observation Groups

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

Observations were conducted in July, August, and September of 2010. The seat belt observations were conducted in partnership with the NDDOT Traffic Safety Office and the ND Community Traffic Safety Program (CTSP). Each CTSP administrator was asked to participate in the project by conducting a survey of seat belt use in specific counties located in their region. Prior to conducting county observations, observers, whether they were the coordinators themselves, or contract employees of CTSP, were required to complete Institutional Review Board (IRB) training as required by North Dakota State University. In addition, each coordinator was supplied and 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 CTSP Coordinators:

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 avoid 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 7a.m. to 7p.m.

3. RESULTS

A total of 5,735 observations of driver seat belt use were collected during surveys conducted at 152 sites across the state (Table 3.1). Passenger seat belt use was also collected when possible. The limited information on passenger use, which includes 1,330 observations, will be used primarily to assess correlation with driver use. The following table also includes the county populations used for weighted results highlighted in the following sections.

Table 3.1 2010 Observation Counts and Observation Site Counts by County

	Observations			2007 Est Population	
County	Count	% of TOTAL	Observation Sites Per County	Population	% of TOTAL
Adams	141	2.5%	3	2,279	2.2%
Benson	394	6.9%	16	6,971	6.8%
Billings	74	1.3%	3	798	0.8%
Bowman	213	3.7%	4	2,944	2.9%
Cavalier	306	5.3%	15	3,911	3.8%
Dickey	265	4.6%	5	5,396	5.3%
Divide	155	2.7%	4	2,004	2.0%
Dunn	154	2.7%	4	3,308	3.2%
Eddy	457	8.0%	16	2,430	2.4%
Griggs	181	3.2%	4	2,754	2.7%
Hettinger	143	2.5%	5	2,427	2.4%
LaMoure	172	3.0%	4	4,110	4.0%
McHenry	204	3.6%	3	5,224	5.1%
McKenzie	314	5.5%	4	5,617	5.5%
McLean	149	2.6%	5	8,349	8.2%
Pierce	141	2.5%	2	4,103	4.0%
Ransom	338	5.9%	4	5,682	5.6%
Rolette	814	14.2%	16	13,665	13.4%
Sargent	121	2.1%	4	4,110	4.0%
Slope	167	2.9%	5	659	0.6%
Steele	144	2.5%	4	1,840	1.8%
Towner	300	5.2%	16	2,292	2.2%
Walsh	388	6.8%	6	11,011	10.8%
TOTAL	**5,735**	**100.0%**	**152**	**101,884**	**100.0%**

3.1 Rural Seat Belt Use

3.1.1 Overall

Unweighted seat belt use by drivers observed in the rural counties in 2010 was 49.2%, up from 44.4% in 2009 (Figure 3.1). The increase in use rate may be related to the balance of highway and town observations or changes in driver behavior. A more representative measure is presented in the weighted seat belt use figures, overall and especially by road type. Seat belt use by road type is presented in the next section. An adjusted statewide rural seat belt use rate of 46.8% is estimated, based on county population weights, up from 44.8% in 2009.

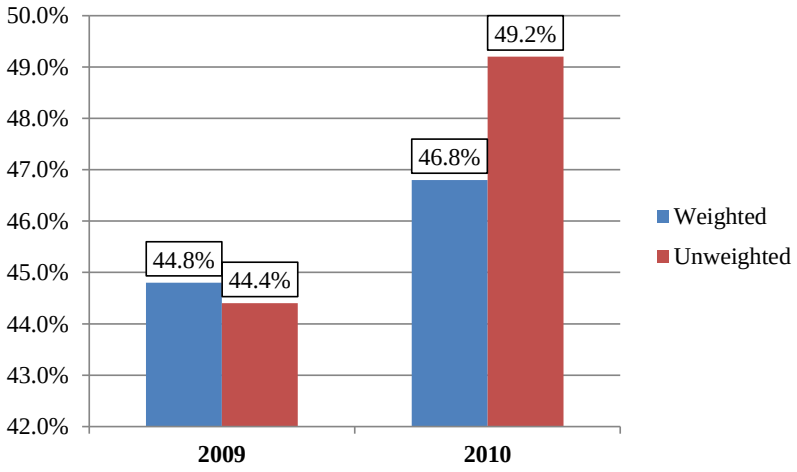


Figure 3.1 Driver Seat Belt Use: 2009-2010

County seat belt use in 2010 ranged from a low of 35.6% in Rolette County to a high of 72.3% in McKenzie County (Table 3.2). In 2009, Bowman County had the lowest usage rate at 29.6%, while Divide had the highest at 74.0%. Between 2009 and 2010, McLean County saw the greatest increase in usage, increasing from 36.6% in 2009 to 60.7% in 2010. Other counties with large increases in seat belt usage were McKenzie, Bowman, and Sargent Counties. Between 2009 and 2010, Hettinger County saw the largest decline in seat belt usage, declining from 51.5% in 2009 to 45.5% in 2010. Other counties with substantial declines were Slope and Eddy Counties. Overall, most counties saw relatively small declines to substantial increases from 2009 to 2010. As previously noted, the changes identified here may be related to driver behavior, but may also be affected by survey implementation issues encountered in transitioning the pilot into a full-scale project involving new sites, new counties and observers. Traill County was dropped as an observation county in 2010 due to its proximity to the interstate, making most observation sites invalid. Steele County replaced Traill County as an observation county.

Table 3.2 Driver Seat Belt Use by County: 2009-2010

County	2010	2009	% Difference
Adams	59.0%	53.5%	5.5%
Benson	44.7%	39.9%	4.8%
Billings	63.0%	64.6%	-1.6%
Bowman	42.8%	29.6%	13.2%
Cavalier	42.6%	46.4%	-3.8%
Dickey	52.1%	50.0%	2.1%
Divide	70.7%	74.0%	-3.3%
Dunn	50.0%	52.1%	-2.1%
Eddy	42.3%	46.5%	-4.2%
Griggs	48.6%	42.8%	5.8%
Hettinger	45.5%	51.5%	-6.0%
LaMoure	45.3%	34.6%	10.7%
McHenry	58.0%	48.0%	10.0%
McKenzie	72.3%	57.0%	15.3%
McLean	60.7%	36.6%	24.1%
Pierce	39.8%	42.6%	-2.8%
Ransom	45.0%	39.6%	5.4%
Rolette	35.6%	37.5%	-1.9%
Sargent	52.9%	41.5%	11.4%
Slope	56.4%	61.7%	-5.3%
Steele (2010)	61.1%		
Towner	48.3%	41.8%	6.5%
Traill (2009)		39.4%	
Walsh	58.5%	56.6%	1.9%

**NOTE: In 2010 Steele County replaced Traill County, which was deemed an invalid county due to the proximity to the interstate.*

3.1.2 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 may be seat belt use by road type, used here as the driving environment, due to relative injury risk between the rural town and rural highway roads. The greater risk associated with travel beyond town is evident in state crash data, which shows only 3% of fatal crashes on rural roads occur in town (NDDOT 2009). Therefore, rural highways are given special attention.

The observed seat belt use rate for drivers on rural highways, 59.3%, is significantly different than the use rate in rural towns at 36.6% (χ^2=285.915, ρ<0.0001, n=5,605). The overall adjusted state use rates are 57.2% and 36.6% for rural highways and rural towns, respectively, based on county population weights (Figure 3.2). Both of these figures fall below the statewide NOPUS rate of nearly 75%. However, town and highway use both increased from 2009. Highway use increased from 55.2% to 57.2%, while town use increased from 35.6% to 36.6%. Seat belt use increases from 2009 to 2010 for both rural highways and rural towns were statistically significant (Highway: F=27.263, p<0.001, n=6,832; Town: F=13.148, p<0.001, n=6,448).

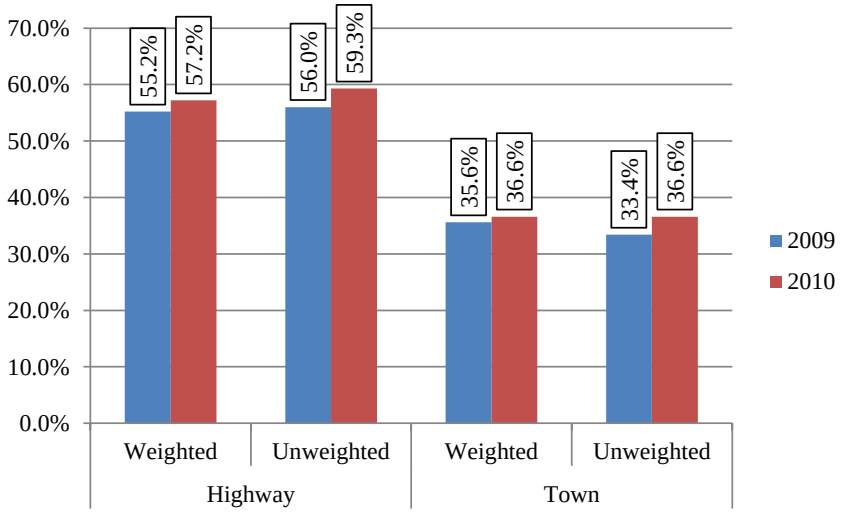
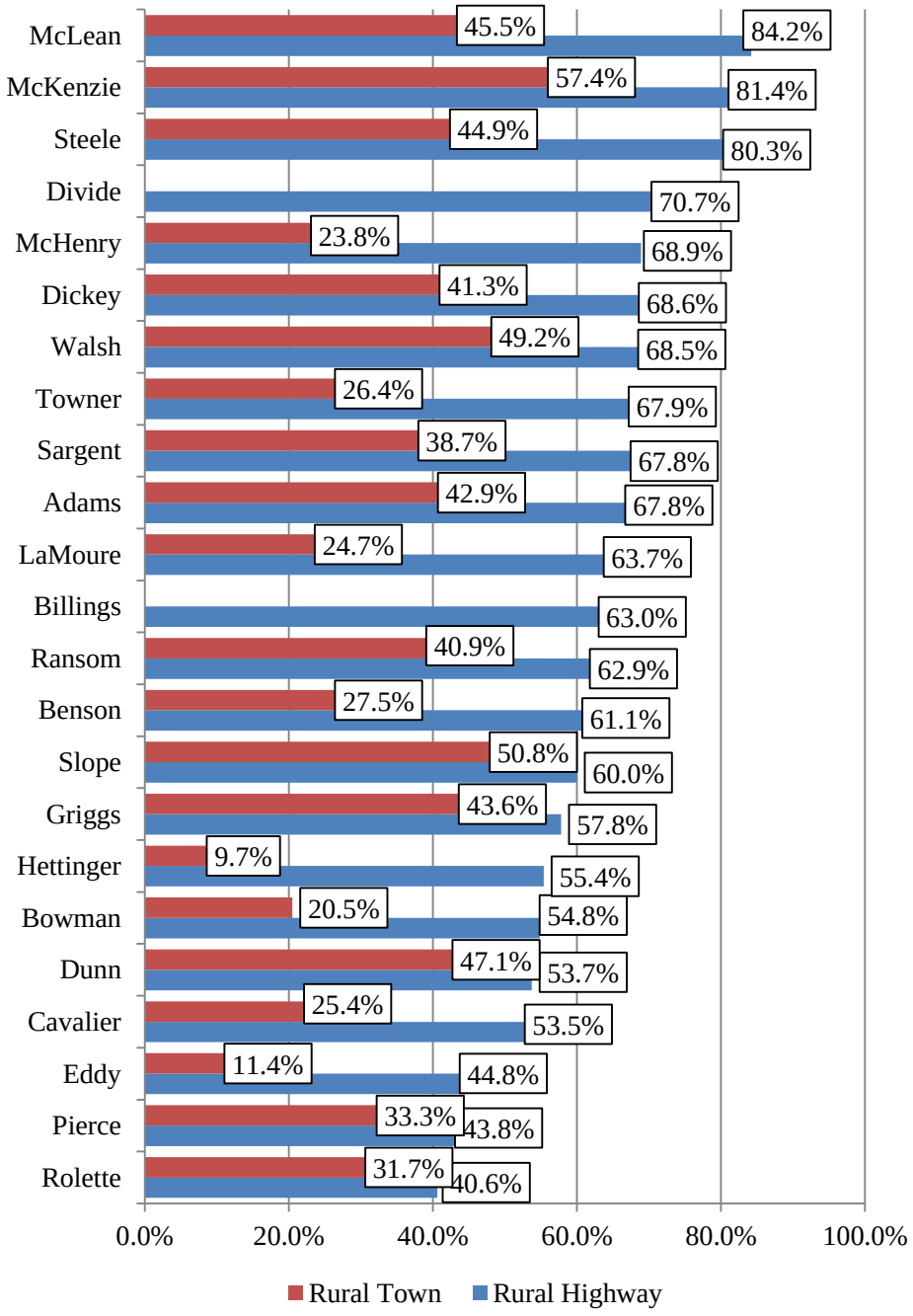


Figure 3.2 Driver Seat Belt Use by Road Type: 2009-2010

The range of highway seat belt use by county was large, considering a high of 84.2% in McLean and a low of 40.6% in Rolette (Figure 3.3). 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. Seat belt use in rural towns ranges from a high of 57.4% in McKenzie County to a low of 9.7% in Hettinger County.



**Rural town observations were not completed in Billings or Divide Counties*

Figure 3.3 Driver Seat Belt Use by Road Type by County: 2010

Counties with the largest increases in highway seat belt use from 2009 to 2010 were Bowman and McLean Counties (Table 3.3). Counties with the largest declines in highway seat belt use were Eddy, Rolette and Pierce Counties. Once again, it is possible that the fluctuations in seat belt use identified here are attributable to driver behavior, but other issues might be at play, including issues related to transitioning the pilot into a full-scale project involving site modification, new counties, and observers.

Table 3.3 Highway Seat Belt Use by County: 2009-2010

County	2010	2009	% Difference
Adams	67.8%	53.3%	14.5%
Benson	61.1%	49.8%	11.3%
Billings	63.0%	64.6%	-1.6%
Bowman	54.8%	29.6%	25.2%
Cavalier	53.5%	55.4%	-1.9%
Dickey	68.6%	60.1%	8.5%
Divide	70.7%	74.0%	-3.3%
Dunn	53.7%	56.3%	-2.6%
Eddy	44.8%	54.2%	-9.4%
Griggs	57.8%	55.2%	2.6%
Hettinger	55.4%	51.5%	3.9%
LaMoure	63.7%	48.2%	15.5%
McHenry	68.9%	58.0%	10.9%
McKenzie	81.4%	65.5%	15.9%
McLean	84.2%	55.8%	28.4%
Pierce	43.8%	56.2%	-12.4%
Ransom	62.9%	58.4%	4.5%
Rolette	40.6%	50.9%	-10.3%
Sargent	67.8%	58.9%	8.9%
Slope	60.0%	61.7%	-1.7%
Steele (2010)	80.3%		80.3%
Towner	67.9%	50.5%	17.4%
Traill (2009)			
Walsh	68.5%	57.9%	10.6%

**Highway observations were not conducted for Traill County in 2009, and Steele County replaced Traill County in 2010.*

3.1.3 Region

Based on the regions defined in the methodology section, drivers in the Northwest region have the highest unweighted seat belt use at 63.4%, followed by the Southwest at 52.6%, the Southeast at 49.8%, and the Northeast at 43.6% (Figure 3.4). All regions saw increases in seat belt use from 2009 to 2010, with the exception of the Northeast, which declined from 49.4% to 43.6% in 2010.

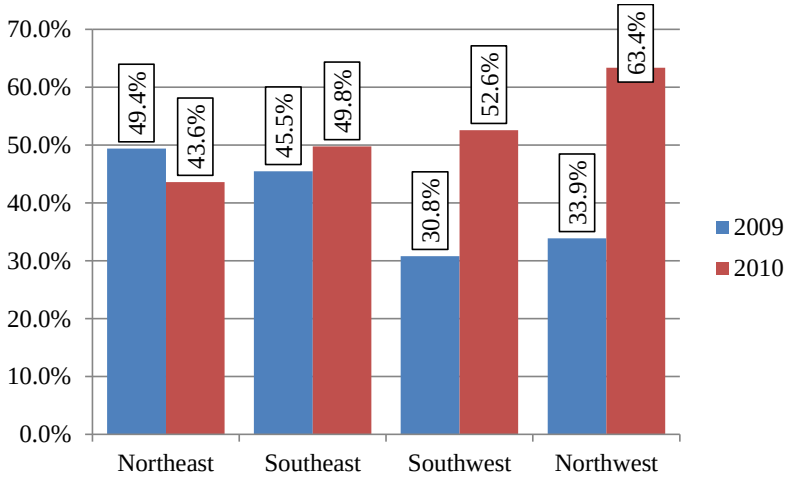


Figure 3.4 Driver Seat Belt Use by Region: 2009-2010 (Unweighted)

3.1.4 Driver Gender

Males present at a ratio of about 2 to 1 in the driver population for the rural roads seat belt observations. Of the 5,707 drivers observed where gender was determined, 3,755 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 42.3% compared to 31.3% on the highways. 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, as found in this study, is consistent with other research (U.S. DOT 2008, Gross et al. 2007, Vivida et al 2007, McCartt and Northrup 2004).

Statewide, the adjusted female use was at 68% compared to 52.2% for males on rural highways (Figure 3.5). These weighted seat belt figures produce rates in rural towns of 42.8% for female drivers and only 32% for males.

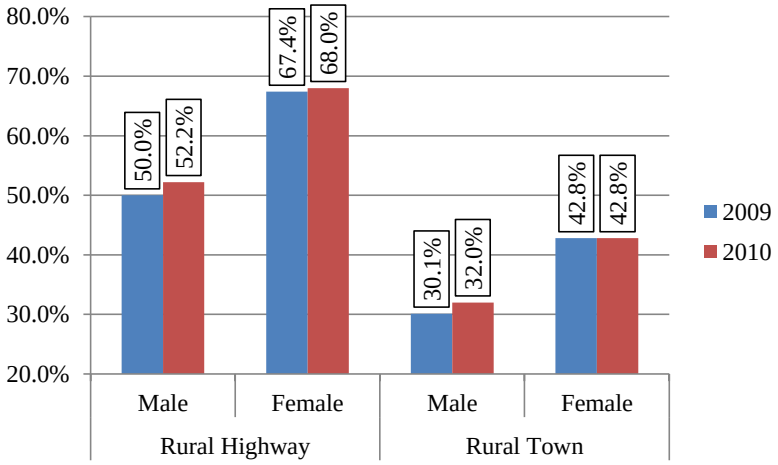


Figure 3.5 Driver Seat Belt Use by Gender and Road Type: 2009-2010 (Weighted)

Table 3.4 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 2010 on rural highways are in Steele, McLean, McKenzie, Walsh, Towner, and Dickey Counties, ranging from 100.0% to 81.3%. The lowest rates seen among female drivers, with rates under 60%, were in Rolette and Eddy Counties.

McLean, McKenzie, Steele, and Divide Counties had the highest use rates among male drivers on rural highways, ranging from 80.6% to 70.3%. The lowest rates among male drivers, with rates under 40%, were in Eddy, Pierce, and Rolette Counties.

Table 3.4 Driver Seat Belt Use by Gender by Road Type by County: 2009-2010

	2009				2010			
	Rural Highway		Rural Town		Rural Highway		Rural Town	
	Male	Female	Male	Female	Male	Female	Male	Female
Adams	47.8%*	71.4%**			67.7%	66.7%*	40.0%*	44.8%*
Benson	48.3%	53.1%	15.8%	27.2%	58.2%	69.2%	24.4%	33.3%
Billings	62.9%	70.8%*			63.5%	60.0%*	NA	NA
Bowman	21.7%	44.0%*			47.3%	70.5%	15.6%	24.4%
Cavalier	55.1%	55.7%	31.3%	25.6%	44.2%	74.1%	19.7%	34.0%
Dickey	51.4%	89.7%	22.5%	64.2%	63.0%	81.3%	36.4%	47.2%
Divide	72.0%	81.3%			70.3%	71.8%	NA	NA
Dunn	48.3%	68.4%	47.9%	42.9%*	50.0%	64.7%*	38.6%	63.3%
Eddy	51.1%	62.0%	30.1%	37.8%	39.7%	58.6%	11.8%*	11.1%*
Griggs	78.1%	69.2%	31.0%	45.7%	51.1%	76.5%*	42.7%	45.2%
Hettinger	46.8%	63.2%*			51.8%	65.5%*	11.1%*	7.7%*
LaMoure	36.7%	70.2%	19.2%	34.7%	58.3%	74.2%	15.4%	33.3%
McHenry	52.6%	68.3%	35.2%	45.9%	65.6%	76.2%	21.4%*	28.6%*
McKenzie	48.7%	72.2%	54.0%	41.5%	80.2%	88.5%*	54.3%	64.7%
McLean	50.0%	69.0%	19.8%	36.5%	80.6%	90.5%*	46.8%	43.9%
Pierce	48.3%	73.4%	17.6%	41.5%	33.3%	64.0%*	18.2%*	47.8%*
Ransom	56.8%	63.0%	25.2%	33.0%	59.5%	68.0%*	40.5%	49.6%
Rolette	47.9%	56.8%	32.5%	39.5%	33.3%	53.1%	28.1%	36.3%
Sargent	57.0%	63.1%	27.4%	28.8%	64.4%	78.6%*	31.0%	55.0%*
Slope	54.8%	77.8%*			56.6%	70.8%*	52.0%	46.7%*
Steele					74.0%	100.0%*	41.1%	52.4%*
Towner	46.2%	60.7%	25.8%	38.1%	62.6%	82.9%	16.1%	43.4%
Traill			31.0%	50.0%				
Walsh	50.0%	86.0%	43.2%	66.7%	58.8%	85.1%	41.1%	59.1%

**Fewer than 30 observations (results may be unreliable due to low number of observations)*
***Fewer than 10 observations (results may be highly unreliable due to low number of observations*

3.1.5 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 enforcement and education 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 2008). Similar usage rates 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 slightly more pickup trucks than cars (2,306 and 2,027, respectively), along with 900 sport utility vehicles (SUVs) and 502 vans (Figure 3.6).

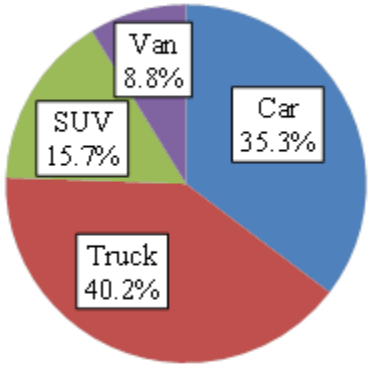


Figure 3.6 Observed Rural Road Passenger Vehicle Fleet, by Vehicle Type (Unweighted)

A significant variation in seat belt use is found across passenger vehicle types, controlling for gender and road type (χ^2=285.915, p<0.0001, n=5,605). In 2010, driver seat belt use in cars was 52.1% compared to 42.5% for pickup truck drivers (Table 3.5). Sport utility vehicle and van drivers both had higher observed use rates than drivers in cars and pickups at 53.9% and 59.8%. Using the county population weights, the adjusted use rates are 48.4% for cars, 40.0% for pickup trucks, and 52.2% and 59.1% for SUVs and vans, respectively. From 2009 to 2010, drivers of cars and SUVs saw very little change in seat belt use, while seat belt use among drivers of vans declined slightly, and trucks increased from 34.4% to 40.0%.

Table 3.5 Driver Seat Belt Use by Vehicle Type: 2009-2010

	2009		2010	
	Weighted	**Unweighted**	**Weighted**	**Unweighted**
Car	48.0%	47.4%	48.4%	52.1%
Truck	34.4%	34.5%	40.0%	42.5%
SUV	50.6%	50.2%	52.2%	53.9%
Van	63.7%	63.7%	59.1%	59.8%

Further stratification for gender shows that female drivers have higher seat belt use rates among all vehicle classes, ranging from 51.8% for pickup trucks to 61.3% for vans (Table 3.6). Males, in comparison, used seat belts only 41.2% of the time in pickup trucks and 58.4% of the time in vans. A significant difference was not found in seat belt use between female and male drivers for SUVs or vans. The variance is significant for car (χ^2=7.287, ρ=0.007, n=1,982) and pickup truck drivers (χ^2=10.241, ρ=0.001, n=2,247). Seat belt use for both male and female drivers of cars, trucks, and SUVs increased from 2009 to 2010. Male and female seat belt use for drivers of vans decreased slightly from 2009.

Table 3.6 Driver Seat Belt Use by Vehicle Type and Gender: 2009-2010 (Unweighted)

	2009		2010	
	Male	**Female**	**Male**	**Female**
Car	46.6%	48.3%	49.2%	55.2%
Truck	33.6%	42.5%	41.2%	51.8%
SUV	44.5%	55.1%	52.0%	55.5%
Van	62.2%	65.1%	58.4%	61.3%

When also considering the road environment, the highest use rate was among females driving vans on rural highways. Seat belts were in use for 77.7% of drivers observed in this group (Table 3.7). The lowest use rate, 29.4%, was found among males driving pickups in rural towns. Seat belt use for both male and female van drivers in towns and on highways declined from 2009 to 2010.

Table 3.7 Driver Seat Belt Use by Vehicle Type, Gender, and Road Type (Unweighted)

	2009				2010			
	Rural Highway		**Rural Town**		**Rural Highway**		**Rural Town**	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Car	55.9%	63.8%	36.6%	37.8%	56.7%	69.5%	38.0%	42.6%
Truck	44.4%	51.0%	21.2%	36.7%	49.7%	64.8%	29.4%	39.7%
SUV	59.2%	72.0%	30.1%	42.8%	64.2%	70.9%	29.9%	42.1%
Van	73.3%	80.4%	47.7%	52.0%	68.7%	77.7%	36.1%	48.5%

3.1.6 Passenger Seat Belt Use

As previously mentioned, the passenger observations were collected when traffic flow and field of vision allowed observers to collect information beyond the driver seat belt use. Of the 1,330 passenger observations, 54.5% were reportedly wearing seatbelts, an increase from 51% n 2009 (Figure 3.7). Unlike the driver population, a majority of passengers were female, comprising 58.3% of the group.

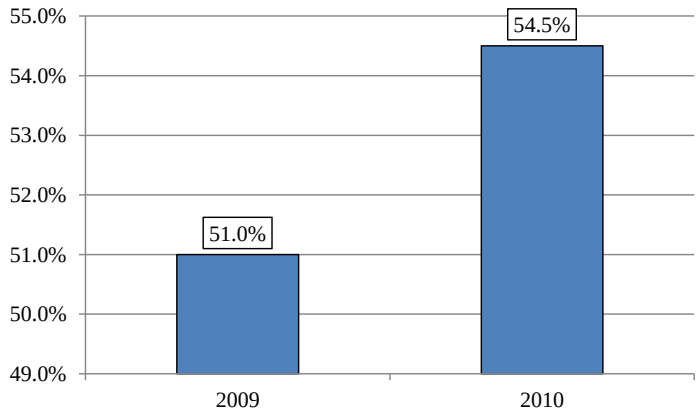


Figure 3.7 Passenger Seat Belt Use: 2009-2010

As with driver observations, gender was a significant factor in seat belt use ($\chi 2$=47.948, p<0.0001, n=1,330). Female passengers were using seat belts in 62.5% of the observations, compared to 43.3% for males (Figure 3.8). While female passenger belt use increased only slightly from 2009, male passenger belt use increased considerably from 26.2% in 2009 to 43.3% in 2010.

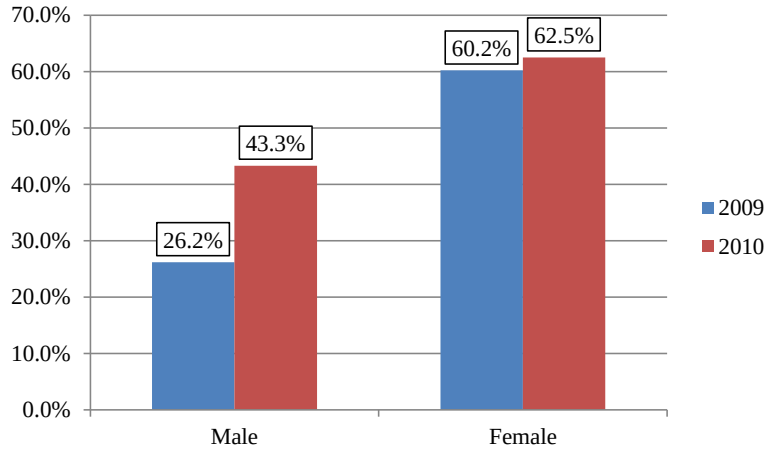


Figure 3.8 Passenger Seat Belt Use by Gender: 2009-2010

The driver and passenger seat belt use rates were strongly correlated in cases where passenger use could be recorded (Pearson's Corr.=0.835, p<.0001, n=1,330). These findings are consistent with earlier research (Nambisan and Vasudevan 2007), and with the 2009 results (Vachal et al. 2009). In more than half of the cases both the driver and passenger were belted (Figure 3.9). Neither passenger nor driver was belted in nearly 42% of the cases. The driver was belted and passenger unbelted in 4.1% of the cases, while the passenger was belted and the driver unbelted in 4.1% of the cases. Males were driving in a majority of the cases where passenger gender and belt use was recorded, representing 71.7% of the drivers. However, passenger seat belt use was not found to be significantly related to driver gender ($\chi 2$=0.300, p=0.584, n=1,332).

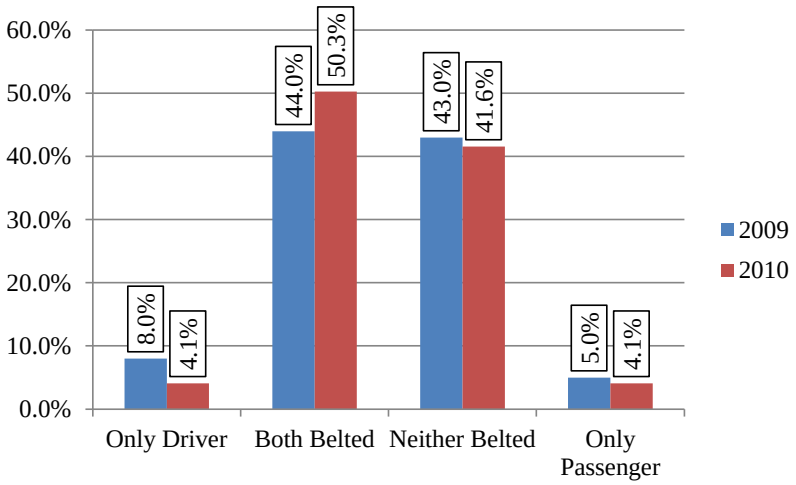


Figure 3.9 Seat Belt Use in Passenger Observation Cases: 2009-2010

Stratifying the passenger seat belt cases by road type does show that the belted passenger and belted driver observations scenario accounted for the greatest share of the observed cases for the rural highways at 61.1% (Table 3.8). The unbelted passenger and unbelted driver observations scenario was the most common in rural towns at 55%. Slightly less than one-third of the observations found neither occupant to be belted. Cases with only the driver belted were 4.0% and 4.2% of the cases on highways and in towns, respectively.

Table 3.8 Passenger Observation Cases by Road Type: 2009-2010

	2009		2010	
	Highway ***n=588***	**Town** ***n=463***	**Highway** ***n=750***	**Town** ***n=571***
Neither Belted	32.1%	56.8%	31.3%	55.0%
Only Passenger	4.6%	5.2%	3.6%	4.7%
Only Driver	6.8%	9.5%	4.0%	4.2%
Both Belted	56.5%	28.5%	61.1%	36.0%

The high degree of correlation between the driver and passenger observations may dissuade future investment associated with increasing passenger data collection. An example would be using an observer team rather than an individual observer to collect both driver and passenger seat belt use – this cost may not be justified in considering the benefit of the knowledge gained, because the passenger seat belt use rate follows the data already collected by observing the driver. Certainly, collection where possible by a single observer and special case studies may be justified with regard to the passenger seat belt 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 55% of annual travel and nearly 89% of fatal and disabling 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 5,735 driver seat belt observations were collected at 152 sites across 23 rural counties. Overall seat belt use increased from 44.8% in 2009 to 46.8% in 2010. Seat belt use was found to be significantly different on rural highways and in rural towns. The statewide seat belt use rates of 57.2% and 36.6% were estimated on highways and in towns, respectively. Observed highway use rates for counties ranged from 84.2% in McLean County to less than 41% in Rolette County. Female driver seat belt use, at 53.4%, was higher than the 42.8% seat belt use rate found among male drivers. Seat belt use rates were also found to vary significantly by vehicle type with pickup truck drivers having the lowest propensity to use seat belts at 40% and van drivers having the highest use rate at 59.1%.

Results also show a strong relationship between driver and passenger seat belt use. Where observations were collected in driver and passenger shared seat belt behavior, both were belted in 50.3% of cases, while neither were belted in 41.6% of cases. These relationships may be useful in assessing the relative benefits for allocating additional resources to collect additional passenger seat belt observations.

Seat belt use on the state's rural roads was found to be significantly less than the commonly reported statewide seat belt use rate collected in the annual NOPUS survey of all state roads. The relative risk and significant difference in use rates between rural highways and towns should be considered in future research related to rural seat belt use. In addition, continued assessment of programs to increase local seat belt enforcement or awareness on rural roads is suggested.

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Appendix A: 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.

Any questions or concerns should be reported to Andrea Huseth: 701-231-6427.

Seat Belt Survey Form

Page # _____ of_____

Start Time: _____ AM/PM

End Time: _____ AM/PM

Date_____

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