

North Dakota Statewide Traffic Safety Survey, 2010

Traffic Safety Performance Measures for State and Federal Agencies

Prepared for

Traffic Safety Office, Safety Division
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Disclaimer

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1. INTRODUCTION

The United States lags behind many other industrialized nations in its ability to ensure safety on public roadways as illustrated in Figure 1.1 (World Health Organization 2009). While progress has been made in reducing traffic deaths, the continued epidemic of preventable deaths and injuries related to factors such as impaired driving and a lack of seat belt use shows that more work is needed. A critical asset in monitoring and communicating traffic safety priorities is a reliable and comprehensive means to set and measure goals in this effort (Government Accounting Office 2010). In a national initiative to improve transparency and quantify metrics for behavior-based investments designed to reduce motor vehicle crashes, the Governor's Highway Safety Association (GHSA) and National Highway Traffic Safety Administration (NHTSA) devised a set of performance measures aimed to elucidate traffic safety priorities and progress related to behavioral safety plans and programs (NHTSA 2008).

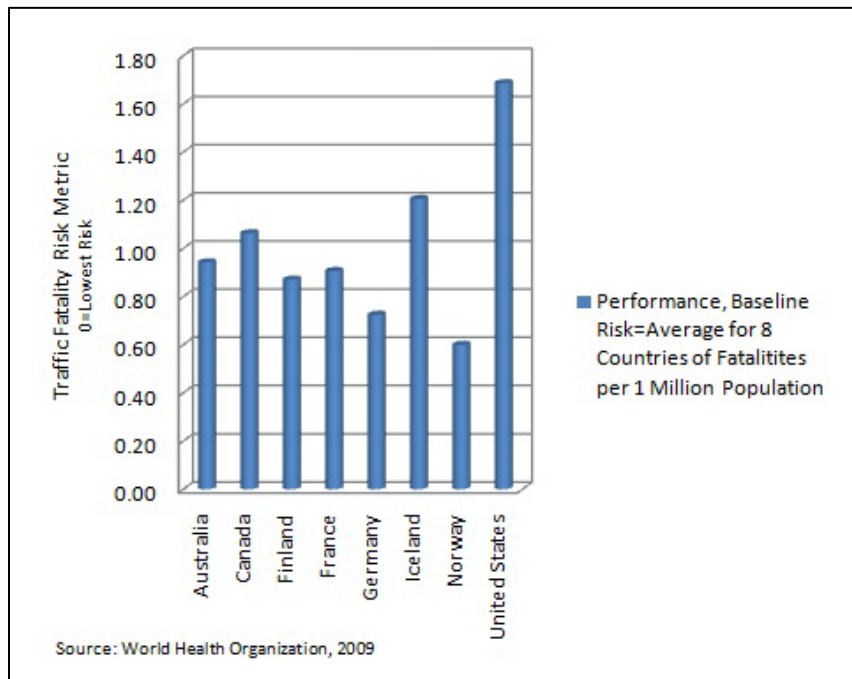


Figure 1.1 International Traffic Fatality Risk for Selected Countries

Within this GHSA-NHTSA effort, 14 measures were agreed upon as *Minimum Performance Measures (MPM)*. These included 10 outcome, three activity, and one behavior measure-types. The MPM are designed to create a quantitative core for developing and implementing highway safety plans and programs. Several uses offered for the MPM include: goal setting, goal-action linkages, resource allocation, program evaluation, and communication. Other benefits may be found in improvements to organizational focus, feedback processes, and accountability (FHWA 2009). The measures were defined to monitor overall traffic safety performance, as well as progress related to specific priority behavior issues including occupant protection, alcohol use, speeding, and targeting high-risk population groups. The 10 outcome measures highlight:

- Overall traffic safety performance
- Seat belt use
- Child occupants
- Alcohol-impaired driving
- Speeding and aggressive driving

- Motorcyclists
- Young drivers
- Older drivers
- Pedestrians, and
- Bicyclists

These 10 core outcome measures combine current exposure data, such as population and vehicle miles traveled (VMT), with the existing national Fatal Crash Reporting System(FARS) to devise performance measures in areas common to state safety plans and data systems. Activity measures focus on actions – such as citations and arrests under grant-funded enforcement initiatives. Seat belt observation was selected as the single initial core behavior measure (NHTSA 2008). The measures used in the outcome highlights are generally calculated as follows:

- Core outcome measures
 - C-1) Number of traffic fatalities (FARS). States are encouraged to report 3-year or 5-year moving averages as appropriate (when annual counts are sufficiently small that random fluctuations may obscure trends). This comment applies to all fatality measures.
 - C-2) Number of serious injuries in traffic crashes (State crash data files).
 - C-3) Fatalities/VMT (FARS, FHWA). States should set a goal for total fatalities/VMT; States should report both rural and urban fatalities/VMT as well as total fatalities/VMT.
 - C-4) Number of unrestrained passenger vehicle occupant fatalities, all seat positions (FARS).
 - C-5) Number of fatalities in crashes involving a driver or motorcycle operator with a BAC of .08 and above (FARS).
 - C-6) Number of speeding-related fatalities (FARS).
 - C-7) Number of motorcyclist fatalities (FARS).
 - C-8) Number of unhelmeted motorcyclist fatalities (FARS).
 - C-9) Number of drivers age 20 or younger involved in fatal crashes (FARS).
 - C-10) Number of pedestrian fatalities (FARS).
- Core behavior measure
 - B-1) Observed seat belt use for passenger vehicles, front seat outboard occupants (survey).
- Activity measures
 - A-1) Number of seat belt citations issued during grant-funded enforcement activities (grant activity reporting).
 - A-2) Number of impaired driving arrests made during grant-funded enforcement activities (grant activity reporting).
 - A-3) Number of speeding citations issued during grant-funded enforcement activities (grant activity reporting).

The MPM publication also included four additional areas for measure improvement and implementation. These areas included traffic injury outcome; driver attitudes/awareness and behavior; traffic speed; and law enforcement activity. The survey conducted here fulfills the need for improved measurement of driver attitudes/awareness and behavior. A core question set recommendation was developed by a GHSA-NHTSA working group and presented to state DOTs subsequent to the MPM initial recommendations (Hedlund et. al 2009).

The set of 10 core questions were designed to measure attitude/awareness and self-reported behavior trends through periodic statewide traffic safety surveys. It was envisioned that this recommended core will provide a benchmark for states in tracking performance, not in comparing states or locales, as they pursue program goals to reduce crash injury and death related to high-risk driver behaviors. The core questions will remain consistent while an option to supplement with other questions provides latitude to address additional local interests and solicit other useful information related to topics such as demographics and driving activity.

Traffic safety is a multifaceted endeavor. Currently, federal initiatives in the driver behavior arena focus heavily on impaired driving, seat belt use, and speeding. Thus, the core questions focus on these issues (Hedlund et. al 2009). The core questions within the respective focus areas are:

- Impaired Driving
 - ID-1: In the past 60 days, how many times have you driven a motor vehicle within 2 hours after drinking alcoholic beverages?
 - ID-2: In the past 30 days, have you read, seen or heard anything about alcohol impaired driving (or drunk driving) enforcement by police?
 - ID-3: What do you think the chances are of someone getting arrested if they drive after drinking?
- Safety Belts
 - SB-1: How often do you use safety belts when you drive or ride in a car, van, sport utility vehicle or pick up?
 - SB-2: In the past 60 days, have you read, seen or heard anything about seat belt law enforcement by police?
 - SB-3: What do you think the chances are of getting a ticket if you don't wear your safety belt?
- Speeding
 - SP-1a: On a local road with a speed limit of 30 mph, how often do you drive faster than 35 mph?
 - SP-1b: On a road with a speed limit of 65 mph, how often do you drive faster than 70 mph?
 - SP-2: In the past 30 days, have you read, seen or heard anything about speed enforcement by police?, and
 - SP-3: What do you think the chances are of getting a ticket if you drive over the speed limit?

These questions have been incorporated into the 'ND Driver Survey' that was developed in cooperation with the North Dakota Department of Transportation Traffic Safety Office (TSO) (Appendix A). The TSO expanded the survey to gather additional information pertinent to its goals and responsibilities.

The annual Highway Safety Plan (HSP) offers insight for current priorities and activities (NDDOT 2009). The most recent HSP offers goals related to the overall traffic safety mission, along with specific issues including seat belt use, motorcycles, alcohol-impairment, speed, young drivers, and pedestrians. Metrics are included to indicate progress on the overall safety mission, considering traffic fatalities and serious injuries. The single core behavior measure shows observed seat belt use at 81.5%. Results here will enhance understanding of behavior by providing more robust coverage, expanded issues, and an increased number of measures.

2. METHOD

A mail survey was selected as the method for the driver traffic safety survey. A draft survey was designed by blending the 10 core questions with additional NDDOT designated questions related to education, policy, and enforcement. The questions were developed based on a review of literature, including previous surveys of this type, and guidelines offered by the GHSA-NHTSA working group. The mailing to drivers included a TSO cover letter which invited driver participation and explained the survey goals. The survey was mailed to drivers on March 1, 2010, and open to response until April 15, 2010.

State DOT driver registration records provided the population for the sampling. The sample size was based on a 95% confidence level, with a 5% confidence interval. The expected response was estimated with a 20% response rate. Although mail survey response is typically low, with 10% not uncommon, a slightly better response rate was expected due to parameters used in the survey design and administration. These parameters included keeping the survey to a single page, including state agency cover letter, using state agency mail envelope, and offering 'Do Not Know/Refuse to Answer' options in the survey responses.

A disproportionate stratified random survey sample was used to select drivers. The North Dakota driver population was stratified by region (east/west) and geography (rural/urban). County jurisdictional boundaries were used to define both region and geography (Figure 2.1). In addition, oversampling was conducted for a target driver group of 18 to 34 year-old male drivers.

The regional geography was defined by aggregating ND health regions into two regions that most closely represented an east/west delineation of the state. The urban geography includes the largest urban population counties according to the rural and urban population figures in the most recently published U.S. Census data. Four urban counties are located in the east and five in the west, considering the population density geography definitions used in the study. The nine counties represent 93% of the urban population in the state. The sampling probabilities for the survey are shown in Table 2.1.

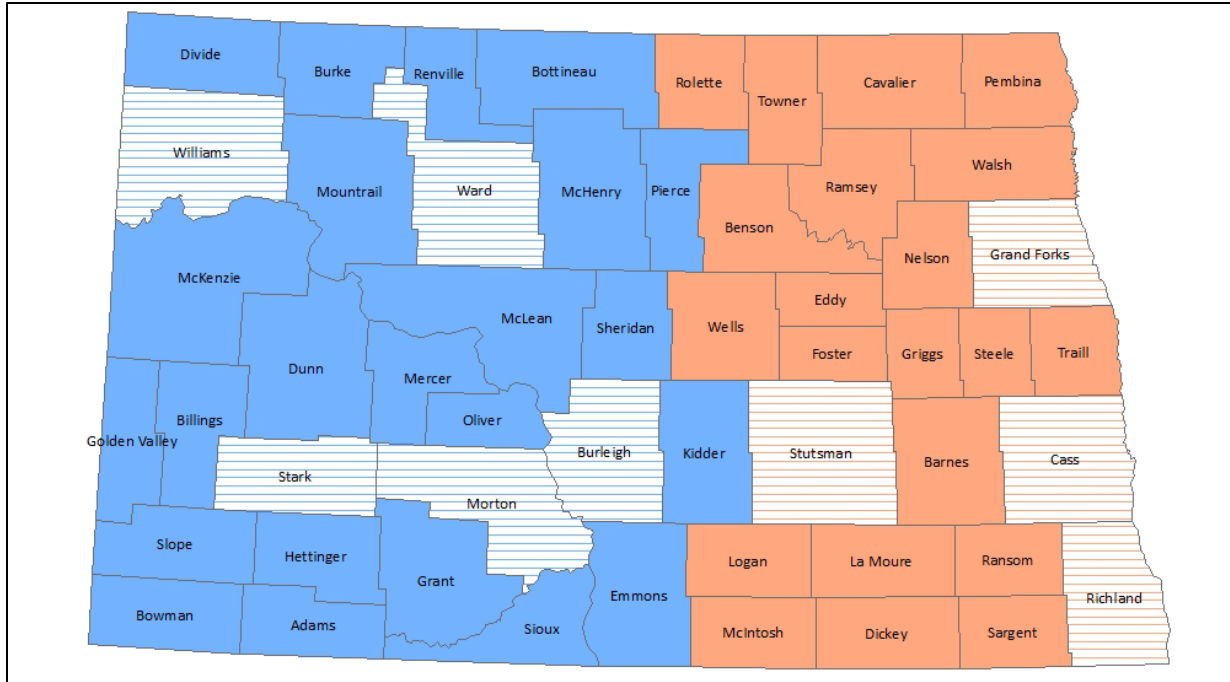


Figure 2.1 County Stratification

Table 2.1 Sampling Probabilities

Region	Geography: Size & Census Designation	Driver Age/Sex	Sampling Probability
East	Urban	18-34M	0.034
East	Urban	Other	0.006
East	Rural	18-34M	0.072
East	Rural	Other	0.012
West	Urban	18-34M	0.039
West	Urban	Other	0.007
West	Rural	18-34M	0.104
West	Rural	Other	0.018

Results reflect statewide driver population views, perceptions, and behaviors through post-stratification weighting based population. The disproportionate stratified sampling structure was used to elicit sufficient driver participation to allow robust analysis of responses by region, geography, and a target driver group. Using these simple average responses would provide skewed results in representing the state driver population. For instance, drivers age 18 to 34 were 52% percent of the survey sample and account for 34% of the survey responses; however, they account for only 16% of the driver population in the state. Therefore, the post-stratification weighting process is used to give an appropriate weight to responses for statewide estimates.

3. RESPONSE

Survey response rate was 31.6%, with 2,172 valid responses received from the sample mailing to 7,120 drivers. As expected, oversampling of the 18-34 male driver target group was needed to achieve a sample sufficient for statistical analysis. The target group response was 16.6% compared to 45.7% for other drivers. Sampling to elicit response by region and geography was successful as shown in Table 3.1. The responses include an acceptable level of participation with more than 1,000 responses from the east, rural, and urban locations and 980 from the west.

Table 3.1 Survey Response by Region and Geography

Region	Geography		Total
	Rural	Urban	
	# Responses (share)		
East	516 (25.1%)	560 (27.2%)	1,076 (52.3%)
West	519 (25.2%)	461 (22.4%)	980 (47.7%)
Total	1,035 (50.3%)	1,021 (49.7%)	2,056

Although sample design did not consider for age or gender beyond the target males, responses among other age groups and by gender have an acceptable distribution as would be expected in the random sample design (Table 3.2). The highest shares in the response are among drivers 45 to 54 years, with lower responses among the older driver groups. Although not directly proportionate, much of the response differential is explained by the differentiation in the population distribution of driver age (Table 3.2). Gender response for drivers over age 34 is 55.8% male and 44.2% female, with females underrepresented compared to their share of 50.0% in the statewide driver population (NDDOT 2010). The number of responses does, however, provide sufficient data to expand these responses to represent the population.

Table 3.2 Response by Age Group

Age Group	Survey		Population*	
	Responses	Share	Drivers	Share
18 to 34	630	29.1%	143,430	31.24%
35 to 44	242	11.2%	71,028	15.47%
45 to 54	423	19.5%	91,665	19.96%
55 to 64	422	19.5%	72,600	15.81%
65 to 74	221	10.2%	42,600	9.28%
75 and Older	229	10.6%	37,838	8.24%

*Source: NDDOT 2010

Information regarding drivers' annual travel provides background for understanding exposure in terms of travel time. The expected declining trend in driving activity is evident in the average annual miles traveled summarized in Figure 3.1. A majority of drivers in each age group under age 65 report driving more than 10,000 miles per year. About one quarter of the drivers in each group travel more than 15,000 miles annually. Drivers between the ages of 35 to 44 years have the largest share of drivers traveling more than 10,000 miles annually at 56%. In comparison, only 38% and 12% of drivers 65 to 74 and 75 and older, respectively, report driving over 10,000 miles per year. The oldest driver group has the largest share – 48% – reporting they drive less than 5,000 miles per year. Differences in levels of driving activity may influence views and perceptions about traffic safety. This information is also valuable in interpreting information on crash injuries and fatalities in assessing driver risk. Specific information on driver responses is provided in Table 3.3.

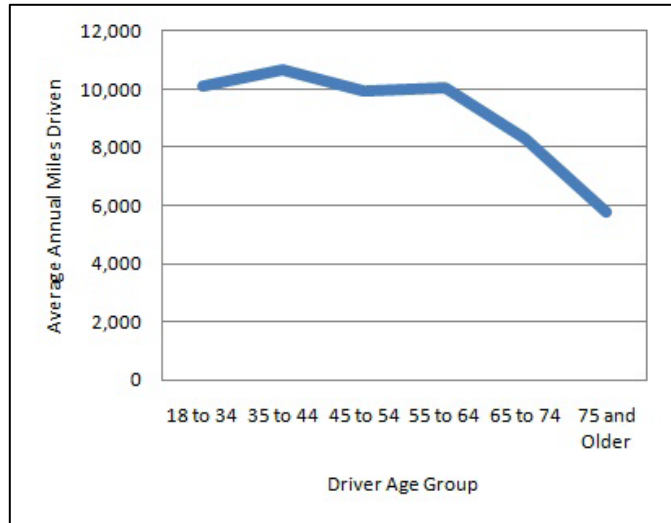


Figure 3.1 Annual Travel by Age Group

Table 3.3 Annual Driving Activity by Age Group

Driver Age	Miles			
	Less than 5,000	5,000 to 10,000	10,000 to 15,000	More than 15,000
	<i>Share of Respondents</i>			
18 to 34	9%	34%	29%	27%
35 to 44	5%	36%	37%	21%
45 to 54	14%	36%	26%	24%
55 to 64	14%	36%	26%	24%
65 to 74	29%	33%	24%	14%
75 and Older	48%	39%	9%	3%

Tables 3.4 and 3.5 show driving activity varies somewhat by region and geography. Regional summaries show a majority of drivers across the state travel less than 10,000 miles – shares are 52% and 53% for the east and west, respectively. Regional travel activity for those reporting higher levels of travel, however, shows that the west has a greater share of drivers with a travel level in the highest category of more than 15,000 miles per year. About a 10% larger share of the population in the rural areas report traveling more than 10,000 miles per year at 52% compared to 46% for urban residents. As expected, the geographic summary of travel activity shows the western region of the state has a larger share of residents who travel more than 15,000 miles per year.

Table 3.4 Annual Driving Activity by Region

Region	Miles			
	Less than 5,000	5,000 to 10,000	10,0001 to 15,000	More than 15,000
<i>Share of Respondents</i>				
East	16%	36%	30%	19%
West	15%	37%	25%	22%

Table 3.5 Annual Driving Activity by Geography

Geography	Miles			
	Less than 5,000	5,000 to 10,000	10,0001 to 15,000	More than 15,000
<i>Share of Respondents</i>				
Rural	14%	34%	28%	24%
Urban	16%	38%	28%	18%

A final question in demographics queried drivers about the roads they most often traveled. Roads in large cities are the most common response at 44% (Figure 3.2). County roads and rural highways are next among the roads most often driven by respondents. Interstate, a common corridor for interstate travel, is the road type most often traveled by 19% of respondents. Small town roadways account for about 17% of responses. Percentages total over 100% due to multiple answers from some respondents.

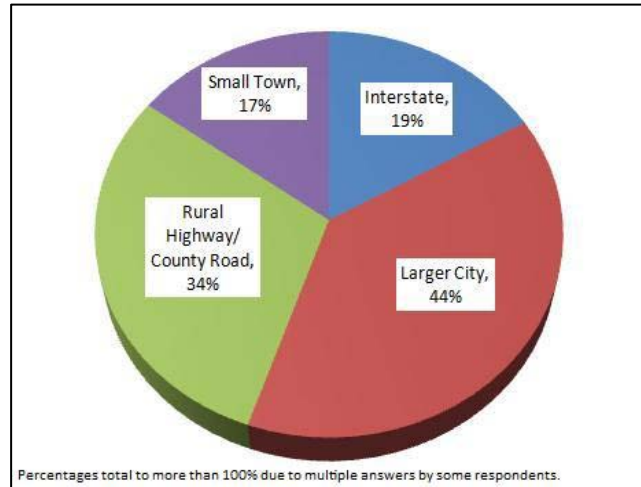


Figure 3.2 Travel by Road Type

4. RESULTS

Survey responses offer important insight into driver perceptions, attitudes, and behaviors regarding traffic safety. Simple frequency analysis of ordinal and dichotomous survey responses provides a general characterization of driver views and behaviors. In addition, the scale responses are transformed to ordinal values to quantify responses between scale extremes to allow for some statistical testing of relationships and means. The higher-than-expected response rate resulted in increased confidence. The 95% confidence level is coupled with smaller margins of error at +/-1% when discussing statewide results, and a +/-2% error margin when addressing the population in regional, geographic, or target driver strata.

4.1 All Drivers

The core questions are designed to focus survey efforts in three issues: impaired driving, seat belt use, and speeding. Response frequencies for the 10 core questions are included in Table 4.1. Responses show drivers believe law enforcement is more likely to ticket for speeding violations than for drunk driving or seat belt violations. Frequencies show that 56% of drivers believe chances are higher than average that drivers who are speeding will be ticketed, compared to 51% and 40% greater-than-average likelihood that drivers will be ticketed for drinking or seat belt violations, respectively.

Among respondents who do drink alcohol, 44% report that they have driven a vehicle within 2 hours of drinking during the past two months. More than 1 in 10 drivers report that they drove after drinking at least 4 times during the past 60 days.

With regard to behavior for speed, only 5% and 6% of drivers report high levels of speeding activity – considering those who answered "Always" or "Nearly Always" to the questions on 30 mph and 65 mph speed zones, respectively. Drivers are more likely to speed on the 30 mph road, with only 17% of the drivers reporting that they "Never" speed on these roads compared to 28% of drivers who "Never" speed on the 70 mph roads.

The share of drivers reporting that they always use their seat belt when driving or riding in a vehicle is substantially lower than the information rate presented by the core behavior metric of 81.5%. Driver self-reported use collected here shows that only 58% "Always" wear a seat belt with another 27% indicating usage as "nearly always." Only 4% of drivers report rarely or never using their seat belts.

Responses to awareness of public media or other education messages about traffic safety related to drinking, speed, and seat belt issues shows speed enforcement is least often read, seen, or heard (RSH) as a traffic safety topic. Considering this and driver perception of relatively high risk for ticketing, it seems that enforcement rather than education is a leading influence in driver perceptions and actions. Only 57% of drivers report recent exposure to speed enforcement. Drivers are most likely to have had recent experience with enforcement messages associated with drunk driving, with 85% of drivers answering positively. There is also a high likelihood (77%) they have recently been exposed to information on seat belt use.

Table 4.1 Core Question Responses

Core	Survey Question	Responses					
ID-1	In the past 60 days, times driving a vehicle within 2 hours after drinking alcohol?	Do Drink, by Times Driving (=57% of Respondents)					
		Do Not Drink	0	1	2 or 3	4 to 6	7 or more
		43%	56%	14%	16%	7%	6%
ID-2	Have you recently read, seen, or heard anything about drunk driving enforcement?	Yes	No				
		85%	15%				
ID-3	Chance of someone getting arrested if they drive after drinking alcohol?	Very Likely	Sw. Likely	Likely	Unlikely	V. Unlikely	
		25%	26%	31%	15%	4%	
SB-1	How often do you use seat belts when you drive or ride in a vehicle?	Always	N. Always	Sometimes	Rarely	Never	
		58%	27%	10%	3%	1%	
SB-2	Have you recently read, seen, or heard anything about seat belt law enforcement?	Yes	No				
		77%	23%				
SB-3	What do you think the chance is of getting a ticket if you don't wear your seat belt?	Very Likely	Sw. Likely	Likely	Unlikely	V. Unlikely	
		14%	26%	23%	26%	10%	
SP-1a	On a road with 30 mph speed limit, how often do you drive faster than 35 mph?	Always	N. Always	Sometimes	Rarely	Never	
		1%	4%	31%	47%	17%	
SP-1b	On a road with a 65 mph speed limit, how often do you drive faster than 70 mph?	Always	N. Always	Sometimes	Rarely	Never	
		1%	5%	22%	45%	28%	
SP-2	What do you think the chance is of getting a ticket if you drive over the speed limit?	Very Likely	Sw. Likely	Likely	Unlikely	V. Unlikely	
		26%	30%	28%	12%	4%	
SP-3	Have you recently read, seen, or heard anything about speed enforcement?	Yes	No				
		57%	43%				

Note: Please see Appendix A for exact question and response wording.

The relationship between behavior and the enforcement expectations and education awareness has an unexpected result. One would expect a relationship in the magnitude of the inverse relationship between a negative behavior – such as speeding – and a related education or enforcement influence – as measured by R/S/H and perceived likelihood for ticketing, respectively. As illustrated in Figure 4.1, driver responses are not consistent with this expectation as the lowest expectation for a ticket is associated with the lowest reported levels of negative behavior in the seat belt issue. With seat belts, 40% of drivers have more than an average expectation of receiving a ticket for not wearing a seat belt. Yet, only 4% report greater than average likelihood they will not wear their seat belts. With drinking, 51% see a greater than average chance for a ticket. A larger share, 15%, report a more than average likelihood they will drive after drinking. The education influence is mixed, considering responses to the read, seen, or heard questions. It does seem that driver behavior may be positively influenced by seat belt education; drivers have similar values of negative behavior with substantially less education. As with enforcement, the highest levels of exposure and negative behavior are reported for driving after drinking.

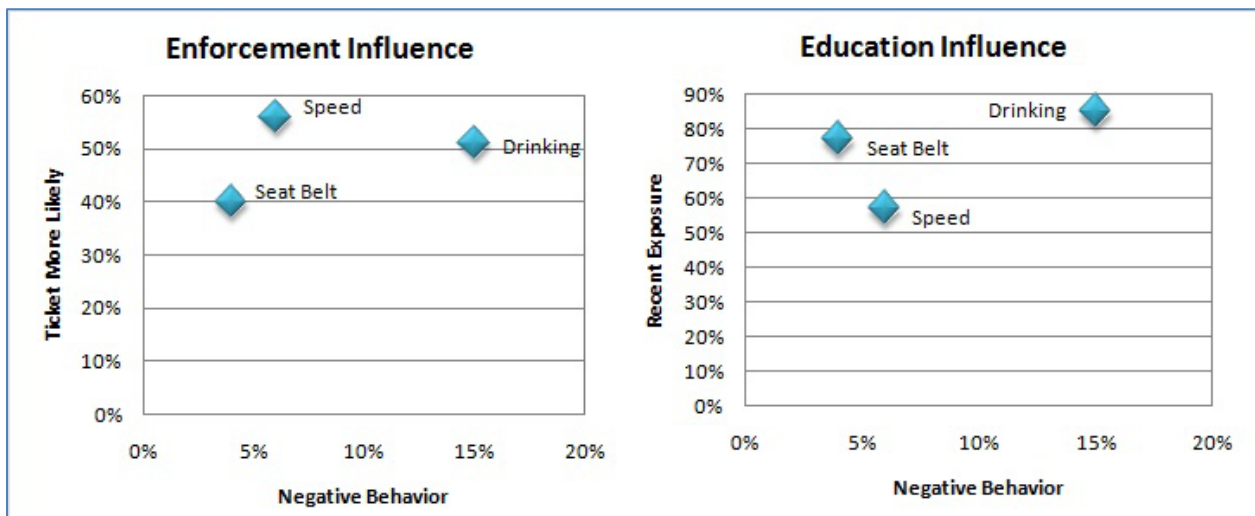


Figure 4.1 Driver Action Related to Enforcement and Education, Core Questions

To further investigate relationships among the core questions and issues that may be related, measures of association are calculated for driver responses. The Pearson coefficient measures the strength of association between two variables – in this case the driver responses. Correlation coefficients range from -1 to +1, with values closer to these extremes indicating stronger relationships. Relationships between -0.5 and +0.5 are generally considered weak and inconsequential. For instance, although the "drive after drinking" and "arrest for drinking" do have the expected negative relationship at Pearson Corr=-0.06861, the correlation measure shows that less than 1% of their variability is shared. Although statistically significant relationships are found among many responses, the Pearson correlation calculations indicate no strong relationships among all questions or within issues (Table 4.2).

Two values indicating a substantive relationship, although weak, are for exposure to impaired driving information and exposure to seat belt information (Pearson Corr=0.5426, $\rho < 0.001$, $n=2,146$). These two variables share 35% of their variability. Considering public information efforts, this seems reasonable because the TSO and other safety partners focus on both of these issues. Drivers who are exposed to information on one topic likely have exposure to the other topic through the same source.

Table 4.2 Correlations in Core Question Responses

	ID2	ID3	SB1	SB2	SB3	SP1a	SP1b	SP2	SP3: Ticket for Speed
ID1: Drive After Drinking	-0.05896	-0.06861	-0.15125	-0.03073	-0.12393	0.11583	0.12552	-0.04988	-0.06114
	0.0517	0.0249	<.0001	0.3116	<.0001	0.0001	<.0001	0.1022	0.0473
ID2: S/H/R Impaired Driving		0.13917	-0.02498	0.54257*	0.07859	-0.04012	-0.05727	0.37926	0.05352
		<.0001	0.2493	<.0001	0.0003	0.0645	0.0082	<.0001	0.0159
ID3: Arrest for Drinking			0.03312	0.07698	0.36969	-0.06291	-0.01242	0.09502	0.34631
			0.1289	0.0004	<.0001	0.0039	0.5693	<.0001	<.0001
SB1: Seat Belt Use				-0.03446	0.08966	-0.06121	-0.14807	0.00584	0.08798
				0.1116	<.0001	0.0046	<.0001	0.7881	<.0001
SB2: S/H/R Seat Belt					0.1102	-0.09205	-0.09241	0.44235	0.01041
					<.0001	<.0001	<.0001	<.0001	0.6392
SB3: Ticket for Seat Belt						-0.10362	-0.13727	0.14449	0.36963
						<.0001	<.0001	<.0001	<.0001
SP1a: Speed on 30 mph							0.50688*	-0.03795	-0.00329
							<.0001	0.0812	0.8819
SP1b: Speed on 65 mph								-0.11036	-0.02701
								<.0001	0.2218
SP2: S/H/R Speed									0.03673
									0.0987

Bold: Significance at the 5% or 1% level.
 *Correlation measure indicates weak relationship.
 Note: Correlations less than 0.5 indicate very weak so other relationships are not addressed in the study.

Questions regarding propensity for speeding on local roads are related for the 30 and 65 miles per hour roads, but the relationship is also weak suggesting the questions address different perceptions of driving behaviors. Although several other relationships are found to be significant at the 1% and 5% levels, the relationship measures are generally well below the 0.5 level. One interesting element is that perceptions of likelihood for receiving a seat belt ticket and speeding. For instance, seat belt information exposure in the "recently seen/heard/read anything about" question has a weak positive relationship to "chances of getting a ticket" on a road with a 30 mile-per-hour (mph) speed limit (Pearson Corr=0.5069, $p < 0.001$, $n = 2,146$). This suggests that general traffic safety message exposure may have halo effects in generally influencing drivers to make safer driving decisions.

Driver responses to other questions are presented in Table 4.3. These responses offer additional insight for decision-makers with queries related to traffic safety enforcement and education programs, policy, and investments. One aspect of traffic safety is deterrence through enforcement. The enforcement aspect combines patrol efforts and penalties to discourage drivers from engaging in risky behaviors. The critical driver risk behaviors studied here are speeding, drinking, and not using seat belts.

Driver perceptions regarding effectiveness of current penalties in deterring drivers from these behaviors may be reflected in their views toward more stringent policies. Responses show 70% of drivers somewhat strongly or strongly favor tougher policies as a deterrent in efforts to reduce driving under the influence (DUI). A majority of drivers, 70%, also have somewhat strong or strong support for enacting a primary seat belt law. Over half of the drivers are currently under the impression that the state's seat belt law is a primary offense. The current law is actually secondary in nature for vehicle occupants age 18 and over, allowing law enforcement to issue a ticket for a seat belt offense only if the driver has been stopped for another traffic violation. A much smaller share of drivers, 37%, somewhat strongly or strongly support increases in speeding fines. The explanation for this may be related to views discussed earlier that drivers' perceive a higher chance for receiving a ticket or lower perceptions for risk associated with the behavior.

Exposure responses in the core questions may offer additional insights in that only 57% of drivers reported recent exposure to speed messages, compared to 85% and 77% for DUI and seat belt exposure, respectively. This difference may influence their views on speeding as a critical risk behavior in traffic safety.

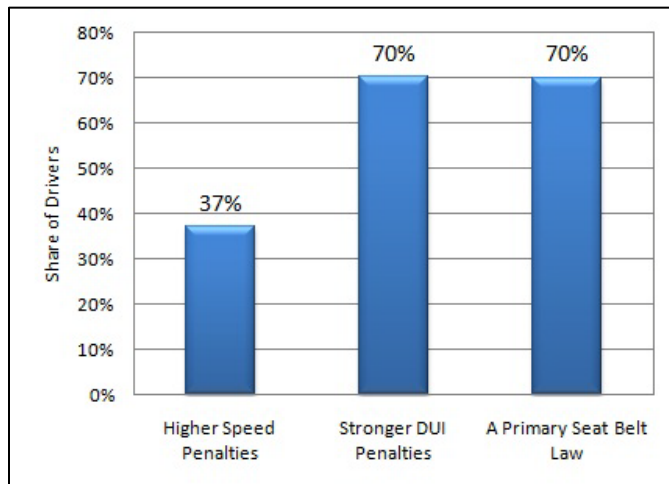


Figure 4.2 Drivers in Favor of Stronger Policies for Risk Behavior

In expanding the scope for understanding success in exposing drivers to traffic safety strategies, two questions specific to impaired driving are included. The questions relate to sobriety checkpoints and saturation patrols – two very high-visibility enforcement activities. The sobriety checkpoints require each vehicle or randomly selected vehicles to move through a temporary law enforcement roadblock site to investigate the possibility that an operator is impaired. During saturation patrols, often conducted subsequent to the check point operations, a relatively large number of law enforcement officers focus efforts to identify impaired drivers in a limited area. The checkpoints and saturation patrols are often combined to raise driver awareness. Law enforcement agencies use local media to alert the public to events. These law enforcement programs foster a perception that their presence encourages safe driving.

Responses indicate that drivers have less exposure to information on specific strategies than to broad drunk driving messages. The sobriety checkpoints were recognized by 68% of drivers as something they had “recently read, seen, or heard” recently. Saturation patrols were recognized by only 34% of the drivers. This difference may be related to less use of the saturation patrols or that this strategy is a newer addition to the law enforcement activities. Three-quarters of drivers agree that strategies which increase police presence positively influence safety, as measured by their perceptions for increased seat belt use. A single question included on roadway features asked drivers about rumble stripes (or strips). Rumble stripes are grooves in the pavement create a vibration and noise when driven over to alert drivers that they are moving outside the bounds of a driving lane. The grooves – which vary in width, length, and depth patterns – can be installed in the centerline and edges of roads. Although a relatively new feature on North Dakota’s state roadways, drivers are well-aware that the rumble stripes are a safety feature – with 98% confirming they recognize it. The state has announced it will install the rumble stripes on all state roads and encourages installation on other public roads as a proven safety feature.

Two final areas addressed in the survey are distracted driving and teen driver training. While the term distracted driving can refer to a broad range of issues, the focus here is on cell phone use, a recent topic in driver safety. Questions on cell phone use for texting and talking indicate that 1 in 10 drivers regularly multitask to include cell phone communication. The share of drivers who “Always” or “Nearly Always” text while driving is 3%. Drivers are more likely to use their cell phone for talking, with 11% of drivers

confirming that they do this "Always" or "Nearly Always." The relative impact of limiting these activities varies substantially as 67% say that they already "Never" text while driving, compared to only 17% for talking.

Teen drivers have long been identified as a driver group at relatively high risk for crash involvement. While teens are required to pass both written and road tests to enter the driving population, little is required with regard to preparation beyond knowing the 'Rules of the Road.' North Dakota currently requires teens under age 16 to complete six hours of behind-the-wheel training in preparation for driving. No requirement is specified for teens 16 years or older. Questions regarding teen driver training show drivers over age 18 do not believe current standards are adequate. Less than 1% supports the current training standards for 16 year olds. While about 1 in 10 drivers believe that 1 to 10 hours of classroom training and 1 to 10 hours of supervised driving is sufficient to prepare young drivers, a majority support increasing the requirements to include at least 20 hours of each. The median hour recommendation was 32 for each of the classroom and supervised driving responses. Responses show that 63.7% think at least 20 hours of classroom instruction should be required in preparation for licensing. A similar share, 61.7%, recommends a requirement for at least 20 hours of supervised driving.

Table 4.3 Other Question Responses

Survey Question	Responses						
To what extent do you favor or oppose...							
	Strongly Favor	Somewhat Favor	DNF or Oppose	Somewhat Oppose	Strongly Oppose		
Higher Speed Penalties	16%	21%	31%	16%	16%		
Stronger DUI Penalties	48%	23%	17%	7%	6%		
Primary Seat Belt Law	46%	25%	14%	6%	10%		
Traffic Safety Knowledge/Tools							
				TRUE	FALSE		
A police officer can ticket you for only a seat belt violation.				57%	43%		
Rumble strips/stripes are a road safety feature.				98%	2%		
Greater police presence increases seat belt use.				74%	26%		
Have you recently read, seen, or heard anything about...							
				YES	NO		
Sobriety Checkpoints				68%	32%		
Saturation Patrols				34%	66%		
Driver Distraction							
	Always	Nearly Always	Sometimes	Rarely	Never		
Cell Text	1%	2%	11%	20%	67%		
Cell Phone	2%	9%	45%	28%	17%		
How many hours of these drivers' training activities do you think a teen should have prior to licensing?							
<i>Hours:</i>	0	1-10	11-20	21-30	31-40	41-99	100+
Classroom Hours	0.5%	17.7%	18.0%	12.3%	26.6%	8.2%	16.6%
Supervised Hours	0.1%	18.4%	19.4%	8.7%	19.4%	9.3%	24.3%

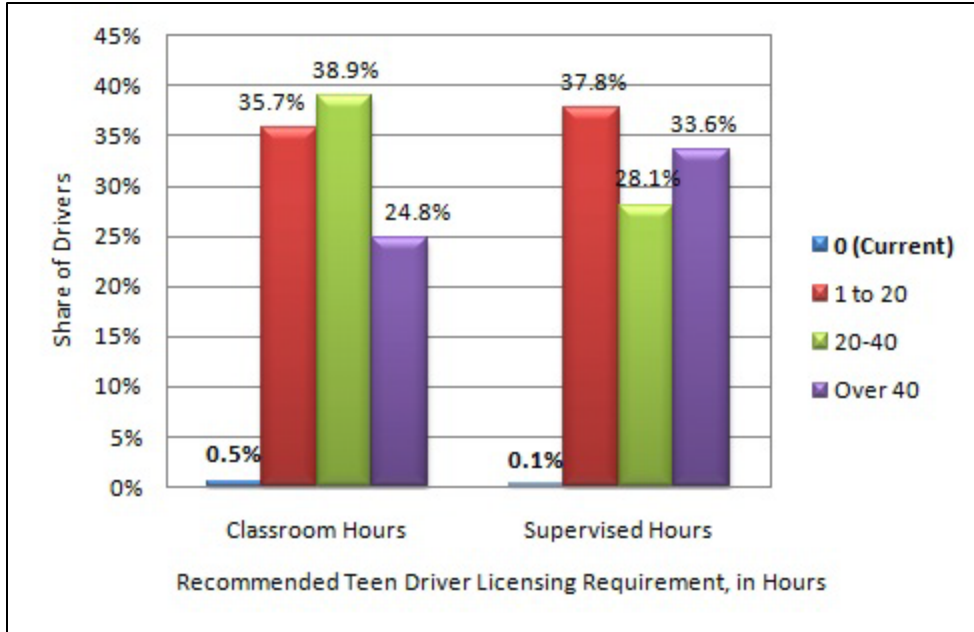


Figure 4.3 Driver Recommendations for Teen Licensing

4.2 Driver Group Evaluations

It is reasonable to assume that driver perceptions and behaviors are influenced by local norms and the driving environment. Therefore, it may be beneficial to investigate differences within the driver population – are they perceived or substantiated? This information may be valuable in more effective traffic safety resource allocations and program assessment, allowing focus for programs and strategies beyond traditional typical statewide treatment. To more easily quantify and manage the discussion of driver responses in the strata, numeric values are assigned to the descriptive answers to create ordinal scales. These transformations also allow for expanded statistical analysis of responses. The scale definitions are provided in Table 4.4.

Table 4.4 Quantitative Scale Definitions for Responses

Q#	Question	Scale	Conversion Values
Q1	Seat Belt Use	1-5	1=Never to 5=Always
Q2a	Ticket Likely Seat Belt	1-5	1=Very Unlikely to 5=Very Likely
Q2b	Ticket Likely Speed	1-5	1=Very Unlikely to 5=Very Likely
Q3	30 mph zone	1-5	1=Never to 5=Always
Q4	65 mph zone	1-5	1=Never to 5=Always
Q5a	Class Hr	0-101	0=0, 1 to 10=5, 11 to 20=15, 21 to 30=25, 31 to 40=35, 41 to 50=45, 51 to 60=55, 61 to 70=65, 70 to 100=85, and 100 or more=101
Q5b	Supervised Hour	0-101	0=0, 1 to 10=5, 11 to 20=15, 21 to 30=25, 31 to 40=35, 41 to 50=45, 51 to 60=55, 61 to 70=65, 70 to 100=85, and 100 or more=101
Q6	Drive After Drinking	0-7	0=0; 1=1; 2 or 3=2.5; 4 to 6=5; 7 or more=7;
Q7	Drinking Arrest	1-5	1=Very Unlikely to 5=Very Likely
Q8a	RSH SB	0-1	0=No, 1=Yes
Q8b	RSH Speed	0-1	0=No, 1=Yes
Q8c	RSH DUI	0-1	0=No, 1=Yes
Q8d	RSH Sobriety Checkpoint	0-1	0=No, 1=Yes
Q8e	RSH Saturation Patrol	0-1	0=No, 1=Yes
Q9	Speed Penalties	1-5	1=Strongly Oppose to 5=Strongly Favor
Q10	DUI Penalties	1-5	1=Strongly Oppose to 5=Strongly Favor
Q11	Seat Belt Alone, Ticket	0-1	0=False, 1=True
Q12	Rumble Safety	0-1	0=False, 1=True
Q13	Police Presence	0-1	0=False, 1=True
Q14	Primary Seat Belt Law	1-5	1=Strongly Oppose to 5=Strongly Favor
Q15	Cell Phone Text	1-5	1=Never to 5=Always
Q16	Cell Phone Talk	1-5	1=Never to 5=Always

Stratification in sampling the driver population provides an opportunity to look at the drivers based on region and geography – as defined in the methods section. In addition, the young male driver group can be distinguished as a high-risk driver population. Insights regarding impaired driving, seat belts, and speed across these strata may benefit traffic safety advocates in their ability to focus efforts. The information may also be useful in assessing the value of including these types of stratification in future surveys.

4.2.1 Regional and Geographic Observations

Table 4.5 shows the mean value for drivers statewide, along with regional and geographic comparisons. Statewide averages show that North Dakota drivers' views and behaviors associated with traffic safety goals have potential for improvement as discussed in the descriptive statistics. For example, seat belt use is at 4.36, this is above the mean value of 3.0 but below the goal of 5.0 – which is equivalent to "Always" in the driver survey response. The principle reason to include the values here is to establish a statewide baseline for the discussion of respondent groups. The figures may also be useful measures in monitoring statewide progress over time.

The regional and geographic strata are tested for significant difference. Driver views and self-reported behaviors showed little regional variation in comparing drivers from east and west. Similar responses for behaviors, exposure, and policy opinions were found when comparing drivers from opposite sides of the state with the exception of whether they had recently seen, heard, or read anything about two programs that are used by law enforcement to influence drivers to not drive after drinking. Driver responses differ significantly with the west having less familiarity with the programs. Difference is also found in driver views on speed penalties. Only questions on seat belt use generate significantly different responses when drivers are compared based on the rural and urban geography.

Table 4.5 Differences in Driver Views and Behaviors, by Region and Geography

Question	Scale	Statewide	Region		Sig.	Geography		Sig.
		All	East	West		Rural	Urban	
Seat Belt Use	1-5	4.36	4.38	4.36		4.08	4.49	**
Ticket Likely								
Seat Belt	1-5	3.06	3.07	3.04		3.13	3.03	
Speeding	1-5	3.59	3.61	3.58		3.58	3.60	
Speed, 30 mph zone	1-5	2.29	2.25	2.32		2.27	2.29	
Speed, 65 mph zone	1-5	2.19	2.17	2.20		2.15	2.20	
Teen Driver Training								
Class Hours Supervised	s.r.	41	40	42		43	40	
Hours	s.r.	46	46	45		47	46	
Drive After Drink	0-7	1.36	1.57	1.12	**	1.21	1.43	
Arrest for DUI	1-5	3.53	3.59	3.47		3.49	3.55	
RSH Seat Belt	0-1	0.77	0.76	0.77		0.80	0.75	
RSH Speeding	0-1	0.57	0.57	0.56		0.56	0.57	
RSH DUI	0-1	0.85	0.86	0.84		0.83	0.86	
RSH Sob Checkpoint	0-1	0.68	0.78	0.57	**	0.65	0.70	
RSH Saturation Patrol	0-1	0.37	0.39	0.26	**	0.33	0.34	
Speed Penalties	1-5	3.05	3.04	3.06	*	2.96	3.09	
DUI Penalties	1-5	3.99	3.96	4.02		3.94	4.01	
Seat Belt Ticket, Alone	0-1	0.57	0.59	0.55		0.56	0.57	
Rumble Stripes	0-1	0.98	0.97	0.98		0.98	0.97	
Police Presence	0-1	0.74	0.74	0.75		0.74	0.74	
Primary Seat Belt Law	1-5	3.89	3.93	3.85		3.64	4.01	**
Cell Phone Text	1-5	1.49	1.52	1.46		1.49	1.50	
Cell Phone Talk	1-5	2.51	2.53	2.48		2.51	2.50	

s.r.: See Reference in Table 4.4 for range definitions.

DND: Share of drivers who "Do Not Drink". "Drive after Drinking" frequencies are calculated for other drivers.

*Significant difference at the 5% level for Wald Chi-Square test.

**Significant difference at the 1% level for Wald Chi-Square test.

Regional differences in driver responses to higher penalties for speed violations show that 40% of drivers in the east have above average support for increasing penalties, compared to only 4% of drivers in the west (Table 4.6). In the other extreme, 24% of drivers in the east have greater than average opposition to increased penalties compared to 29% of drivers in the west.

Table 4.6 Speed Penalty Response Frequencies, by Region

Speed Penalties	Strongly Favor	Somewhat Favor	DNF or Oppose	Sw. Oppose	Strongly Oppose
East	18%	22%	26%	17%	17%
West	15%	19%	37%	14%	15%

Wald Chi Sq=11.652, $\rho=0.0180$

Figure 4.4 shows the difference in exposure to specific traffic safety activities. Responses to the “read, seen, heard” questions associated with sobriety checkpoints and saturation patrols are significantly different between drivers in the east and the west (Wald Chi Sq=19.5043, $\rho=0.0002$). Fewer drivers in the west have had recent experience with programs at 57% and 26%, respectively, compared to the east – where 78% of drivers have recently read, seen, or heard something related to sobriety checkpoints and 39% have had recent exposure to the saturation patrol activities. Because drivers indicated police presence is positively correlated with increased traffic safety, as measured by seat belt use, increasing levels and awareness of activities such as the sobriety checkpoints and saturation patrols may generate traffic safety gains not only related to the target impaired driver group but to all drivers in the safety halo effects mentioned previously.

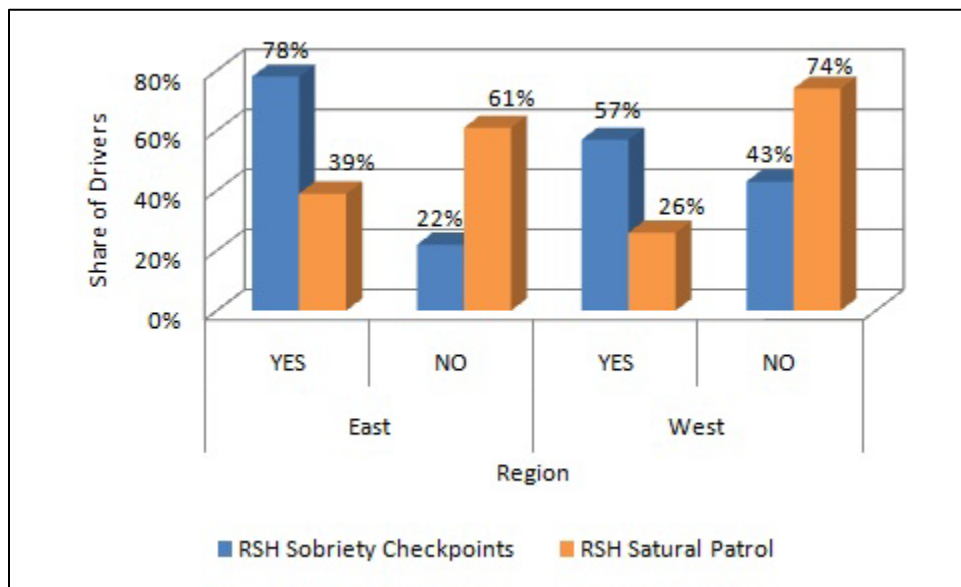


Figure 4.4 Traffic Safety Exposure Responses, by Region

Geographic distinctions in seat belt use and views on a primary seat belt law are highlighted in Figure 4.5. As expected, seat belt use by rural drivers is significantly lower than that of urban drivers (Wald Chi Sq=126.5207, $p=0.0001$; Wald Chi Sq=34.6542, $p=0.0001$). Responses indicate that a 46% greater share of the drivers in urban areas “Always” use their seat than in rural areas. This response is reflected in the substantially smaller share of rural residents who favor a primary seat belt law, about one in three drivers compared to one in two urban drivers. A majority of drivers in both regions do “Strongly Favor” or “Somewhat Favor” enacting a primary seat belt law. Opposition, as shown in the “Somewhat Oppose” and “Strongly Oppose” responses, is stronger in rural areas with 21% of responses in rural areas and only 14% in urban areas. Complete frequency distributions among all responses, by geography, are shown in Appendix C.

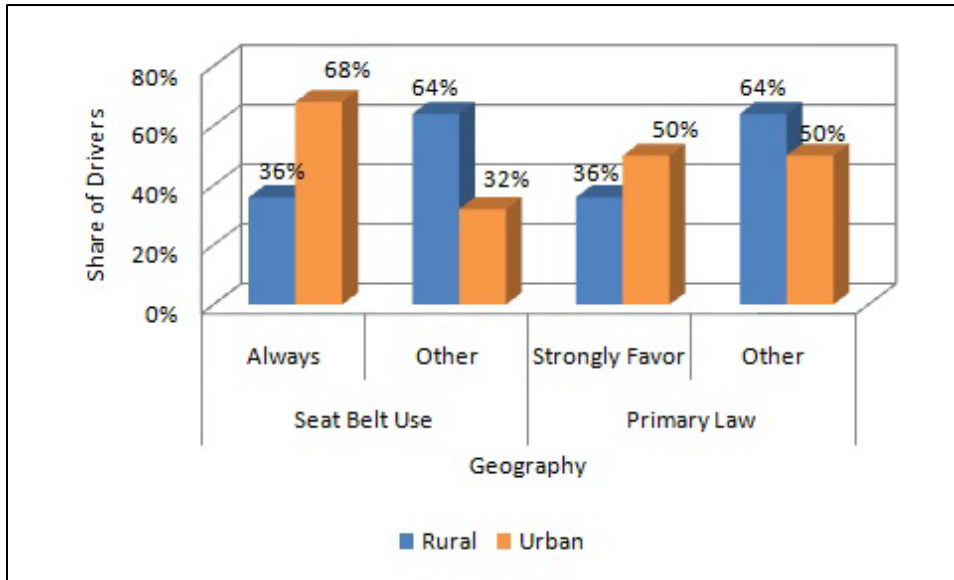


Figure 4.5 Driver Seat Belt Use and Views, by Rural and Urban Geography

4.2.2 Young Male Driver Target Group

The selected target group of male drivers between 18 and 35 years does show significantly different views and behaviors when compared to other drivers (Table 4.7). This high risk driver group is significantly less likely to use seat belts (Wald Chi Sq=12.9020, $p=0.0001$), and more likely to exhibit behavior at-odds with traffic safety goals – such as speeding (Wald Chi Sq=46.7080, $p=0.0001$) and driving impaired (Wald Chi Sq=13.2293, $p=0.0001$). This target group also has a lower expectancy for law enforcement to ticket drivers for seat belt or speed violations, compared to the balance of the driver population (Wald Chi Sq=9.2855, $p=0.0001$; Wald Chi Sq=34.7923, $p=0.0001$).

Table 4.7 Differences in Driver Views and Behaviors, Young Male Target Group

	Target Male Drivers, 18-35 yr	Other Drivers	Sig.
Seat Belt Use	4.04	4.43	**
Ticket Likely			
Seat Belt	2.74	3.12	**
Speeding	3.47	3.62	**
Speed in 30 mph zone	2.38	2.27	
Speed in 65 mph zone	2.51	2.12	**
Teen Driver Training			
Class Hours	41	41	
Supervised Hours	41	47	
Drive After Drinking	1.78	1.27	*
Arrest for DUI	3.61	3.52	
RSH Seat Belt	0.77	0.77	
RSH Speeding	0.50	0.58	
RSH DUI	0.88	0.84	
RSH Sob Checkpoint	0.59	0.70	**
RSH Saturation Patrol	0.28	0.35	**
Speed Penalties	2.65	3.13	**
DUI Penalties	3.66	4.05	**
Seat Belt Ticket, Alone	0.54	0.58	
Rumble Stripes	0.97	0.98	
Police Presence	0.61	0.77	**
Primary Seat Belt Law	3.34	4.00	**
Cell Phone Text	2.01	1.39	**
Cell Phone Talk	2.91	2.43	**

s.r.: See Reference in Table 4.4 for range definitions.

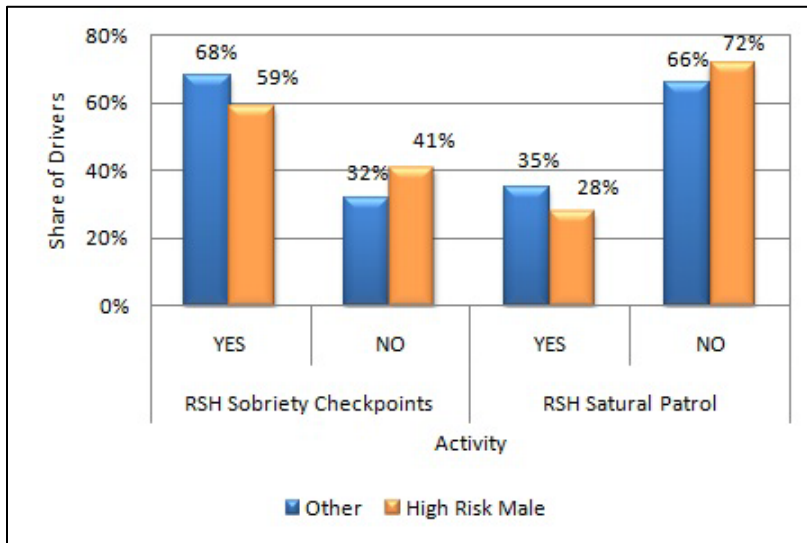
*Significant difference at the 5% level for Wald Chi-Square test.

**Significant difference at the 1% level for Wald Chi-Square test.

Only 42% of young male drivers “Always” wear a seat belt while driving or riding in a vehicle, compared to 61% of other drivers. The share of young males reporting they “Rarely” or “Never” use seat belts is twice as high as it is for other drivers. Other responses show young males are also twice as likely as other drivers to speed on a 65 mph road. Among drivers who indicate they drink, the share of young males driving after drinking is 35% higher than for other drivers – at 54% compared to 40% for other drivers. In light of recent discussions on distracted driving, results show that only 37% of young males “Never” text while driving. This is a substantially larger share than for other drivers – where 72% “Never” text while

driving (Wald Chi Sq=32.7434, $p=0.0001$). Young males also have a significantly higher share of drivers who frequently talk on their phone while driving (Wald Chi Sq=94.2442, $p=0.0001$). It seems that lower belt use exacerbates potential crash injury outcomes for drivers who have described their behaviors as higher risk.

The TSO continues to explore opportunities to increase safe driving behavior overall in this driver group. Young driver responses to R/S/H, penalty, and law questions offer some insight. While exposure to messages on seat belts, speeding, and DUI are similar to that of other drivers, young males are less familiar with sobriety checkpoint and saturation patrol activities. This may be important to the degree that these activities are effective in deterring drunk drivers, and in benefits gained through traffic safety halo effects.



Young male drivers are less supportive of stronger laws or penalties for seat belt use, speeding, and drunk driving violations. Because they appear to have a greater likelihood for being stopped for these behaviors, this lack of support seems rational. Although a majority of young males agree that law enforcement presence is a positive influence in traffic safety, based on responses to the effect on seat belt use, the share is lower at 61% compared to 77% for other drivers.

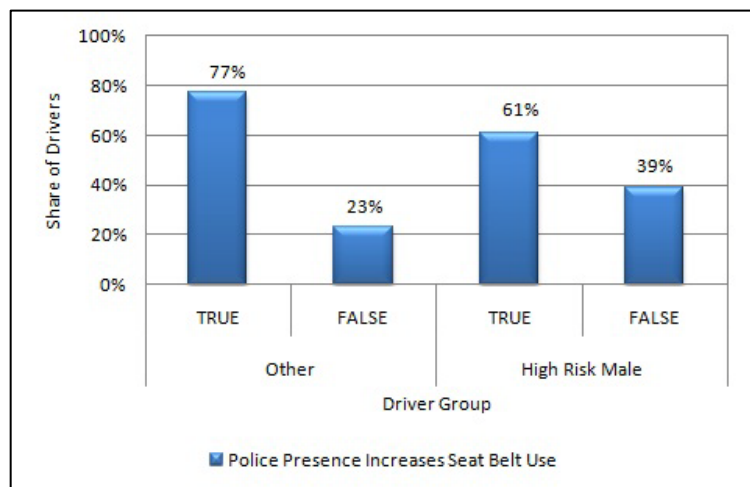


Figure 4.6 Influence of Police Presence, Young Males and Other Drivers

Table 4.8 Responses for High Risk Male Drivers

Survey Question	Responses, by Driver Group					
Seat Belt Use	Always	N. Always	Sometimes	Rarely	Never	
Other	61%	26%	9%	3%	1%	
HR Males	42%	31%	19%	5%	3%	
Seat Belt Ticket	Very Likely	Sw. Likely	Likely	Unlikely	Very Unlikely	
Other	15%	27%	23%	25%	10%	
HR Males	9%	28%	16%	34%	13%	
Ticket for Speed	Very Likely	Sw. Likely	Likely	Unlikely	Very Unlikely	
Other	27%	30%	26%	12%	5%	
HR Males	17%	29%	39%	13%	2%	
Speed in 30 mph	Always	N. Always	Sometimes	Rarely	Never	
Other	1%	4%	33%	46%	16%	
HR Males	2%	6%	32%	47%	13%	
Speed in 65 mph	Always	N. Always	Sometimes	Rarely	Never	
Other	1%	6%	23%	45%	25%	
HR Males	3%	12%	31%	41%	13%	
Drive After Drink	<i>DND*</i>	0	1	2 or 3	4 to 6	7+
Other	45%	59%	13%	14%	8%	5%
HR Males	32%	46%	14%	22%	9%	9%
Drinking Arrest	Very Likely	Sw. Likely	Likely	Unlikely	Very Unlikely	
Other	25%	26%	30%	15%	4%	
HR Males	27%	25%	32%	14%	2%	
Speed Penalties	St. Favor	Sw. Favor	DNF/Oppose	Sw. Oppose	St. Oppose	
Other	18%	22%	31%	15%	14%	
HR Males	10%	17%	29%	18%	26%	
DUI Penalties	St. Favor	Sw. Favor	DNF/Oppose	Sw. Oppose	St. Oppose	
Other	50%	23%	15%	7%	5%	
HR Males	37%	21%	23%	10%	9%	
Primary SB Law	St. Favor	Sw. Favor	DNF/Oppose	Sw. Oppose	St. Oppose	
Other	49%	25%	13%	5%	8%	
HR Males	29%	23%	18%	12%	18%	
Cell Text	Always	N. Always	Sometimes	Rarely	Never	
Other	1%	1%	9%	17%	72%	
HR Males	1%	4%	26%	32%	37%	
Cell Phone	Always	N. Always	Sometimes	Rarely	Never	
Other	2%	8%	41%	30%	19%	
HR Males	3%	13%	61%	18%	5%	

Note: Please see Appendix A for exact question and response wording.

*DND: Share of drivers who 'Do Not Drink'. 'Drive after Drinking' frequencies are calculated for other drivers.

5. CONCLUSION

The initial statewide driver traffic safety survey provides baseline metrics for the TSO and others in understanding perceptions and behaviors related to focus issues. A core set of questions addresses nationally agreed upon priorities, including seat belts, drinking, and speeding. In addition, questions were included to ascertain views of teen drivers and on specific programs and activities. Results show that many North Dakota drivers have adopted safe practices, but it is apparent that efforts are still needed to improve safety on the state's roads. Within the driver population, a target driver population of young male drivers engages in relatively high risk driving practices and has some disregard for reducing potential for crash injury through consistent seat belt use. Surprisingly, few differences were found in comparing drivers by region and geography.

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APPENDIX B. DO NOT KNOW/REFUSE TO ANSWER RESPONSES

Q#	Question	Total Responses	DNK/Refuse Responses
Q1	Seat Belt Use	2,161	1
Q2a	Ticket Likely	2,151	33
Q2b	Seat Belt		
	Speeding	2,067	10
Q3	Speed, 30 mph zone	2,156	3
Q4	Speed, 65 mph zone	2,160	28
	Teen Driver Training		
Q5a	Class Hours	2,055	732
Q5b	Supervised Hours	2,006	268
Q6	Drive After Drink	2,156	179
Q7	Arrest for DUI	2,152	4
Q8a	RSH Seat Belt	2,146	n.a.
Q8b	RSH Speeding	2,130	n.a.
Q8c	RSH DUI	2,142	n.a.
Q8d	RSH Sob Checkpoint	2,136	n.a.
Q8e	RSH Saturation Patrol	2,096	n.a.
Q9	Speed Penalties	2,136	55
Q10	DUI Penalties	2,158	56
Q11	Seat Belt Ticket, Alone	2,150	247
Q12	Rumble Stripes	2,152	114
Q13	Police Presence	2,165	15
Q14	Primary Seat Belt Law	2,165	3
Q15	Cell Phone Text	2,165	43
Q16	Cell Phone Talk	2,165	2

Total n=2,193

APPENDIX C. DRIVER RESPONSES BY REGION AND GEOGRAPHY

Region or Geography, Question	Region or Response				
Regional Differences					
	East		West		
Have you recently read, seen, or heard anything about...	YES	NO	YES	NO	
RSH Sob Checkpoint	78%	22%	57%	43%	
RSH Saturation Patrol	39%	61%	26%	74%	
Speed Penalties	Strongly Favor	Somewhat Favor	DNF or Oppose	Sw. Oppose	Strongly Oppose
East	18%	22%	26%	17%	17%
West	15%	19%	37%	14%	15%
Times Driving After Drinking in the past 60 days...	0	1	2 or 3	4 to 6	7 or more
East	59%	13%	14%	8%	5%
West	46%	14%	22%	9%	9%
Geographic Differences					
Seat Belt Use	Always	Nearly Always	Sometimes	Rarely	Never
Rural	36%	43%	16%	4%	1%
Urban	68%	20%	8%	3%	1%
Primary SB Law	Strongly Favor	Somewhat Favor	DNF or Oppose	Sw. Oppose	Strongly Oppose
Rural	36%	25%	18%	10%	11%
Urban	50%	24%	12%	5%	9%