

SEAT BELT USE ON RURAL NORTH DAKOTA ROADS



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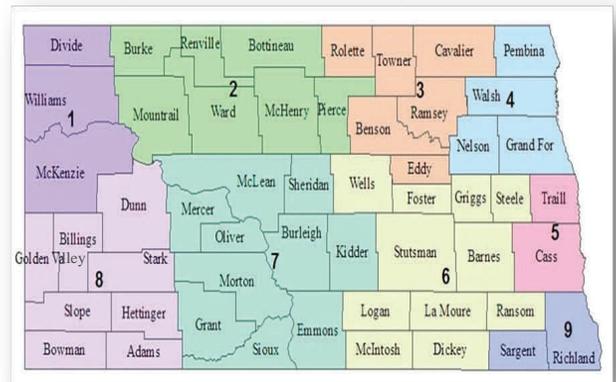
North Dakota’s rural roads are vital social and economic connectors. These roads have a relatively high crash injury risk. Efforts are underway to reduce crash risk, but seat belts offer immediate and low-cost injury protection. A pilot observation study was conducted around the time of the state’s annual seat belt campaign to increase knowledge about seat belt use on these roads.

GOAL Conduct cooperative pilot project to establish scope and method for estimating a rural seat belt use metric that is needed for project management and program strategy in community health and public safety.

METHOD A traditional observation survey method was used for this study. A first step was to define a representative and realistic survey sample. Stratified random sampling of the rural counties was based on rural county population and geographic representation of counties across four quadrants of the state. The quadrants are defined based on 2009 ND Safe Communities (NDSC) regions as shown in Figure 4. The Northwest includes NDSC regions 1 and 2; Northeast includes NDSC regions 3 and 4; Southwest includes NDSC regions 7 and 8; and Southeast includes NDSC regions 5, 6 and 9.

U.S. Census estimates for county population were used to select a minimum preferred group to initiate a process for estimating rural county seat belt use. In addition, participation in the NDDOT high visibility enforcement (HVE) program was considered in designating preferred counties so an assessment could be made for the initial year of a rural county program modification. Within the preferred sample counties, sites selected for observation were based on state traffic flow maps and local traffic knowledge. The seat belt observations were collected at the sites in April and again in June or July. The observations were conducted in partnership with the NDDOT Office of Traffic Safety and ND Safe Communities.

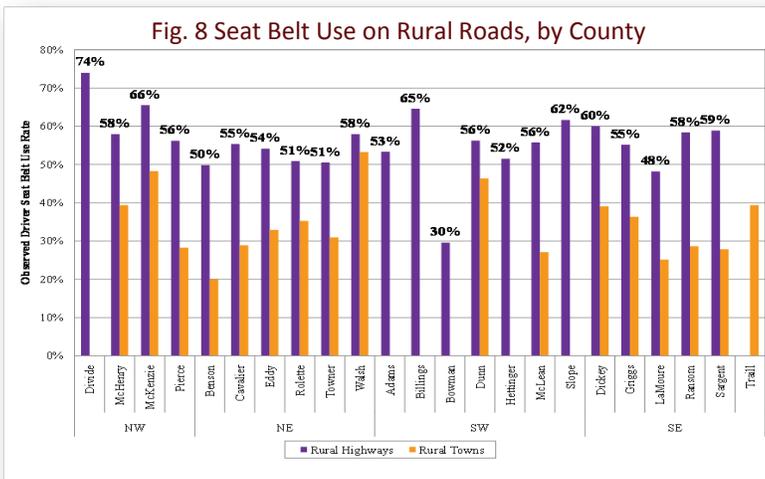
Fig. 4 Safe Communities Regions, 2009



RESULTS A total of 6,919 observations of driver seat belt use were collected at 149 sites across the state. The sites were in rural towns and on rural highways located at least 20 miles from Interstate highways to reduce bias associated with urban commuter traffic. Passenger seat belt use was also collected when possible. Of the sites surveyed, 64 percent were located on rural highways with the balance situated in rural communities. Observations were completed in 23 of the 37 rural counties.

RURAL SEAT BELT USE Seat belt use by drivers observed in the rural counties was 44.4%. Drivers in the Northeast have the highest use at 49.4%, with second highest in the region to its south, at 45.5%. Driver seat belt use in the western regions was observed at 33.9% and 30.8% in the North and South quadrants, respectively. A state-wide rural seat belt use rate of 44.8% is estimated, based on county population weights. This figure may be skewed by the mix of rural highway and rural town observations – which may not truly reflect crash exposure risk.

Fig. 8 Seat Belt Use on Rural Roads, by County

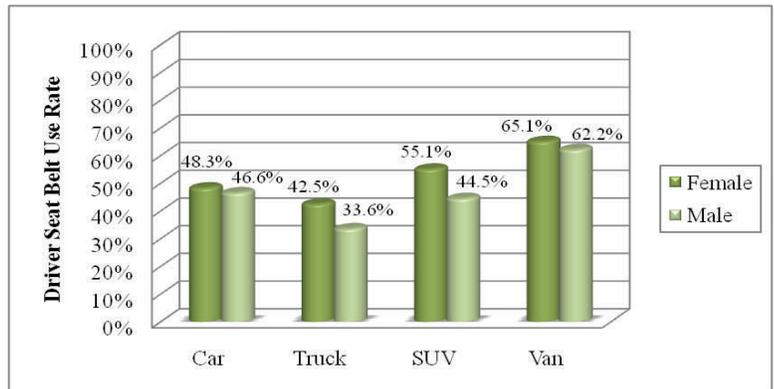


The greater risk associated with travel outside of towns is evident in state crash data. It shows only 3% of fatal crashes on rural roads occur in town (NDDOT 2009). Therefore, the rural highways are given special attention in this study. The observed seat belt use rate for drivers on rural highways, 56.0%, is significantly different than the use rate in rural towns at 33.4%. The overall state use rates are estimated at 55.2% and 35.6% for rural highways and rural towns, respectively, based on county population weights.

GENDER Of the 6,919 drivers observed, 4,478 were male. The lower propensity for males to use seat belts, as found in this study, is consistent with other research. The estimated statewide seat belt use rates on rural roads are 53.7% and 40.2% for females and males, respectively, based on county population weights. Statewide, the estimated female use was at 67.4% compared to 50.0% for males on rural highways. These weighted seat belt figures produce estimated rates in rural towns at 42.8% for female drivers and only 30.1% for males. The county information shows the highest female use rates are in Dickey, Walsh, Divide, Slope, and Pierce, ranging from 86.7% to 73.4% and the lowest rates among female drivers, with rates under 62%, were in Bowman, Benson, Cavalier, Rolette, and Towner counties. Griggs, Divide, Billings, Sargent, and Ransom counties had the highest use rates among male drivers on rural highways, ranging from 78.1% to 57.0%. Bowman County had the lowest use rate among the counties for observed seat belt use among male and female drivers. Fewer than half the female drivers and only 1 in 5 male drivers used seat belts on that county's rural roads.

VEHICLE TYPE The rural seat belt observations included slightly more pickup trucks than cars at 2,619 and 2,606 units, respectively, along with 1,069 sport utility vehicles (SUVs) and 625 vans. A significant variation in seat belt use is found across passenger vehicle types, controlling for gender and road type. Driver seat belt use in cars was 47.4% compared to 34.5% for pickup truck drivers. Sport utility vehicle and van drivers both had higher observed use rates than drivers in cars and pickup at 50.2% and 63.7%. Statewide use rates are similar. Using the county population weights, the use rates are 48.0% for cars, 34.4% for pickup trucks, and 50.6% and 63.7% for SUVs and vans, respectively. Further stratification for gender shows that female drivers have higher seat belt use rates among all vehicle classes, ranging from 42.5% for pickup trucks to 65.1% for vans (Figure 10). Males, in comparison, used seat belts only 33.6% of the time in pickup trucks and 62.2% in vans. A significant difference was not found in seat belt use between female and male drivers for cars or vans.

Fig. 10 Driver Seat Belt Use by Gender and Vehicle Type

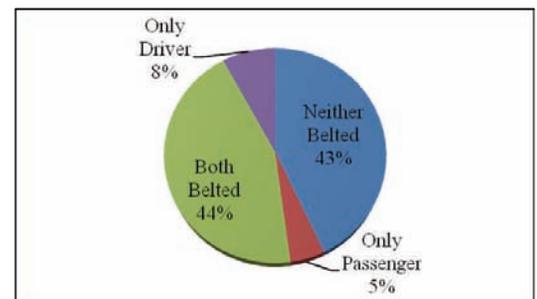


SPECIAL TOPICS While the primary objective for this study was to estimate rural roads seat belt use, it was also possible to investigate driver and passenger seat belt use and to gain insight into how high-visibility enforcement efforts affect driver decisions.

HIGH VISIBILITY ENFORCEMENT A limited investigation into effectiveness of HVE on rural roads was possible with information collected for this study. The gains in driver seat belt use rates from increased enforcement visibility are found to be statistically significant in comparing observations collected in rural counties with HVE activity with observations collected in rural counties that did not participate in the program. The initial seat belt use rates, collected prior to May, were significantly different at 43.8% for non-HVE counties compared to 38.5% for the counties who would be participating in the HVE program. Seat belt use rates following the May HVE activities were 50.1% in the HVE counties and 46.7% in the non-HVE counties. With a 30 %increase in the use rate for the HVE counties, and only 7% increase in the seat belt use rate for the non-HVE counties, a significant difference in seat belt use was not found between the county groups following the HVE activities

PASSENGER SEAT BELT USE In the 1,051 passenger observations, 51.0% were reportedly wearing seat belts. Unlike the driver observations, a majority of passenger observations were female as they comprise 60.0% of the group. Again, gender was a significant factor in seat belt use. Female passengers used seat belts in 60.2% of the observations, compared to 26.2% for male passengers. The driver and passenger seat belt use rates were strongly correlated in cases where passenger use could be recorded. In 44.2% of cases both driver and passenger were belted. Neither driver nor passenger was belted in 43.0% of the cases, nearly the same share of observations.

Figure 12. Seat Belt Use in Passenger Observation Cases



CONCLUSION North Dakota's rural roads provide vital economic and social connections for residents and visitors. Interest here is in measuring rural seat belt use for managing it as a public safety priority. Seat belt use was found to be significantly different on rural highways and in rural towns. The statewide seat belt use rates of 55.2% and 35.6% were estimated on highways and in towns, respectively. Observed use rates for counties ranged from 74% to less than 30%. As expected, female driver seat belt use, at 67.4%, was higher than the 50.0% 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 34.4%.



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