

North Dakota Statewide Traffic Safety Survey, 2017: Traffic Safety Performance Measures for State and Federal Agencies



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North Dakota Department of Transportation Safety Division

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August 2017

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ABSTRACT

The statewide driver traffic safety survey provides baseline metrics for the North Dakota Department of Transportation Safety Division and others to use in understanding perceptions and self-reported behaviors related to focus issues. A core set of questions addresses nationally agreed upon priorities including seat belts, impaired driving, and speeding. In addition to the core issues, questions were included to better understand views on specific programs and attitudes pertinent to North Dakota drivers. Results show that more North Dakota drivers have adopted safe driving practices, but additional efforts are needed to improve safety on the state's roads.

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1. INTRODUCTION

The United States lags behind other developed countries in several transportation safety metrics. One metric, road traffic death rate, is higher than in other developed countries (World Health Organization 2016) (Figure 1.1). Progress has been made in reducing the number of traffic-related fatalities, but crashes resulting in death, injury, and property damage continue to take place due to preventable factors. These factors include driving under the influence of drugs or alcohol, distracted driving, and operating a vehicle without a seat belt, among others. The metric highlighted in Figure 1.1, which presents the most current data from the World Health Organization, suggests that more work is needed to improve driver behavior and overall safety on roadways in the United States. One critical asset in monitoring and communicating traffic safety priorities is a reliable and comprehensive means to set and measure goals (Government Accounting Office 2010). In a nationwide effort to improve transparency and quantify metrics for behavior-based investments designed to reduce motor vehicle crashes, the Governor's Highway Safety Association (GHSA) and the National Highway Traffic Safety Administration (NHTSA) established a set of performance measures to support traffic safety priorities and demonstrate progress related to behavioral safety plans and programs (Hedlund 2008).

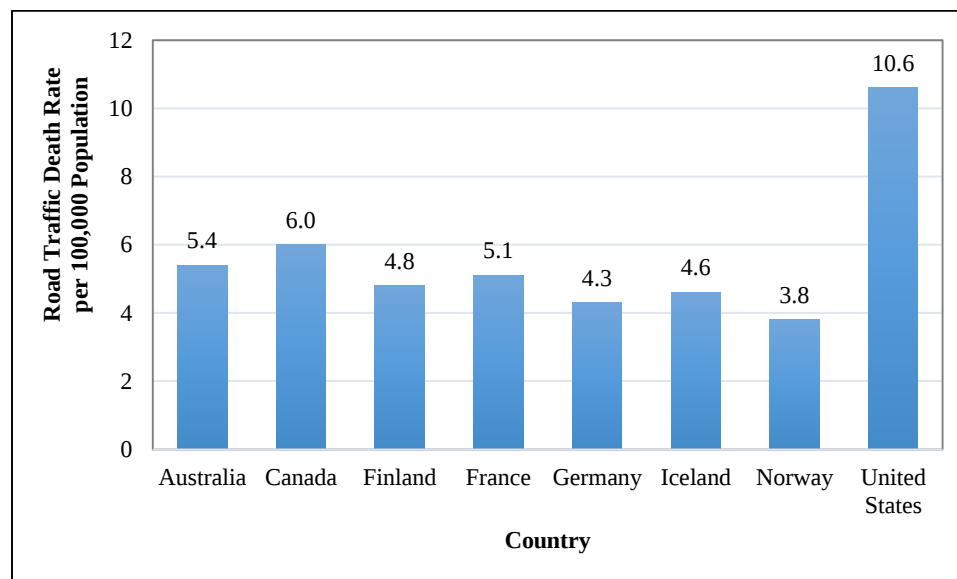


Figure 1.1 Road Traffic Death Rate of Selected Countries, 2013

Within the GHSA-NHTSA safety effort, 14 measures were agreed upon as minimum performance measures. These include one behavior, three activity, and ten outcome measure-types. The minimum performance measures are designed to create a quantitative core for the development and implementation of highway safety plans and programs. Several uses include goal setting, goal-action linkages, resource allocation, program evaluation, and communication. Other benefits occur from improvements to organizational focus, feedback processes, and accountability (Herbel et al. 2009). The measures were defined to monitor overall traffic safety performance and progress related to the prioritized behavioral issues. These issues include occupant protection, alcohol use, and speeding. Additionally, the measures target high-risk population groups. The 10 outcome measures focus on the following:

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

- Motorcyclists
- Young drivers
- Older drivers
- Pedestrians
- Bicyclists

These 10 core outcome measures combine current exposure data, such as population and vehicle miles traveled (VMT) with existing national Fatality Analysis Reporting System (FARS) data to generate performance measures in areas common to state safety strategies and data systems. Activity measures emphasize actions such as citations or arrests under grant-funded enforcement initiatives. Seat belt observation was chosen as the single initial core behavior measure (Hedlund 2008). The measures utilized in the outcome highlights are typically calculated as:

- Core outcome measures
 - C-1) Number of traffic fatalities (FARS). States are encouraged to report three-year or five-year moving averages when appropriate. (One example is when annual counts are small enough that random fluctuations may inaccurately reflect true trends. This applies to all fatality measures.)
 - C-2) Number of serious injuries in traffic crashes (state crash data files).
 - C-3) Fatalities per VMT (FARS, FHWA). States should set a goal for total fatalities per VMT; states should report both urban and rural fatalities per VMT in addition to total fatalities per 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 blood alcohol content (BAC) of at least 0.08 grams/deciliter (FARS).
 - C-6) Number of speeding-related fatalities (FARS).
 - C-7) Number of motorcyclist fatalities (FARS).
 - C-8) Number of motorcyclist fatalities not wearing a helmet (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 (observational 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 minimum performance measure publication also referenced four additional areas for measuring improvement and implementation: traffic injury outcome; driver attitudes, awareness, and behavior; traffic speed; and law enforcement activity. The following report fulfills the need for improved measurement of driver knowledge, attitudes, behaviors, and beliefs. A core question set was developed by a GHSA-NHTSA working group and presented to state departments of transportation following the preliminary recommendations in the minimum performance measures (Hedlund, Casanova, and Chaudhary 2009).

A set of 10 core questions was created to quantify attitudes, awareness, and self-reported behavioral patterns through periodic statewide traffic safety surveys/questionnaires. This recommended list of core questions was intended to provide a standard for states to track performance as they pursue program goals and objectives to reduce crashes, injuries, and fatalities related to high-risk driver behaviors. Core questions remain consistent across all entities. Beyond the core questions, an option to supplement the survey with other additional questions provides latitude to address local interests and to obtain other useful information related to topics such as demographics and driving activity.

Commonly, federal initiatives relating to driving behavior focus on impaired driving, seat belt use, and speeding. Thus, the core questions emphasize these issues (Hedlund, Casanova, and Chaudhary 2009). The core questions of the focus areas are:

- Impaired driving
 - ID-1: In the past 60 days, how many times have you driven a motor vehicle within two 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 pickup?
 - 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 miles per hour, how often do you drive faster than 35 miles per hour?
 - SP-1b: On a road with a speed limit of 65 miles per hour, how often do you driver faster than 70 miles per hour?
 - SP-2: In the past 30 days, have you read, seen or heard anything about speed enforcement by police?
 - 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 “2017 North Dakota Driver Survey” developed in conjunction with the North Dakota Department of Transportation Safety Division (see Appendix A for complete survey). The Safety Division expanded the survey to gain additional information relevant to its goals and responsibilities. Ultimately, the core questions were slightly modified to better fit driving conditions in North Dakota. These core questions read as follows:

- Impaired driving
 - ID-1) In the past 60 days, how many times have you driven a motor vehicle within two hours after drinking alcoholic beverages?
 - ID-2) Within the last six months, have you read, seen, or heard anything about alcohol impaired driving (or drunk driving) enforcement by the police?
 - ID-3) What do you think the chances are of someone getting arrested if they drive buzzed/drunken?

- Safety belts
 - SB-1) How often do you use seat belts when you drive or ride in a vehicle?
 - SB-2) Within the last six months, have you read, seen, or heard anything about seat belt law enforcement by police?
 - SB-3) What do you think the chance is of getting a ticket if you do not wear your seat belt?
- Speeding
 - SP-1) On a road with a speed limit of 75 miles per hour, how often do you drive faster than 80 miles per hour?
 - SP-2) Within the last six months, have you read, seen, or heard anything about speed enforcement by police?
 - SP-3) What do you think the chance is of getting a ticket if you drive over the speed limit?

The annual Highway Safety Plan (HSP) provides insight for current priorities and activities (Levi et al. 2016a). The most recent HSP outlines goals related to the overall traffic safety mission of the NDDOT, in addition to specific issues to address in the coming fiscal year. In 2017, these issues will be analyzed via projects designed to improve performance in the following areas:

- Number of fatalities from traffic crashes
- Number of serious injuries from traffic crashes
- Fatalities per vehicle miles traveled
- Number of unrestrained passenger vehicle occupant fatalities
- Number of fatalities involving a driver or motorcycle operator with a 0.08 BAC or above
- Number of speed-related fatalities
- Number of motorcycle fatalities
- Number of un-helmeted motorcycle fatalities
- Number of drivers age 20 and younger involved in fatal crashes
- Number of pedestrian fatalities
- Number of bicyclist fatalities
- Observed seat belt usage
- Seat belt citations
- Impaired driving citations
- Speeding citations
- Percentage of crash reports electronically submitted
- Percentage of misused car seats during checks
- Distracted driving

Metrics are included to indicate progress of the overall safety mission in light of traffic fatalities and serious injuries. The single core behavior measure shows 2016 observed seat belt use at 80.8%, with a 2017 goal of increasing this rate by 0.5 percent (Levi et al. 2016a). Results here will enhance the understanding of behavior by providing additional coverage, expanded insights into issues, and an increased number of measures.

2. METHOD

A mail survey was selected as the method for the driver traffic safety survey. A questionnaire was created by blending the core questions with other NDDOT-designated questions pertaining to education, policy, and enforcement. The questions were developed based on a literature review – which included previous surveys of this type – and guidance offered by the GHSA-NHTSA working group. The mailings to drivers included a Safety Division cover letter which invited participation and explained the survey objectives. The questionnaire was mailed to North Dakota drivers on March 1, 2017, and was open to response until April 1, 2017.

NDDOT driver records formed the population used for sampling. Originally, the NDDOT mail list consisted of 10,920 driver addresses. From this preliminary list of addresses, it was discovered that some out-of-state drivers had accidentally been included in the survey sample. After cleaning the sample, a total of 10,596 drivers were verified as having North Dakota residency. Furthermore, the sample had regional, geographic, age, and gender distributions that were a reasonable representation of the general North Dakota driver population.

Unlike mailing lists from earlier iterations of this study, extensive screening of the address list resulted in zero addresses being identified as duplicates and zero addresses being flagged as “problem addresses.” From the 10,596 original addresses, none were returned by the postal service as being undeliverable; this is probably due to “or current resident” being added to the address labels. Ultimately, 2,255 surveys were completed and returned to the research team. However, not all of the surveys were from valid North Dakota counties. A total of 79 respondents presumably misread “In which county do you live?” to read “In which country do you live?” and responded with “USA.” A smaller share, 59 participants, did not provide an answer whatsoever. One person indicated that he/she lived in a county outside of the state. Therefore, of the usable survey responses provided, 2,116 were confirmed as valid and form the driver response sample used in the analysis.

The sample size was based on a 95% confidence interval with a 5% confidence level. The expected response rate was estimated at 20%. Although mail survey response is typically low, with 10% not unusual, a slightly better response rate was expected due to the parameters used in the survey design and administration. These parameters include keeping the survey to a single page, including the state agency cover letter, using state agency mail envelopes, and providing postage-paid return envelopes.

A disproportionate stratified random sample was used to select drivers. North Dakota drivers were stratified by region (east/west) and geography (urban/rural). County jurisdictional boundaries were used to define both region and geography (Figure 2.1). Additionally, oversampling was necessary for two target driver groups: 18-to-34-year-old male and female drivers. The disproportionate stratified sampling structure was used to elicit sufficient driver participation to allow robust analysis of responses by region, geography, and the target driver groups. Using these simple average responses, however, would provide skewed results in representing the statewide driver population. For example, drivers age 18 to 34 were 63.5% of the survey sample and account for 39.6% of the survey responses. However, this age cohort only accounts for 32.4% of the licensed driver population in the state (Levi et al. 2016b). Therefore, a post-stratification weighting process is used to give an appropriate weight to responses for statewide estimates. Results from post-stratification consider the age, gender, and location of North Dakota registered drivers when weighting to reflect the views, perceptions, and behaviors of the statewide driving population. Note that answers with fewer than 30 responses are not considered large enough to extrapolate to fit the entire North Dakota driver population. These instances are indicated with asterisks throughout the analysis.

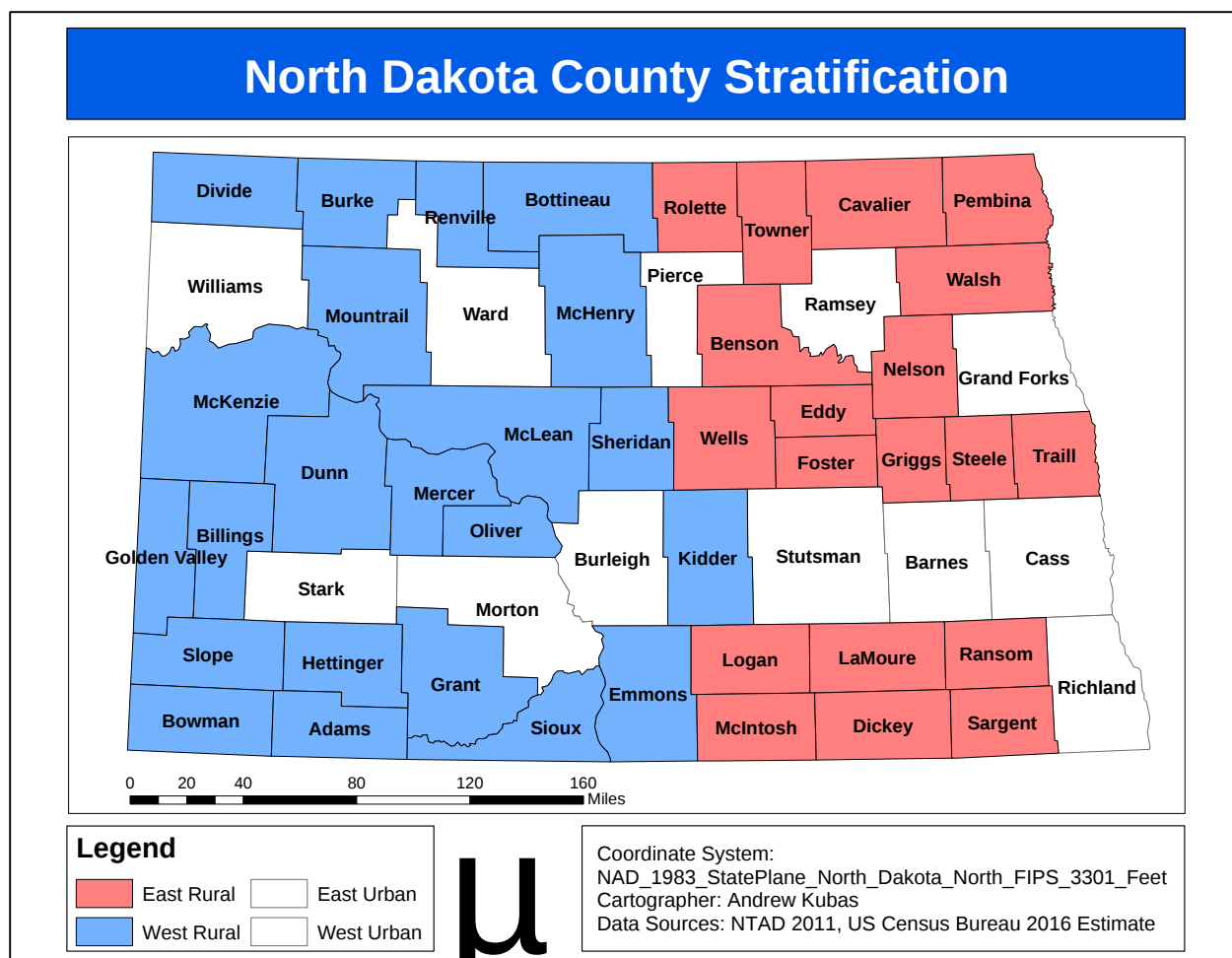


Figure 2.1 County Stratification

The regional definition was created by aggregating North Dakota health regions into two areas closely representing an east/west division of the state. The geography definition includes an urban/rural dichotomy. Urban drivers are those from counties with the largest urban population according to the most recently published data estimates from the US Census Bureau. Six urban counties are located in the east and another six are located in the west as indicated by the population density geographic definitions used in the study. These counties represent the clear majority of the urban population in the state. The sampling probabilities for the survey are displayed in Table 2.1.

Table 2.1 Sampling Probabilities

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

3. RESPONSE

The survey response rate was 20.0% with 2,116 valid responses obtained from a mailing to 10,596 drivers. The response rate was comparable to prior surveys (Vachal, Benson, and Kubas 2010-2016) and was 1.4% higher than the 2016 mailing (Vachal, Benson, and Kubas 2016). As expected, oversampling of the 18-34-year-old male and female driver target groups was needed to achieve a sample sufficient for statistical analysis. The target group response rate was 12.4% compared to 32.9% 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 comparable response rates from east, west, urban, and rural demographics.

Table 3.1 Survey Response by Region and Geography

		GEOGRAPHY		
		Urban	Rural	Total
R E G I O N	East	556 (26.3%)	494 (23.3%)	1,050 (49.6%)
	West	564 (26.7%)	502 (23.7%)	1,066 (50.4%)
	Total	1,120 (52.9%)	996 (47.1%)	2,116

The sample design did not account for age or gender beyond the target male and female groups. Responses have an acceptable distribution among age cohorts, though the 35-44-year-old age group is moderately underrepresented compared to its actual proportion of the driver population in the state (Table 3.2). The highest share of responses is among drivers age 25-34; this age cohort makes up 30.6% of the survey responses and continues the trend from prior iterations of this survey in which this group has the largest number of responses. The 35-44-year-old age cohort makes up the lowest proportion of survey responses. Nonetheless, there were well over 30 responses from each age group, making statistical extrapolation possible and allowing for inferences to be drawn with regard to the entire North Dakota driver population. Response rates were slightly skewed by gender: 58.5% of the respondents were women. This deviates from the North Dakota driver population in which there is an approximately equal distribution of males and females. The number of responses based on gender also provides sufficient data to expand the responses to represent the entire statewide driver population.

Table 3.2 Response by Age Group

Age Group	Survey		Driver Population	
	Responses	Share	Drivers	Share _i
18-24	186	8.8%	65,669	12.3%
25-34	648	30.6%	112,025	20.9%
35-44	122	5.8%	83,582	15.6%
45-54	237	11.2%	85,705	16.0%
55-64	421	19.9%	93,293	17.4%
65-74	310	14.7%	55,520	10.4%
75 and Older	183	8.6%	39,130	7.3%

_iRepresents share of drivers above age 18; percentages do not account for novice (under 18) drivers

Frequency Missing: 9

Source: *Levi et al. 2016b*

Information regarding drivers' annual travel generates baseline data for understanding statewide travel activity. The expected trend in driving behavior is that the number of annual miles traveled declines as drivers age. This trend is evident in this iteration of the survey (Figure 3.1). With the exception of those over age 65, a majority of drivers report driving more than 10,000 miles annually. Responses show three-quarters (74.8%) of those over the age of 75 drive less than 10,000 miles annually. About three-in-five (60.9%) 35-44 year-olds reported driving more than 15,000 miles annually; this was the largest share among age cohorts for driving at least 15,000 miles each year. In contrast, more than half (57.2%) of drivers in the 75+ year-old age group indicated that they drive fewer than 5,000 miles annually.

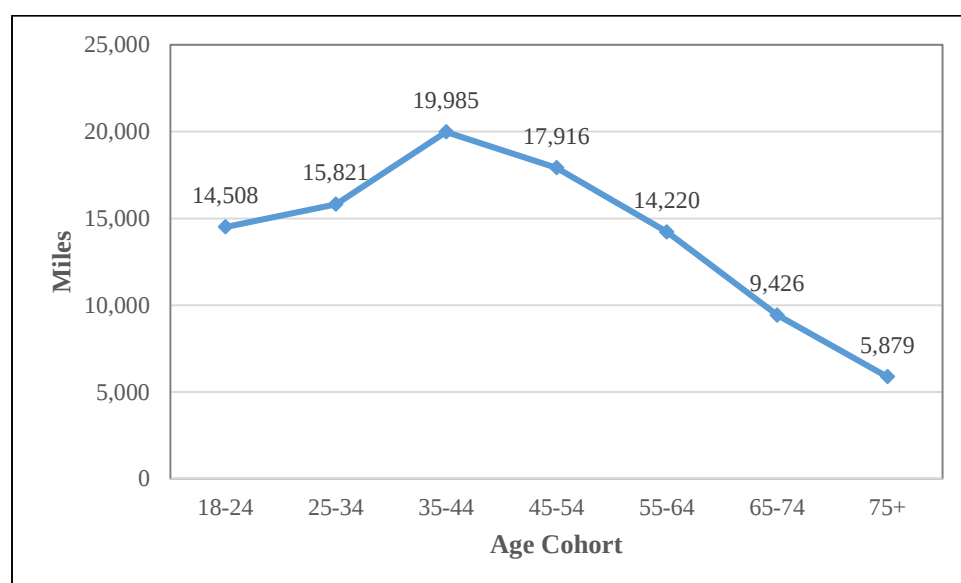


Figure 3.1 Average Miles Driven per Year, by Age Cohort

In North Dakota, the western portion of the state is typically associated with more miles driven annually. Similarly, rural residents generally travel more frequently than their urban counterparts. Thus, one would expect residents from the western region of the state and drivers from rural backgrounds to travel further, on average, than their eastern and urban neighbors. When annual travel is broken down by both region and geography, it becomes apparent that drivers from rural areas do indeed drive more, on average, than those from urban portions of the state. The same trend occurred when factoring for regional differences: with the exception of the 55-64-year-old cohort, western drivers in each age group traveled more throughout the year than their eastern counterparts (Table 3.3) (Figure 3.2). There was consistency when factoring for the age of those who drive the greatest distance annually: those between ages 35 and 44 drove the most in each region and geography.

Table 3.3 Average Annual Miles Driven by Age, Factoring for Region and Geography

Age	East	West	Urban	Rural
18-24	14,282	14,657	13,311	17,797
25-34	15,383	16,186	14,660	18,615
35-44	18,849	21,214	19,239	21,940
45-54	15,908	20,412	16,671	20,191
55-64	14,503	13,751	13,520	16,886
65-74	8,737	11,657	8,531	15,788
75 and older	5,074	8,840	5,356	10,696

Bold: Highest in region or geography
Italic: Highest in age cohort

Drivers from the western half of the state reported traveling an average of 15,581 miles per year, a larger share than their eastern counterparts who drove 12,950 miles annually. Responses reveal that rural residents, on average, drive farther than urban North Dakotans in each age cohort. Rural respondents reported annual travel of 18,187 miles compared to just 12,850 miles yearly for urban North Dakotans. Annual travel is vital in understanding patterns and exposure for traffic safety assessments.

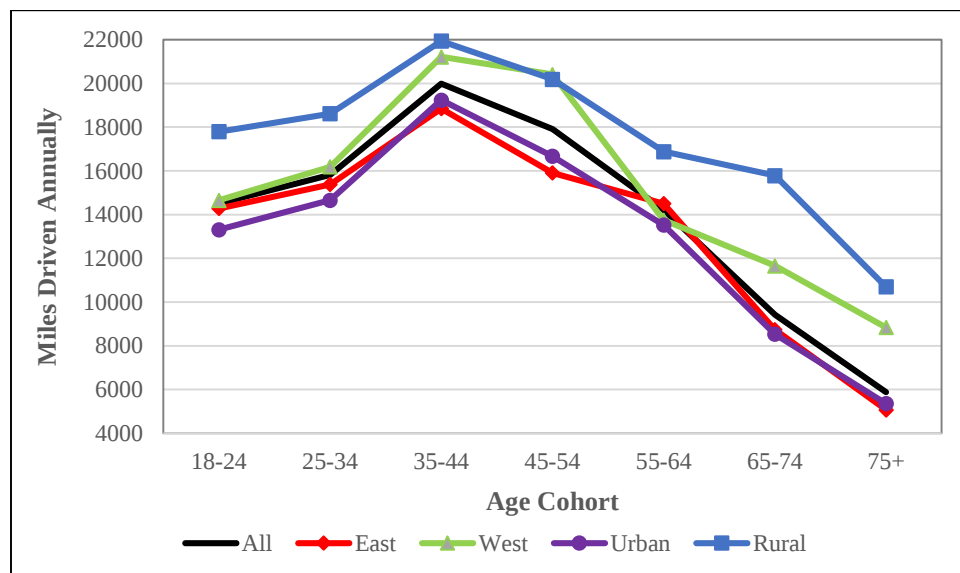


Figure 3.2 Average Annual Driving Activity, by Respondent Group

In rural North Dakota, 35-44 year-olds drive the most, on average, at 21,940 miles annually. This was the largest annual average of any group studied in this survey and continues a trend that started in the 2015 iteration of this questionnaire. The largest discrepancy in annual travel is between urban and rural drivers in the 65-74-year-old cohort. Among these drivers, rural residents travel more than 7,000 more miles on average yearly. This information is also valuable in understanding and interpreting information regarding crashes, injuries, fatalities, and assessing driver risk. Specific travel information regarding driver responses is provided in Table 3.4.

Table 3.4 Annual Average Miles Traveled, by Age Group

Driver Age	Less than 5,000	5,000 to 9,999	10,000 to 14,999	More than 15,000
18-24	12.2%	17.1%	32.0%	38.7%
25-34	6.7%	16.7%	34.0%	42.5%
35-44	6.1%	9.3%	23.7%	60.9%
45-54	8.9%	14.3%	30.1%	46.7%
55-64	12.1%	20.8%	34.2%	32.9%
65-74	24.4%	21.0%	38.9%	15.6%
75+	57.2%	17.6%	15.9%	9.4%

Frequency Missing: 144

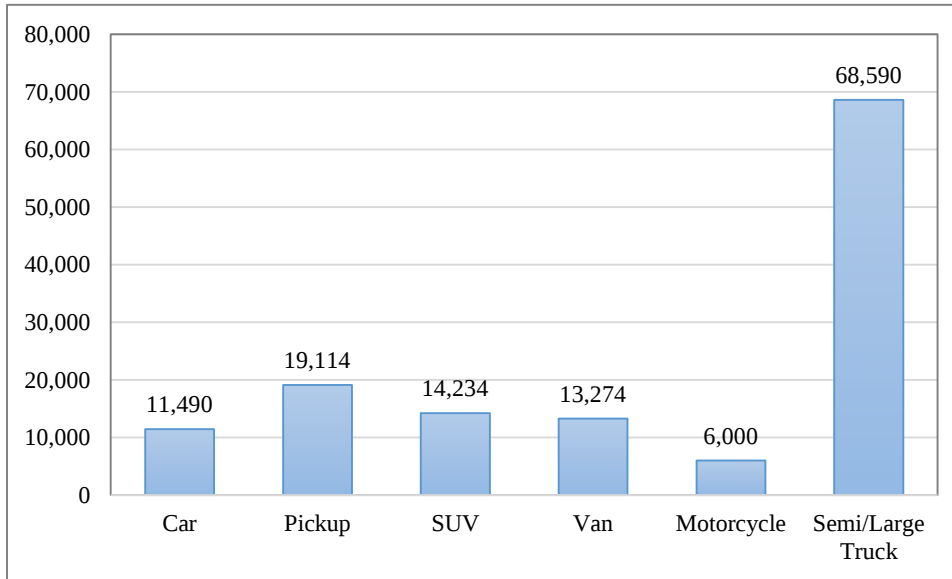
Table 3.5 indicates that driving activity does vary substantially by geography. Rural residents drive further, on average, than those in urban counties. The difference between urban and rural annual driving activity is statistically significant at the 1% level ($F=14.141$, $df=1$, $p<0.001$). There was no statistically significant difference in annual driving distance when factoring for one's region ($F=1.400$, $df=1$, $p=0.241$).

Table 3.5 Annual Driving Activity by Geography

Geography	Less than 5,000	5,000 to 9,999	10,000 to 14,999	More than 15,000
Urban	15.8%	19.4%	33.6%	31.2%
Rural	9.6%	11.3%	28.8%	50.4%

Frequency Missing: 135

Travel patterns vary based on the type of vehicle being driven (Figure 3.3). As expected, respondents who drive a semi/large truck travel the furthest annually. Among vehicles that were not semi/large trucks, drivers of pickups traveled the greatest average distance annually at 19,114 miles. With regard to regional and geographic strata, residents from rural portions of western North Dakota who drove pickup trucks traveled the most with an average of 22,629 miles per year.

**Figure 3.3** Average Annual Vehicle Miles Traveled, by Vehicle Type

4. RESULTS

Responses to the survey questions provide valuable 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. Additionally, the scale responses can be transformed into ordinal values to help quantify responses between scale extremes to allow for some statistical testing of relationships and means. The strong response rate resulted in increased confidence. The 95% confidence interval 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 emphasize three specific issues: impaired driving, seat belt use, and speeding. Response frequencies for these questions are included in Table 4.1. The table includes 2010-2016 responses to establish metrics that may be used to identify driving trends in North Dakota. In addition, five-year averages shed further light into patterns during this timeframe. Responses show drivers believe law enforcement is more likely to ticket for impaired driving violations than for speeding or seat belt violations. Frequencies indicate that 68.4% of drivers think the chances are higher-than-average that impaired drivers will be arrested. This is higher than the 60.7% and 35.0% of respondents who believe there is a greater-than-average likelihood that drivers will be ticketed for speeding or seat belt violations, respectively.

Responses reveal that perceptions of getting a ticket for illegal driving behavior is related to whether one has driven within two hours of consuming alcohol in the last 60 days. For example, compared to drivers who never drove within two hours of consuming alcohol, those that operated a vehicle at least once within two hours of consuming one or two alcoholic beverages were less likely to think that they would be ticketed for not wearing a seat belt ($F=28.083$, $df=1$, $p<0.001$) and were also less likely to believe that they would be ticketed for speeding ($F=7.207$, $df=1$, $p=0.007$). A similar pattern occurred among those that chose to operate a vehicle within two hours of consuming three or more alcoholic drinks. In this survey, operating a vehicle after consuming three or more alcoholic beverages is associated with a lower perceived chance of getting a ticket for not wearing a seat belt ($F=13.472$, $df=1$, $p<0.001$) and for speeding ($F=4.802$, $df=1$, $p=0.029$). This suggests that a driver engaging in one dangerous activity (driving after consuming alcohol) may also take part in another (driving unbelted, speeding) and therefore may exponentially increase danger on the roadway.

In this survey, 31.5% of respondents reported that they had driven a vehicle within two hours of drinking one or two drinks at least once during the past two months. In contrast, just 7.0% noted that they had operated a vehicle within two hours of drinking three or more drinks at least once during the past two months. These numbers represent worsening trends compared to the 2016 survey in which 29.0% of respondents had one or two alcoholic beverages and 4.7% consumed at least three alcoholic beverages within two hours of operating a motor vehicle.

With regard to speeding, 10.5% of drivers report high levels of speeding activity based on those who answered “always” or “nearly always” to the question about the 75-mile-per-hour speed zone. This is a new question introduced into the survey and is comparable to prior iterations of the questionnaire which asked about speeding trends on 65-mile-per-hour roads.

Table 4.1 Core Question Responses

Core	Survey Question		Responses			
ID-1	In the past 60 days, how many times have you driven a vehicle within two hours after drinking 1-2 drinks?					
		None	1-5 Times	6-10 Times	More than 10 Times	
	2017 [#]	68.5%	29.1%	1.6%	0.7%*	
	2016 [#]	71.0%	26.5%	2.0%	0.4%*	
	2015 [#]	66.7%	30.1%	1.5%	0.7%*	
	2014 [#]	71.3%	27.0%	1.3%	0.4%*	
	2013 [#]	69.5%	26.8%	3.0%	0.7%*	
	2013-2017 Five-Year Avg.	69.4%	27.9%	1.9%	0.6%	
	In the past 60 days, how many times have you driven a vehicle within two hours after drinking 3+ drinks?					
		None	1-5 Times	6-10 Times	More than 10 Times	
	2017 [#]	93.0%	6.7%	0.3%*	0.1%*	
	2016 [#]	95.3%	4.4%	0.1%*	0.2%*	
	2015 [#]	93.4%	6.1%	0.5%*	0.1%*	
	2014 [#]	94.5%	5.1%	0.2%*	0.2%*	
	2013 [#]	92.4%	6.6%	0.8%*	0.2%*	
	2013-2017 Five-Year Avg.	93.7%	5.8%	0.4%	0.2%	
ID-2	Have you recently read, seen, or heard anything about drunk driving enforcement?					
		Yes	No			
	2017	86.4%	13.6%			
	2016	89.2%	10.8%			
	2015	89.5%	10.5%			
	2014	85.2%	14.8%			
	2013	88.9%	11.1%			
	2012	89.5%	10.5%			
	2011	87.0%	13.0%			
	2010	85.0%	15.0%			
	2013-2017 Five-Year Avg.	87.8%	12.2%			
	2012-2016 Five-Year Avg.	88.5%	11.5%			
	2011-2015 Five-Year Avg.	88.0%	12.0%			
	2010-2014 Five-Year Avg.	87.1%	12.9%			
ID-3	Chances of someone getting arrested if they drive after drinking alcohol?					
		Very Likely	Sw. Likely	Likely	Unlikely	V. Unlikely
	2017	32.5%	26.3%	35.9%	4.4%	1.0%
	2016	32.9%	29.0%	31.4%	5.4%	1.2%
	2015	33.6%	32.9%	21.3%	10.3%	2.1%
	2014	29.7%	31.6%	25.9%	11.1%	1.7%
	2013	25.9%	29.1%	26.5%	16.7%	1.8%
	2012	32.5%	29.7%	25.9%	10.3%	1.6%
	2011	31.3%	26.7%	26.7%	12.6%	2.7%
	2010	25.0%	26.0%	31.0%	15.0%	4.0%
	2013-2017 Five-Year Avg.	30.9%	31.7%	26.3%	9.6%	1.6%
	2012-2016 Five-Year Avg.	30.9%	30.5%	26.2%	10.8%	1.7%
	2011-2015 Five-Year Avg.	30.6%	30.0%	25.3%	12.2%	2.0%
	2010-2014 Five-Year Avg.	28.9%	22.7%	27.2%	13.1%	2.4%
Note: Please see Appendix A for exact question and response wording						
*Estimate uncertain due to limited sample size						
[#] Due to wording changes in ID-1, trends from previous years could not be studied						

Table 4.1 Core Question Responses (continued)

Core	Survey Question		Responses			
SB-1	How often do you use seat belts when you drive or ride in a vehicle?					
		Always	N. Always	Sometimes	Rarely	Never
	2017	74.4%	19.5%	4.6%	1.2%*	0.3%*
	2016	74.2%	19.7%	4.1%	1.6%	0.4%*
	2015	71.9%	20.4%	5.6%	1.6%	0.6%*
	2014	72.2%	19.7%	5.6%	2.1%	0.5%*
	2013	70.5%	21.3%	6.0%	1.8%	0.4%*
	2012	62.8%	26.9%	6.5%	2.9%	0.9%
	2011	67.9%	23.5%	5.3%	2.7%	0.6%*
	2010	58.0%	27.0%	10.0%	3.0%	1.0%
	2013-2017 Five-Year Avg.	72.6%	20.1%	5.2%	1.7%	0.4%
	2012-2016 Five-Year Avg.	70.3%	21.6%	5.6%	2.0%	0.6%
	2011-2015 Five-Year Avg.	69.1%	22.4%	5.8%	2.2%	0.6%
	2010-2014 Five-Year Avg.	66.3%	23.7%	6.7%	2.5%	0.7%
SB-2	Have you recently read, seen, or heard anything about seat belt law enforcement?					
		Yes	No			
	2017	70.7%	29.3%			
	2016	77.1%	22.9%			
	2015	78.2%	21.8%			
	2014	74.5%	25.5%			
	2013	80.6%	19.4%			
	2012	84.7%	15.3%			
	2011	82.8%	17.2%			
	2010	77.0%	23.0%			
	2013-2017 Five-Year Avg.	76.2%	23.8%			
	2012-2016 Five-Year Avg.	79.0%	21.0%			
	2011-2015 Five-Year Avg.	80.2%	19.8%			
	2010-2014 Five-Year Avg.	79.9%	20.1%			
SB-3	What do you think the chances are of getting a ticket if you don't wear your seat belt?					
		Very Likely	Sw. Likely	Likely	Unlikely	V. Unlikely
	2017	11.4%	39.5%	23.6%	19.2%	6.3%
	2016	15.1%	39.2%	24.5%	16.7%	4.5%
	2015	16.9%	30.6%	21.6%	26.5%	4.4%
	2014	16.5%	24.9%	26.8%	26.3%	5.6%
	2013	15.5%	28.8%	21.8%	31.3%	2.7%
	2012	17.1%	28.1%	26.6%	23.7%	4.5%
	2011	16.0%	22.6%	25.3%	25.0%	11.2%
	2010	14.0%	26.0%	23.0%	26.0%	10.0%
	2013-2017 Five-Year Avg.	15.1%	29.4%	26.8%	24.0%	4.7%
	2012-2016 Five-Year Avg.	16.2%	30.3%	24.3%	24.9%	4.3%
	2011-2015 Five-Year Avg.	16.4%	27.0%	24.4%	26.6%	5.7%
	2010-2014 Five-Year Avg.	15.8%	26.1%	24.7%	26.5%	6.8%
Note: Please see Appendix A for exact question and response wording						
*Estimate uncertain due to limited sample size						

Table 4.1 Core Question Responses (continued)

Core	Survey Question	Responses				
SP-1	On a road with 75 mph speed limit, how often do you drive faster than 80 mph?	Always	N. Always	Sometimes	Rarely	Never
	2017 [#]	3.2%	7.3%	20.9%	40.6%	28.0%
SP-2	What do you think the chances are of getting a ticket if you drive over the speed limit?	Very Likely	Sw. Likely	Likely	Unlikely	V. Unlikely
	2017	15.4%	33.5%	45.3%	4.4%	1.3%
	2016	20.5%	32.8%	42.4%	3.8%	0.5%*
	2015	24.0%	43.3%	25.7%	6.5%	0.5%*
	2014	23.9%	34.3%	32.7%	8.1%	1.0%*
	2013	24.0%	37.5%	29.3%	8.4%	0.9%*
	2012	28.7%	33.6%	28.8%	7.4%	1.5%*
	2011	28.0%	31.3%	29.1%	9.5%	2.1%
	2010	26.0%	30.0%	28.0%	12.0%	4.0%
	2013-2017 Five-Year Avg.	21.6%	38.6%	32.7%	6.2%	0.8%
	2012-2016 Five-Year Avg.	24.2%	36.3%	31.8%	6.8%	0.9%
	2011-2015 Five-Year Avg.	25.7%	36.0%	29.1%	8.0%	1.2%
	2010-2014 Five-Year Avg.	26.1%	33.3%	29.6%	9.1%	1.9%
SP-3	Have you recently read, seen, or heard anything about speed enforcement?	Yes	No			
	2017	34.9%	65.1%			
	2016	37.3%	62.7%			
	2015	41.7%	58.3%			
	2014	38.1%	61.9%			
	2013	36.3%	63.7%			
	2012	34.2%	65.8%			
	2011	35.8%	64.2%			
	2010	57.0%	43.0%			
	2013-2017 Five-Year Avg.	37.7%	62.3%			
	2012-2016 Five-Year Avg.	37.5%	62.5%			
	2011-2015 Five-Year Avg.	37.2%	62.8%			
	2010-2014 Five-Year Avg.	40.3%	59.7%			
Note: Please see Appendix A for exact question and response wording						
*Estimate uncertain due to limited sample size						
[#] Due to wording changes in SP-1, trends from previous years could not be studied						

The share of drivers reporting that they always use their seat belts when driving or riding in a vehicle is lower than the information presented by the core behavior metric of 80.8%. Driver self-reported use collected here shows that 74.4% “always” wear a seat belt with another 19.5% reporting usage as “nearly always.” The 74.4% of drivers “always” wearing a seat belt represents an increase from 74.2% in 2016 and is the highest self-reported number in the eight-year history of this questionnaire. Only 1.5% report that they “rarely” or “never” use a seat belt which is the lowest reported number in the history of this survey. These metrics indicate that North Dakota drivers are trending in a safer direction with regard to safety belt use.

Responses to awareness of public media or other educational messages about traffic safety related to drinking, speeding, and seat belt issues reveals speed enforcement is least often read, seen, or heard (“RSH”) as a traffic safety topic; just 34.9% of survey participants responded that they had exposure to this safety message. This is expected as the NDDOT Safety Division does not disseminate safety messages for speeding. This low exposure rate represents a stark contrast to messages about impaired driving and seat belt use. Exposure rates to these topics were 86.4% and 70.7%, respectively. These exposure rates declined compared to 2016. Considering these trends and drivers’ perceptions that there is a relatively high risk for ticketing, it appears enforcement does influence some driving attitudes.

An examination of the relationships between behavior and enforcement along with behavior and education awareness yields expected results. One would presume an inverse relationship between a negative behavior – such as speeding – and a related education or enforcement influence, as measured by read, seen, or heard exposure levels and perceived likelihood for ticketing, respectively. As illustrated in Figure 4.1, driver responses are mostly consistent with this expectation. The ticket North Dakota drivers most expect to receive – impaired driving – is associated with the lowest reported levels of negative behavior.

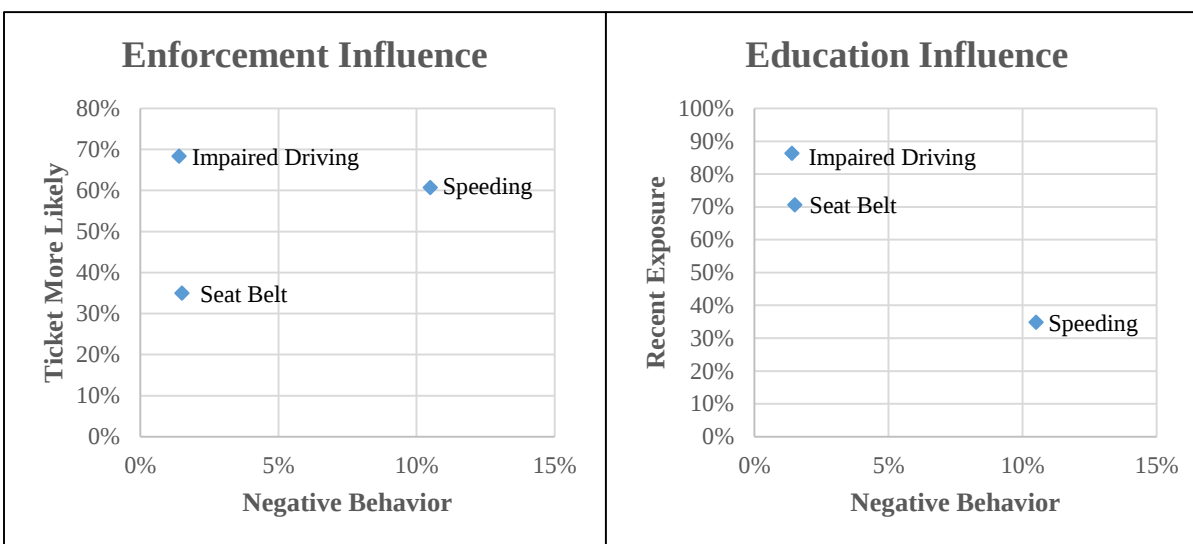


Figure 4.1 Driver Action Related to Enforcement and Education

The education influence also follows an expected pattern factoring for responses to read, seen, or heard questions. One would expect that as drivers have more exposure to traffic safety issues via educational messages, they will subsequently have lower levels of negative behavior. This is precisely what was reported by drivers. Respondents in this iteration of the survey were most often exposed to traffic safety messages about impaired driving (86.4%) and seat belt use (70.7%) and these have the lowest levels of self-reported negative behavior at 1.4% and 1.5%, respectively. Similarly, drivers reported that educational exposure to messages about speeding occurred least often. As a result, speeding had the highest rate of self-reported negative behavior among survey participants. This is a logical relationship. One would expect drivers to be more likely to behave negatively if they have not had educational exposure to the safety topic. It appears as though in this sample of North Dakota drivers, enforcement and education have similar positive impacts on drivers, especially with regard to impaired driving. Speeding, however, continues to be an area in which North Dakotans behave dangerously. This negative behavior exists when controlling for both enforcement and education separately.

To further examine relationships among the core questions and issues that may be related, measures of association are calculated for responses. The Pearson coefficient measures the strength of association between two variables – in this case the driver responses. Correlation coefficients ranges from -1 to +1, and values closer to these extremes are considered stronger relationships. Relationships between -0.5 and +0.5 are generally considered weak and inconsequential. For example, the “arrest for impaired driving” and “ticket for speeding” variables do have an expected positive relationship at Pearson Corr.=0.464, but the correlation measure shows that less than 22% of their variability is shared. The Pearson Correlation values suggest there are no strong relationships between survey items.

Table 4.2 Correlations in Core Question Responses

	ID1a	ID1b	ID2	ID3	SB1	SB2	SB3	SP1	SP2	SP3
ID1a: Drive After Drinking 1-2 Drinks	1	.546** .000	.062** .006	.002 .917	-.102** .000	.048* .032	-.124** .000	.167** .000	-.054* .016	-.055* .012
ID1b: Drive After Drinking 3+ Drinks		1	.027 .241	-.027 .236	-.150** .000	.051* .027	-.088** .000	.118** .000	-.013 .572	-.044 .052
ID2: Read, Seen, or Heard Drunk Driving			1	.044* .047	.028 .212	.489** .000	.020 .366	-.018 .410	.223** .000	.023 .291
ID3: Arrest for Drunk Driving				1	-.015 .497	.048* .029	.362** .000	.026 .232	.087** .000	.464** .000
SB1: How Often Use Seat Belts					1	-.019 .382	.075** .001	-.068** .002	-.038 .091	.008 .724
SB2: Read, Seen, or Heard Seat Belt						1	.072** .001	.016 .478	.359** .000	.048* .029
SB3: Ticket for No Seat Belt							1	-.128** .000	.126** .000	.457** .000
SP1: Speed on 75 MPH Road								1	-.076** .001	-.079** .000
SP2: Read, Seen, or Heard Speed									1	.114** .000
SP3: Ticket for Speeding										1
**Correlation is significant at the 1% level *Correlation is significant at the 5% level Bold: Correlation and p-value indicate a substantive relationship Note: Correlations between -0.5 and +0.5 indicate a weak relationship and are not addressed in this study										

There was one substantive relationship within the core correlations studied, though this relationship was relatively weak. This relationship occurred for the questions concerning driving after having one or two alcoholic beverages and driving within two hours of consuming three or more alcoholic drinks (Pearson Corr.=0.546, $p < 0.001$, $n = 1,938$). These two variables share roughly 30% of their variability. This relationship demonstrates that as one chooses to drive after consuming one or two alcoholic beverages, one is more likely to also drive after drinking three or more alcoholic drinks. Although several other relationships between variables are found to be statistically significant at the 1% and 5% levels, the relationship measures are between the -0.5 and +0.5 thresholds and are not considered substantive.

Driver responses to other questions are presented in Table 4.3. These responses offer additional insight for practitioners and policymakers 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 taking part in dangerous or risky behaviors. The critical driver risk behaviors here are traffic safety knowledge, driver preferences, and distracted driving.

Less than half (47.9%) of respondents had recent exposure to *Code for the Road* traffic safety messages, a statewide safety campaign rolled out by the North Dakota Department of Transportation. This was a decline from the 53.1% of respondents who recognized such a campaign in 2016. Nonetheless, this is still a higher proportion than the 26.6% of respondents who had exposure to these messages during the first year of the campaign in 2014. The safety effort is designed to target high-risk (18-34-year-old) males via television, radio, and online advertisements. It utilizes online advertising to optimize exposure likelihood and play more frequently on certain websites when visited by the target demographic (Heidle, Horton, and Lerman 2014). In this sample of North Dakota drivers, 64.5% of high-risk males reported recent exposure to the safety campaign, a higher proportion than the 47.0% of other drivers who had recently

read, seen, or heard the advertisements. The difference was statistically significant at the 1% level (Chi-Sq.=23.685, df=1, p<0.001).

Table 4.3 Other Question Responses

Survey Question		Responses			
Traffic Safety Knowledge/Tools					
		Yes		No	
Recently read, seen, or heard ads for <i>Code for the Road</i>		47.9%		52.1%	
Recently read, seen, or heard ads for distracted driving		67.9%		32.1%	
Driver Preferences					
Do you favor or oppose...	St. Favor	Sw. Favor	Neutral	Sw. Oppose	St. Oppose
Higher fines for speeding?	13.2%	22.6%	32.3%	16.7%	15.2%
A primary seat belt law?	35.2%	26.4%	17.1%	10.5%	10.9%
Driver Distraction					
	Daily	Few/Week	Few/Month	<1/Month	Never
Cell phone text while driving	6.9%	11.3%	21.1%	17.9%	42.8%
Cell phone talk while driving	22.4%	26.5%	25.9%	12.4%	12.8%
	V. Likely	Likely	Sw. Likely	Unlikely	V. Unlikely
Chances driver is ticketed for texting?	8.6%	17.6%	32.8%	31.3%	9.7%

Opinions have remained fairly stable over time regarding higher fines for speeding (Figure 4.2) and support for a primary seat belt law (Figure 4.3). With regard to higher fines for speeding, support remained virtually unchanged between 2016 and 2017 as none of the response choices differed by more than three percentage points. Responses to this prompt remained close to 2010 baseline levels. The overall distribution of responses somewhat resembles a bell curve.

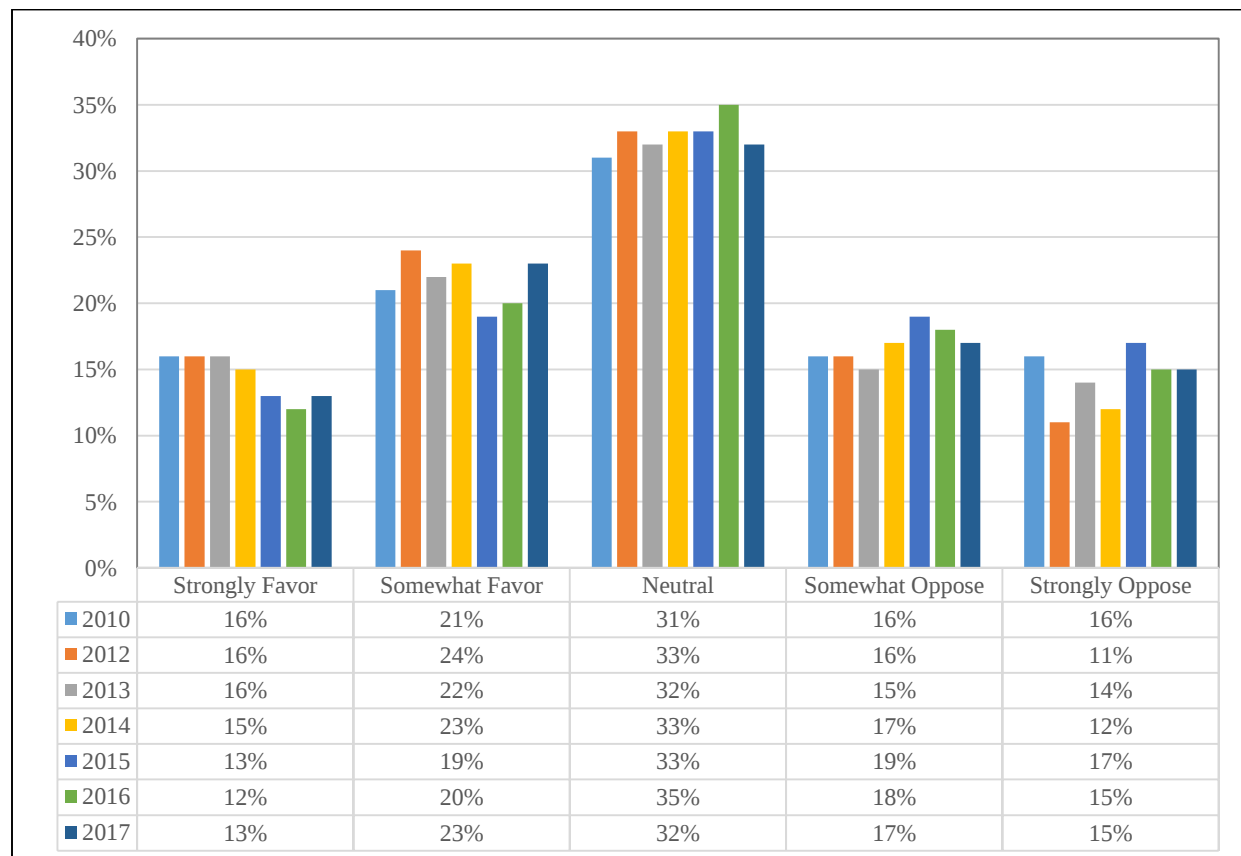


Figure 4.2 Driver Preferences for Higher Speeding Fines

The question concerning driver preferences towards having a primary seat belt law has had more variability in the dispersion of responses between 2010 and 2017. In 2010, nearly half (46%) of the North Dakota driver population “strongly favored” a primary seat belt law, but only about one-third (35%) hold the same viewpoint in 2017. Although perceptions have changed noticeably since 2010, attitudes have remained relatively stable since 2012. One modest improvement between the 2016 and 2017 iterations of the survey concerns opposition to such a law. Whereas approximately 25% of respondents in 2016 either “somewhat opposed” or “strongly opposed” such legislation, 22% held these views in 2017. Overall, all of the response choices either improved or worsened by no more than three percentage points between the 2016 and 2017 questionnaires.

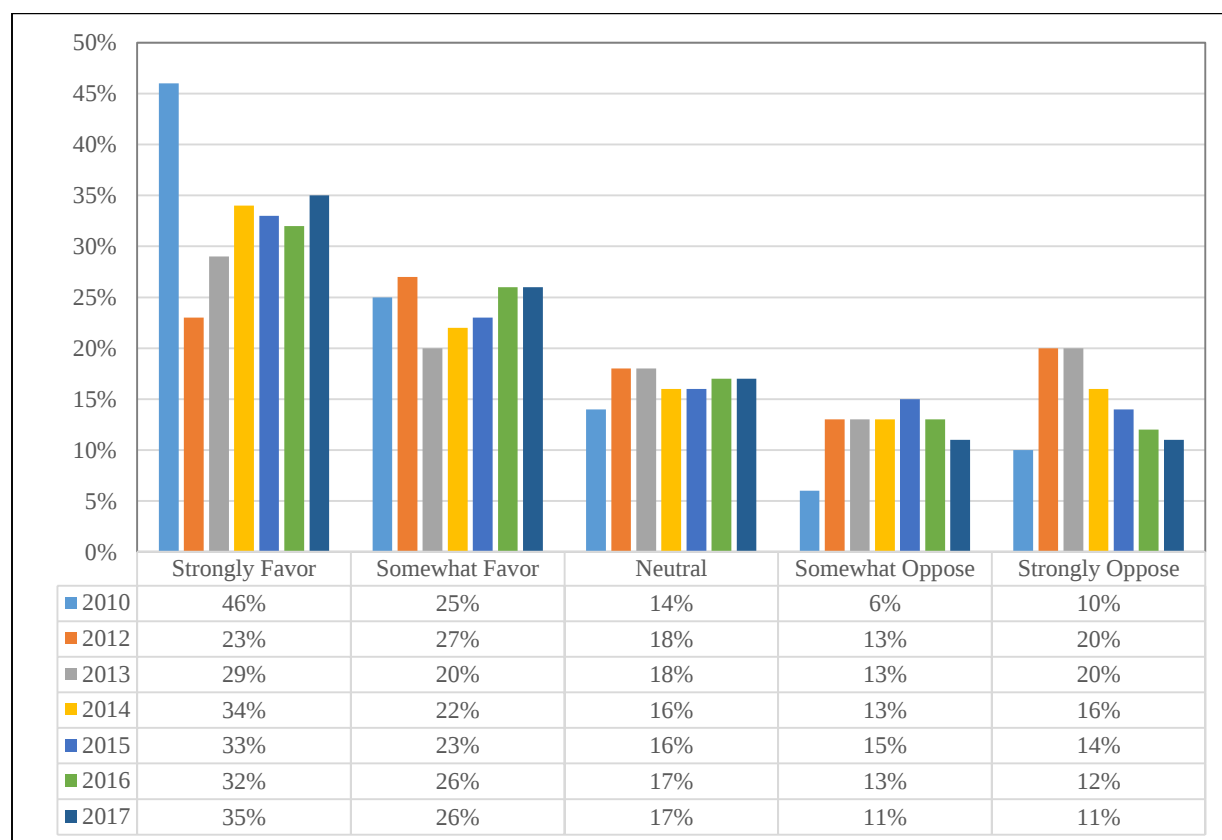


Figure 4.3 Driver Preferences for a Primary Seat Belt Law

Three questions specific to distracted driving were included in the survey. Although the term distracted driving can refer to a broad range of issues, the focus here is on cell phone use via texting or talking on the phone while driving. In terms of texting while driving, some noticeable trends have emerged over the last seven years (Figure 4.4). For example, the proportion of respondents who report “never” texting on the phone while driving has decreased on average since the question was first asked on the survey in 2011. Whereas about 62% of respondents in 2011 claimed to “never” text on the phone when driving, only about 43% of drivers report “never” doing so currently. This is, however, an improvement from the roughly 36% who reported “never” texting while driving in 2016. The percent of drivers texting daily while driving declined by 1.3% between 2016 and 2017, a trend that continued for the second consecutive year. The general trend, however, has shown an increase in daily texting over the last seven years. Overall, the number of drivers who reported texting a few times per week or a few times per month has generally grown as well. It is clear that cell phone use for texting while driving is still occurring at dangerous levels within the state.

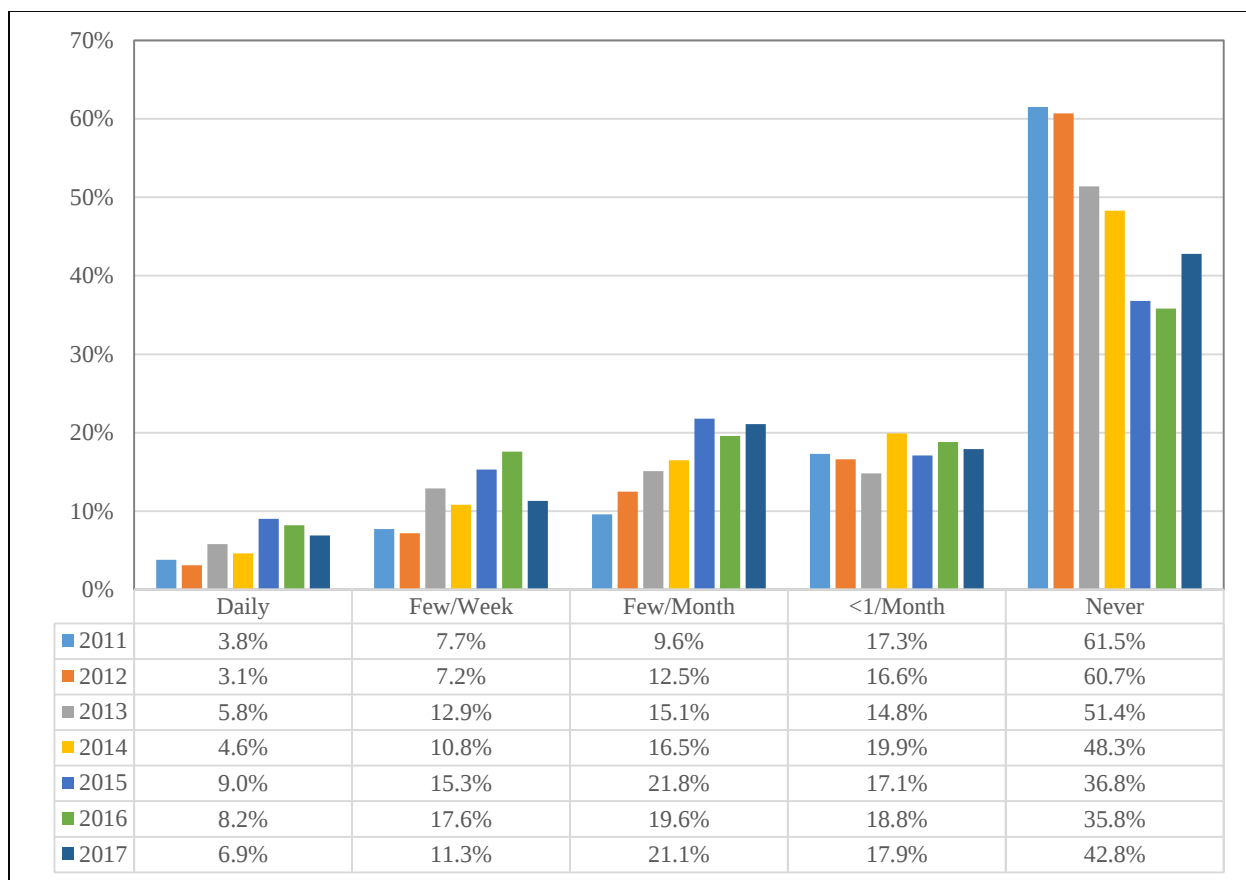


Figure 4.4 Cell Phone Texting Distractions, by Year

Drivers are more likely to use their cell phone for talking while driving (Figure 4.5). About one-quarter (22.4%) of drivers in North Dakota use their cell phone for talking while driving on a daily basis. This is an improvement from 2016 in which 25.2% reported using their cell phone for talking daily. The proportion of respondents that “never” use their cell phone for talking while driving increased slightly from 11.3% to 12.8% between 2016 and 2017.

One new question related to cell phone distraction asked respondents how likely they think it is that a driver will be cited by law enforcement for using a cell phone to text while driving. About two-in-five (41.0%) believed there was a lower-than-average chance that a law enforcement officer would issue a citation to a driver for texting while driving. Only about one-quarter (26.2%) reported a higher-than-average belief that such a driver would be issued a ticket for this traffic violation.

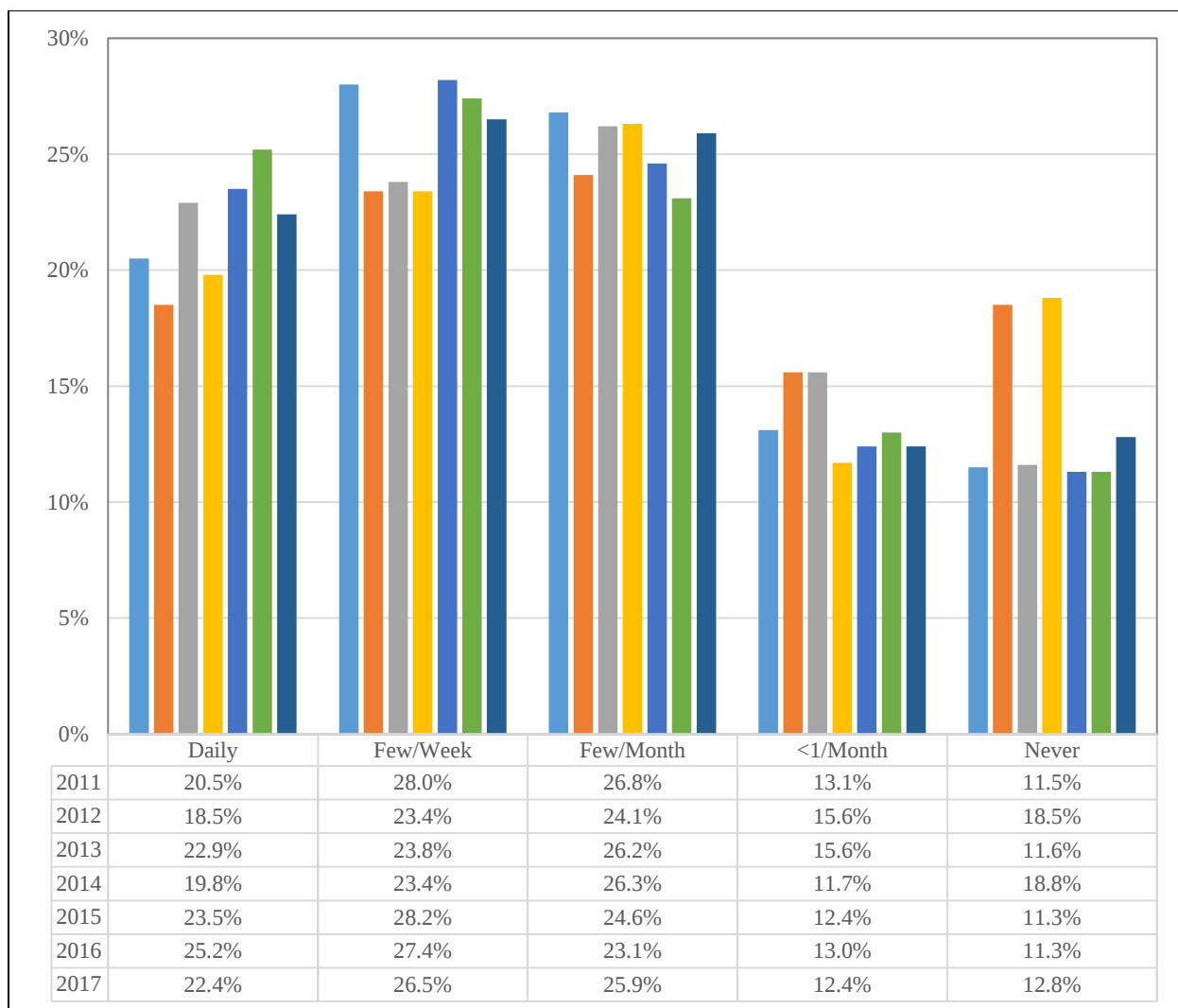


Figure 4.5 Cell Phone Talking Distractions, by Year

One question new to the 2017 survey asked drivers to rate their main concern when traveling in North Dakota. Respondents were given four options – speeding drivers, distracted drivers, drunk drivers, and young/inexperienced drivers – and were asked to choose only one. If a respondent believed that a separate issue was more pressing than the four listed, they were encouraged to write a response next to an “other” box listed as a survey option.

Of the 1,946 respondents who answered this question, 166 chose to write in their own answer. These written responses were subjected to emergent theme content analysis and were coded based on which themes emerged when addressed by the researcher in charge of analysis. These codes were then organized and collated based on the overall number of responses. Due to the small line provided for writing responses, most respondents who chose this option wrote only a handful of words to indicate their main concern. In sum, 173 themes were identified from these 166 respondents. Table 4.4 summarizes responses from this question. A majority of respondents (62.2%) listed distracted drivers as their main concern when traveling in North Dakota. (Note that some respondents writing on the “other” line wrote themes that were asked in the question, yet did not check one of the appropriate boxes. For example, seven individuals wrote in the “other” box that distracted driving was their main concern, yet these individuals did not check the “distracted drivers” box listed in the question as an answer choice.)

Table 4.4 North Dakota Drivers' Main Concern when Driving

Topic	Percent
Distracted Drivers	62.2%
Drunk Drivers	15.7%
Young/Inexperienced Drivers	6.7%
Speeding Drivers	6.7%
Other	8.9%
Elderly Drivers	1.4%
Weather	1.3%
Truck Drivers	0.7%
Road Conditions	0.7%
Yellow/Red Light/Stop Sign Runners	0.6%
Animals	0.5%
Reckless Drivers	0.5%
All of the Above	0.5%
Not Following Rules of the Road	0.4%
Distracted Drivers	0.4%
Stupid/Bad Drivers	0.4%
Slow Drivers	0.3%
Drowsy Drivers	0.2%
No Concerns Whatsoever	0.2%
Right/Left-Hand Turns	0.1%
Oil Traffic	0.1%
Not Using Headlights	0.1%
Large Truck/Passenger Vehicle Interaction	0.1%
Law Enforcement Harassment	0.1%
(Other Individual Answers)	0.5%

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 is prudent to investigate differences within the driver population to determine if perceptions can be substantiated. This information may be valuable in more effectively allocating traffic safety resources, conducting program assessments, and focusing programs and strategies beyond 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 quantitative scale definitions are provided in Table 4.5.

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 and female driver groups can be distinguished as high-risk populations. Insights regarding impaired driving, seat belts, and speed across these strata may benefit traffic safety advocates by enhancing their ability to focus efforts. The information may also be useful in assessing the value of including these types of stratification in future surveys.

Table 4.5 Quantitative Scale Definitions for Responses

Q#	Question	Scale	Conversion Values
1	Seat Belt Use	1-5	1=Never to 5=Always
2	Ticket Likely Seat Belt	1-5	1=Very Unlikely to 5=Very Likely
3	Primary Seat Belt Law	1-5	1=Strongly Oppose to 5=Strongly Favor
4	Ticket Likely Speeding	1-5	1=Very Unlikely to 5=Very Likely
5	75 MPH Speed Zone	1-5	1=Never to 5=Always
6	Higher Speeding Fines	1-5	1=Strongly Oppose to 5=Strongly Favor
7	Chances of DUI Arrest	1-5	1=Very Unlikely to 5=Very Likely
9	Cell Phone Text	1-5	1=Never to 5=Daily
10	Cell Phone Text Citation	1-5	1=Very Unlikely to 5=Very Likely
11	Cell Phone Talk	1-5	1=Never to 5=Daily
13a	RSH Seat Belt	0-1	0=No, 1=Yes
13b	RSH Speeding	0-1	0=No, 1=Yes
13c	RSH Impaired Driving	0-1	0=No, 1=Yes
13d	RSH Distracted Driving	0-1	0=No, 1=Yes
13e	RSH <i>Code for the Road</i>	0-1	0=No, 1=Yes

4.2.1 Regional and Geographic Observations

Table 4.6 shows the mean values for drivers surveyed statewide, along with regional and geographic comparisons. Statewide survey averages show that 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 a mean of 4.66. This number is below the goal of 5.0 – equivalent to “always” in the driver survey response. Table 4.7 shows the changes in mean values from 2010 to 2017. The primary 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 were tested for significant differences. Driver views and self-reported behaviors showed little regional variation in comparing drivers from the east and west. Similar responses for exposure to policy opinions were found when comparing drivers from opposite sides of the state. In all, two issues were statistically significant by region and seven issues were statistically significant in geographic comparisons.

With regard to regional designations, statistically significant differences were present for perceptions of the likelihood of being ticketed for speeding ($F=5.080$, $df=1$, $p=0.024$) and exposure to messages surrounding the *Code for the Road* safety campaign ($\text{Chi-Sq.}=5.446$, $df=1$, $p=0.020$). These issues represent shifts from 2016 in which neither were statistically significant.

In general, urban residents exhibit safer behaviors behind the wheel than rural North Dakotans. For instance, North Dakota drivers living in the 12 urban counties are more likely to use a seat belt ($F=51.448$, $df=1$, $p<0.001$) and less likely to talk on the cell phone while driving ($F=4.275$, $df=1$, $p=0.039$). Compared to rural drivers, the higher seat belt use among urban residents continues a trend that has been in place each year since 2010.

Table 4.6 Differences in Mean Driver Views and Behaviors, by Region and Geography

Question	Scale ₁	Statewide	Region			Geography		
		All	East	West	Sig.	Urban	Rural	Sig.
Seat Belt Use	1-5	4.66	4.69	4.63		4.73	4.46	##
Ticket Likely Seat Belt	1-5	3.15	3.17	3.12		3.14	3.15	#
Primary Seat Belt Law	1-5	3.65	3.74	3.53		3.71	3.43	##
Ticket Likely Speeding	1-5	3.69	3.67	3.72	#	3.67	3.75	##
75 MPH Speed Zone	1-5	2.17	2.08	2.28		2.22	2.02	##
Higher Speeding Fines	1-5	3.02	3.12	2.89		3.03	2.97	
Chances of DUI Arrest	1-5	3.94	3.90	4.00		3.92	4.02	
Cell Phone Text	1-5	2.22	2.10	2.35		2.13	2.49	
Cell Phone Talk	1-5	3.33	3.14	3.56		3.27	3.54	#
Cell Phone Text Citation	1-5	2.84	2.86	2.82		2.82	2.89	##
RSH Seat Belt	0-1	0.71	0.70	0.71		0.69	0.75	
RSH Speeding	0-1	0.35	0.38	0.31		0.35	0.34	
RSH Impaired Driving	0-1	0.86	0.87	0.85		0.86	0.88	
RSH <i>Code for the Road</i>	0-1	0.48	0.45	0.51	*	0.48	0.49	
RSH Distracted Driving	0-1	0.68	0.72	0.63		0.68	0.68	
₁ Note: Nominal/Ordinal scales require different tests of significance *Significant difference at the 5% level for Pearson Chi-Square test #Significant difference at 5% level for 1-way ANOVA ##Significant difference at 1% level for 1-way ANOVA								

Interestingly, despite exhibiting more dangerous driving behaviors, rural residents were more likely to think that drivers would be ticketed for not wearing a seat belt ($F=4.083$, $df=1$, $p=0.043$), speeding ($F=8.506$, $df=1$, $p=0.004$), and texting while driving ($F=8.721$, $df=1$, $p=0.003$). These same North Dakota drivers were less likely to support a primary seat belt law ($F=11.188$, $df=1$, $p=0.001$). This represents a conflicting viewpoint because without a primary seat belt law in place, drivers cannot be ticketed solely for operating a vehicle without wearing seat belt.

The five-year trends presented in Table 4.7 provide insight about patterns emerging from North Dakota drivers. With eight years of data available, some conclusions can be made. For instance, self-reported seat belt use is currently tied for an all-time high with results from 2016. The average rating of 4.66 is the same as in the previous version of this survey. This means that the average North Dakota driver is currently wearing a seat belt “always” or “nearly always” when operating a motor vehicle. Another positive trend is the perceived likelihood of receiving a ticket for driving while impaired by alcohol. North Dakotans are reporting this value at an all-time high when factoring for all eight years of data. This may be deterring some drivers from choosing to operate a vehicle while under the influence of alcohol.

A few negative trends become apparent when analyzing results from the previous eight years. The mean values for exposure to safety messages about seat belt use and speeding are at all-time lows. This means that, on average, North Dakota drivers are not being exposed to seat belt and speeding safety message interventions as often as they have been in prior years.

One ongoing trend is the substantial discrepancy in seat belt use between urban and rural drivers. Urban residents are more likely to wear seat belts compared to their rural counterparts. Note, however, that in 2017 rural residents’ self-reported seat belt use was the highest it has been since this annual survey has been conducted. Although both subcategories are well under the goal of a mean value of 5.00, rural residents are much farther away from this target number. Perhaps more efforts are needed to increase seat belt use among these individuals because rural residents have a higher-than-average exposure rate to traffic safety messages about seat belt use.

Table 4.7 Differences in Driver Views and Behaviors from 2010-2017, by Region and Geography

Question	Year	Scale	Statewide All	Region East	West	Sig.	Geography Urban	Rural	Sig.	Core Y/N
Seat Belt Use	2017	1-5	4.66	4.69	4.63		4.73	4.46	**	Y
1=Never to 5=Always	2016		4.66	4.70	4.61		4.73	4.44	**	Y
	2015		4.61	4.64	4.59		4.68	4.44	**	Y
	2014		4.61	4.63	4.58		4.67	4.40	**	Y
	2013		4.47	4.44	4.50	*	4.54	4.36	**	Y
	2012		4.31	4.37	4.24	*	4.40	4.23	**	Y
	2011		4.42	4.44	4.36	**	4.52	4.21	**	Y
	2010		4.36	4.38	4.36		4.49	4.08	**	Y
			2013-2017 Five-Year Average	4.60	4.62	4.58	4.67	4.42		
			2012-2016 Five-Year Average	4.53	4.56	4.50	4.60	4.37		
			2011-2015 Five-Year Average	4.48	4.50	4.45	4.56	4.33		
			2010-2014 Five-Year Average	4.43	4.45	4.41	4.52	4.26		
Ticket Likely Seat Belt	2017	1-5	3.15	3.17	3.12		3.14	3.15	*	Y
1=Very Unlikely to 5=Very Likely	2016		3.29	3.27	3.31		3.26	3.37	**	Y
	2015		3.29	3.38	3.19		3.27	3.35	**	Y
	2014		3.20	3.26	3.14		3.19	3.25	*	Y
	2013		3.17	3.18	3.15		3.10	3.17	**	Y
	2012		3.16	3.24	3.06	*	3.10	3.22		Y
	2011		2.98	2.93	3.10		2.94	3.06		Y
	2010		3.06	3.07	3.04		3.03	3.13		Y
			2013-2017 Five-Year Average	3.22	3.25	3.18	3.19	3.26		
			2012-2016 Five-Year Average	3.22	3.27	3.17	3.18	3.27		
			2011-2015 Five-Year Average	3.16	3.20	3.13	3.12	3.21		
			2010-2014 Five-Year Average	3.11	3.14	1.10	3.07	3.17		
Ticket Likely Speed	2017	1-5	3.69	3.67	3.72	*	3.67	3.75	**	Y
1=Very Unlikely to 5=Very Likely	2016		3.79	3.76	3.81		3.76	3.87	**	Y
	2015		3.84	3.82	3.87	*	3.84	3.84		Y
	2014		3.72	3.71	3.73		3.71	3.77	**	Y
	2013		3.67	3.66	3.68	*	3.63	3.67		Y
	2012		3.69	3.71	3.66		3.62	3.76	*	Y
	2011		3.62	3.61	3.66		3.76	3.62	*	Y
	2010		3.59	3.61	3.58		3.60	3.58		Y
			2013-2017 Five-Year Average	3.74	3.72	3.76	3.72	3.78		
			2012-2016 Five-Year Average	3.74	3.73	3.75	3.71	3.78		
			2011-2015 Five-Year Average	3.71	3.70	3.72	3.71	3.73		
			2010-2014 Five-Year Average	3.66	3.66	3.66	3.66	3.68		
Speed 75 MPH Zone	2017	1-5	2.17	2.08	2.28		2.22	2.02	**	Y
1=Never to 5=Always										
Arrest for DUI	2017	1-5	3.94	3.90	4.00		3.92	4.02		Y
1=Very Unlikely to 5=Very Likely	2016		3.89	3.86	3.93		3.89	3.90		Y
	2015		3.86	3.90	3.80		3.84	3.89		Y
	2014		3.76	3.71	3.83		3.79	3.69		Y
	2013		3.53	3.54	3.52		3.51	3.53		Y
	2012		3.64	3.67	3.60		3.68	3.61		Y
	2011		3.62	3.61	3.69		3.63	3.65		Y
	2010		3.53	3.59	3.47		3.55	3.49		Y
			2013-2017 Five-Year Average	3.80	3.78	3.82	3.79	3.81		
			2012-2016 Five-Year Average	3.74	3.74	3.74	3.74	3.72		
			2011-2015 Five-Year Average	3.68	3.69	3.69	3.69	3.67		
			2010-2014 Five-Year Average	3.62	3.62	3.62	3.63	3.59		

Table 4.7 (continued)										
Question	Year	Scale	Statewide All	Region East West		Sig.	Geography Urban Rural		Sig.	Core Y/N
RSH Seat Belt	2017	0-1	0.71	0.70	0.71		0.69	0.75		Y
0=No, 1=Yes	2015		0.78	0.79	0.77		0.78	0.79	**	Y
	2014		0.74	0.78	0.70		0.74	0.77	**	Y
	2013		0.83	0.83	0.82		0.80	0.83	**	Y
	2012		0.88	0.89	0.86		0.85	0.90	*	Y
	2011		0.84	0.84	0.84		0.83	0.87		Y
	2010		0.77	0.76	0.77		0.75	0.80		Y
2013-2017 Five-Year Average			0.79	0.80	0.77		0.77	0.81		
2012-2016 Five-Year Average			0.80	0.81	0.78		0.79	0.81		
2011-2015 Five-Year Average			0.81	0.83	0.80		0.80	0.83		
2010-2014 Five-Year Average			0.81	0.82	0.80		0.79	0.83		
RSH Speeding	2017	0-1	0.35	0.38	0.31		0.35	0.34		Y
0=No, 1=Yes	2016		0.37	0.41	0.34		0.36	0.40	**	Y
	2015		0.42	0.46	0.37		0.41	0.44	**	Y
	2014		0.38	0.41	0.34		0.37	0.43	**	Y
	2013		0.39	0.40	0.38		0.36	0.39	**	Y
	2012		0.38	0.39	0.36		0.36	0.39		Y
	2011		0.38	0.39	0.36		0.39	0.36		Y
	2010		0.57	0.57	0.56		0.57	0.56		Y
2013-2017 Five-Year Average			0.38	0.41	0.35		0.37	0.40		
2012-2016 Five-Year Average			0.39	0.41	0.36		0.37	0.41		
2011-2015 Five-Year Average			0.39	0.41	0.36		0.38	0.40		
2010-2014 Five-Year Average			0.42	0.43	0.40		0.41	0.43		
RSH DUI	2017	0-1	0.86	0.87	0.85		0.86	0.88		Y
0=No, 1=Yes	2016		0.89	0.90	0.88		0.89	0.89		Y
	2015		0.90	0.90	0.89		0.89	0.90		Y
	2014		0.85	0.86	0.84	*	0.85	0.85		Y
	2013		0.90	0.91	0.89		0.88	0.90	**	Y
	2012		0.90	0.90	0.90		0.90	0.90		Y
	2011		0.88	0.88	0.88		0.87	0.90		Y
	2010		0.85	0.86	0.84		0.86	0.83		Y
2013-2017 Five-Year Average			0.88	0.89	0.87		0.87	0.88		
2012-2016 Five-Year Average			0.89	0.89	0.88		0.88	0.89		
2011-2015 Five-Year Average			0.89	0.89	0.88		0.88	0.89		
2010-2014 Five-Year Average			0.88	0.88	0.87		0.87	0.88		
*Statistically significant difference at the 5% level										
**Statistically significant difference at the 1% level										

4.2.2 Young Male Driver Group

As with the previous seven surveys, the selected target group of 18-to-34-year-old high-risk males (“HRM”) shows significantly different behaviors, exposure levels, and views when compared to other drivers (Table 4.8). (Note that high-risk females were not included in the “other” group. See Section 4.2.3 for results for high-risk females.) In terms of behavior, high-risk male drivers in this survey are more likely to exhibit behaviors at odds with traffic safety goals, such as speeding in a 75-mile-per-hour zone ($F=165.880$, $df=1$, $p<0.001$), texting while driving ($F=398.695$, $df=1$, $p<0.001$), and talking on the phone while driving ($F=155.608$, $df=1$, $p<0.001$).

In addition to having higher levels of risky behavior than the rest of the North Dakota driver population, young males are also less likely to engage in safe driving behaviors. The high-risk young male drivers surveyed are less likely to wear safety belts than other drivers ($F=40.979$, $df=1$, $p<0.001$). Only 54.7% of young male drivers “always” wear a seat belt while driving or riding in a vehicle, a number much smaller than the 78.8% of other drivers who “always” do so. The share of young males who report that they “rarely” or “never” use seat belts (5.2%) is more than seven times the rate of other drivers (0.7%). Lower levels of seat belt use likely go hand-in-hand with the fact that young male drivers have a lower expectancy for law enforcement to ticket drivers for seat belt violations when compared to the balance of

the population ($F=15.464$, $df=1$, $p<0.001$). This suggests that these two behaviors from young males are linked: young male drivers may not use seat belts in part because they perceive that there is a low risk of facing consequences from law enforcement for not doing so.

Table 4.8 Differences in Driver Views and Behaviors, Young Male Target Group

Question	HRM (n=331)	Other Drivers (n=1,282)	Sig. ¹
Seat Belt Use	4.36	4.73	##
Ticket Seat Belt	2.85	3.19	##
Primary Seat Belt Law	2.91	3.68	##
Ticket Likely Speeding	3.53	3.66	
Speed in 75 MPH Zone	2.45	1.74	##
Higher Fines for Speeding	2.60	3.43	##
Drive After Drinking 1-2 Drinks	1.61	1.24	##
Drive After Drinking 3+ Drinks	1.17	1.04	##
How Often Use Sober Driver?	3.92	4.03	
Chance Arrest for DUI	3.89	3.75	##
RSH Seat Belt	0.77	0.73	
RSH Speeding	0.32	0.45	**
RSH Drunk Driving	0.91	0.88	
RSH Distracted Driving	0.65	0.76	**
RSH <i>Code for the Road</i>	0.64	0.45	**
Cell Phone Text	2.75	1.44	##
Chance Ticket, Text	2.54	2.83	##
Cell Phone Talk	3.84	2.61	##

¹Note: Nominal/Ordinal scales require different tests of significance

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

##Significant difference at the 1% level for 1-way ANOVA

The NDDOT Safety Division continues to explore opportunities to increase safe driving behavior overall in this driver group. Young male driver responses to read, seen, or heard education and exposure questions offer insight into this key demographic. Exposure to traffic safety messages that can be read, seen, or heard vary between the young male drivers and other drivers based on the message at hand. There were no statistically significant differences between young male drivers and others who were exposed to messages about seat belt use ($\text{Chi-Sq.}=0.050$, $df=1$, $p=0.824$) and impaired driving ($\text{Chi-Sq.}=0.619$, $df=1$, $p=0.431$). Differences between high-risk young males and all other North Dakota drivers were statistically significant for exposure to three other safety materials that can be read, seen, or heard. These drivers were less likely to have had exposure to messages about speeding ($\text{Chi-Sq.}=10.097$, $df=1$, $p=0.001$) and distracted driving ($\text{Chi-Sq.}=16.158$, $df=1$, $p<0.001$). In contrast, this group was statistically more likely to have had exposure to *Code for the Road* safety messages ($\text{Chi-Sq.}=24.572$, $df=1$, $p<0.001$) which makes sense considering that the advertisements target this specific demographic.

It is particularly interesting to note the attitudes of young male drivers toward driving under the influence of alcohol. Differences in opinions about the chances of getting arrested for DUI are statistically significant at the 1% level with young male drivers thinking there is a greater likelihood of facing arrest ($F=7.074$, $df=1$, $p=0.008$). It is unknown what factors cause high-risk males to have these perceptions as this target group and all other North Dakota drivers reported seeing traffic safety messages targeting impaired driving at comparable rates ($\text{Chi-Sq.}=0.619$, $df=1$, $p=0.431$). Perhaps messages need to be

better focused at targeting this group in an effort to deter these individuals from operating a motor vehicle while impaired. This is especially important because young male drivers continue to have a higher propensity to drive within two hours of consuming one or two drinks ($F=83.469$, $df=1$, $p<0.001$) and a higher likelihood of driving within two hours of consuming three or more alcoholic beverages ($F=29.418$, $df=1$, $p<0.001$).

This tendency to operate a vehicle after consuming alcohol could perhaps be curtailed by encouraging this target group to designate a sober driver. At present, there is no statistically significant difference in the rate at which young males use designated drivers when compared to all other North Dakota drivers who consume alcohol ($F=0.005$, $df=1$, $p=0.941$). This finding, in conjunction with young males' tendencies to drive after consuming alcohol, undoubtedly serves as a major contributing factor to the danger on North Dakota's roadways.

Young male drivers hold viewpoints about driving that are notably different than other drivers. For example, the target group indicated that they do not support a primary seat belt law as strongly as the rest of the population does ($F=31.191$, $df=1$, $p<0.001$) (Figure 4.6). Only 39.2% of high-risk young males either "somewhat favor" or "strongly favor" such legislation. A similar pattern occurred when asked to rate support for higher fines for speeding drivers. High-risk males were less likely to support this initiative ($F=68.794$, $df=1$, $p<0.001$) and were least likely to "somewhat" or "strongly" favor increasing fines among the six demographic groups analyzed in this report (Figure 4.7).

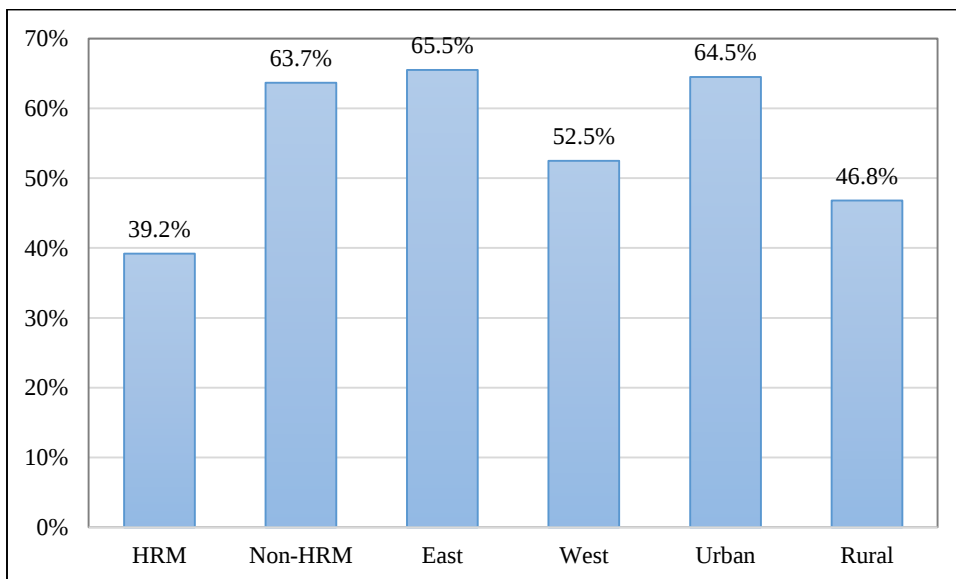


Figure 4.6 Percent "Strongly" or "Somewhat" Favoring a Primary Seat Belt Law

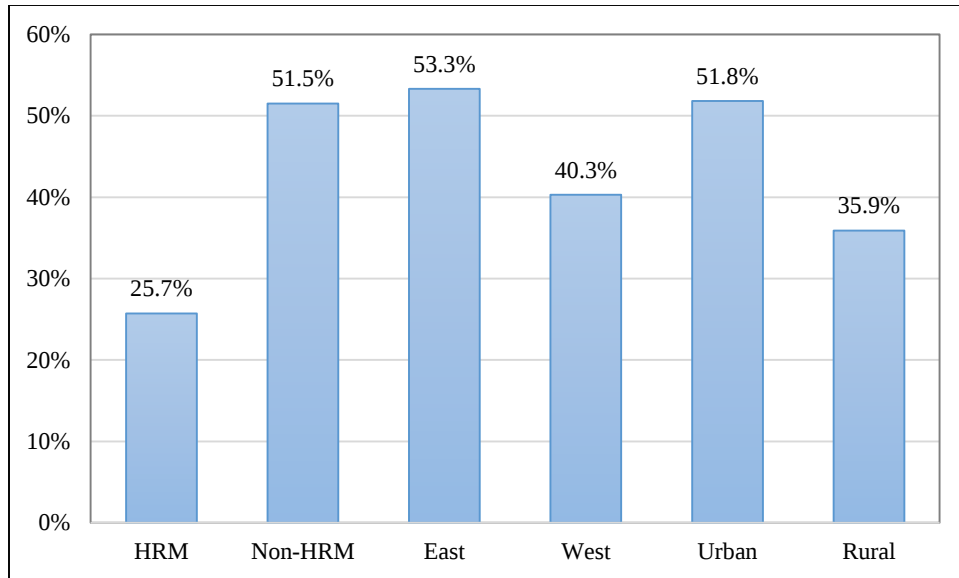


Figure 4.7 Percent “Strongly” or “Somewhat” Favoring Higher Speeding Fines

Table 4.9 compares the responses of high-risk young males to all other driver groups. It is clear that there are differences in views, behaviors, and attitudes toward various transportation safety topics. The complete list of survey questions is provided in Appendix A.

Table 4.9 Responses for High-Risk Male Drivers

Question		Responses, by Driver Group				
Seat Belt Use	n=1,605	Always	N. Always	Sometimes	Rarely	Never
	Other	78.8%	15.9%	4.5%	0.4%**	0.3%**
	HRM	54.7%	33.6%	6.5%**	3.6%**	1.6%**
Seat Belt Ticket	n=1,602	V. Likely	Sw. Likely	Likely	Unlikely	V. Unlikely
	Other	12.3%	40.0%	24.3%	16.7%	6.6%
	HRM	5.7%**	35.3%	21.2%	28.4%	9.5%
Primary Seat Belt Law	n=1,600	S. Favor	Sw. Favor	Neutral	Sw. Oppose	S. Oppose
	Other	39.2%	24.5%	14.1%	10.1%	12.1%
	HRM	21.9%	17.3%	18.3%	14.8%	27.7%
Chance Speed Ticket	n=1,604	V. Likely	Sw. Likely	Likely	Unlikely	V. Unlikely
	Other	16.2%	34.5%	42.3%	5.2%	1.7%**
	HRM	12.9%	35.9%	40.0%	9.6%	1.6%**
Speed in 75 mph	n=1,607	Always	N. Always	Sometimes	Rarely	Never
	Other	0.8%**	2.0%	12.1%	40.8%	44.3%
	HRM	5.8%**	9.4%	24.8%	44.2%	15.9%
Speed Fines	n=1,606	S. Favor	Sw. Favor	Neutral	Sw. Oppose	S. Oppose
	Other	22.3%	29.2%	27.0%	11.7%	9.7%
	HRM	11.3%	14.4%	28.7%	14.8%	30.9%
Chance DUI Arrest	n=1,602	V. Likely	Sw. Likely	Likely	Unlikely	V. Unlikely
	Other	24.7%	33.6%	34.6%	5.5%	1.6%**
	HRM	31.9%	24.3%	34.7%	8.0%**	1.0%**
Drive 1-2 Drinks	n=1,575	None	1-5 Times	6-10 Times	10+ Times	
	Other	78.0%	20.4%	1.2%**	0.3%**	
	HRM	48.0%	45.1%	4.4%**	2.5%**	
Drive 3+ Drinks	n=1,457	None	1-5 Times	6-10 Times	10+ Times	
	Other	96.1%	3.5%	0.2%**	0.1%**	
	HRM	84.2%	14.9%	0.4%**	0.4%**	
Sober Driver ₁	n=945	Always	N. Always	Sometimes	Rarely	Never
	Other	50.6%	22.3%	14.4%	5.3%	7.4%
	HRM	39.0%	29.7%	19.9%	7.3%**	4.1%**
Cell Phone Text	n=1,606	Daily	Few/Week	Few/Month	<1/Month	Never
	Other	1.2%**	2.4%	9.8%	12.9%	73.8%
	HRM	11.5%	15.7%	30.8%	19.9%	22.1%
Cell Phone Text, Ticket	n=1,602	V. Likely	Sw. Likely	Likely	Unlikely	V. Unlikely
	Other	9.7%	32.3%	15.7%	32.9%	9.4%
	HRM	4.2%**	28.6%	15.6%	33.0%	18.6%
Cell Phone Talk	n=1,607	Daily	Few/Week	Few/Month	<1/Month	Never
	Other	11.0%	15.9%	25.4%	19.0%	28.7%
	HRM	33.5%	29.8%	25.9%	8.9%	1.9%**

Note: Please see Appendix A for exact question and response wording
₁Note: Percentages based only on those North Dakota drivers who report that they consume alcohol
 **Estimate uncertain due to limited sample size

4.2.3 Young Female Driver Group

Another driver group with noticeable differences in behavior and attitudes is that of 18-to-34-year-old high-risk female (“HRF”) drivers. Like their high-risk male counterparts, young female drivers tend to exhibit behaviors that are more dangerous than all other drivers. Similarly, their attitudes toward safe driving habits and exposure to messages promoting safe driving lag behind the balance of the driver population (Table 4.10). When this female driver group was compared to all other drivers, there were statistically significant differences for almost all variables studied in this project. The results from the “other driver” group were likely skewed from the extreme viewpoints held by high-risk male drivers. As such, the young female driver group was compared only to non-high-risk male other drivers.

Table 4.10 Differences in Driver Views and Behaviors, Young Female Target Group

Question	HRF (n=503)	Other Drivers (n=1,282)	Sig. ¹
Seat Belt Use	4.65	4.73	
Ticket Seat Belt	3.14	3.19	
Primary Seat Belt Law	3.68	3.68	##
Ticket Likely Speeding	3.73	3.66	#
Speed in 75 MPH Zone	2.45	1.74	##
Higher Fines for Speeding	2.76	3.43	##
Drive After Drinking 1-2 Drinks	1.40	1.24	##
Drive After Drinking 3+ Drinks	1.09	1.04	
How Often Use Sober Driver?	4.40	4.03	##
Chance Arrest for DUI	4.09	3.75	##
RSH Seat Belt	0.69	0.73	*
RSH Speeding	0.28	0.45	**
RSH Drunk Driving	0.85	0.88	
RSH Distracted Driving	0.63	0.76	**
RSH <i>Code for the Road</i>	0.49	0.45	
Cell Phone Text	2.72	1.44	##
Chance Ticket, Text	2.87	2.83	#
Cell Phone Talk	3.79	2.61	##

¹Note: Nominal/Ordinal scales require different tests of significance

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

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

#Significant difference at the 5% level for 1-way ANOVA

##Significant difference at the 1% level for 1-way ANOVA

The 18-to-34-year-old female cohort is more likely to engage in dangerous driving behaviors. This target group has a higher likelihood of speeding on a 75-mile-per-hour road ($F=185.887$, $df=1$, $p<0.001$), texting while driving ($F=524.902$, $df=1$, $p<0.001$), and talking on the phone while driving ($F=198.607$, $df=1$, $p<0.001$). The cell phone behaviors were also evident in the 2015 and 2016 iterations of this survey.

Like their high-risk male counterparts, 18-to-34-year-old females also have a lower likelihood of being exposed to safety messages about speeding ($\text{Chi-Sq.}=24.428$, $df=1$, $p<0.001$) and distracted driving ($\text{Chi-Sq.}=22.569$, $df=1$, $p<0.001$). These individuals are also less likely to have had recent exposure to messages regarding seat belt use ($\text{Chi-Sq.}=6.388$, $df=1$, $p=0.011$). Lower exposure levels for these three messages continues a trend that began in 2015.

For the third year in a row, this group was less likely to support higher fines for speeding ($F=39.149$, $df=1$, $p<0.001$). It is plausible that this stems from the group's propensity to speed, especially on roads with a posted limit of 75 miles per hour.

With regard to impaired driving, there was one unique difference among young female drivers. This target group of 18-to-34-year-old females thought that the chances of being arrested for driving under the influence of alcohol were more likely than did other North Dakota drivers ($F=51.620$, $df=1$, $p<0.001$). This group also reported designating a sober driver more often than other drivers ($F=36.956$, $df=1$, $p<0.001$). However, in spite of these perceptions toward impaired driving, 18-to-34-year-old females in North Dakota were nonetheless more likely to operate a vehicle within two hours of consuming one or

two alcoholic beverages ($F=18.854$, $df=1$, $p<0.001$). This suggests that the target group may believe that consuming a small number of alcoholic beverages does not greatly affect one's driving performance. The fact that there is no statistically significant difference in how often one drives after consuming three or more alcoholic beverages ($F=1.128$, $df=1$, $p=0.288$) implies that this group may be making safe choices when binge drinking. Further efforts must target this group with regard to the dangers that are associated with driving after consuming what is perceived to be a small amount of alcohol.

5. CONCLUSIONS

The annual statewide driver traffic safety survey provides baseline metrics for the Safety Division and others in understanding perceptions and behaviors related to focus issues. A core set of questions was selected to address nationally agreed upon priorities. These include emphases on seat belt use, impaired driving, and speeding. In addition to the core issues, questions were included to better understand views on specific programs and activities. Results show that many North Dakota drivers have adopted safe driving practices, but it is apparent that additional efforts are needed to improve safety on the state's roads.

Two specific recommendations can be made when examining trends that have taken place over the last eight years of administering this survey. First, there is a continued dichotomy between how urban and rural residents approach the use of seat belts while operating a vehicle. Results clearly show that rural residents are less likely to use safety belts than their urban counterparts. Improvement in this area must be made to reduce rates of fatalities and serious injuries during crash events among rural North Dakotans. Second, there is a bifurcation among exposure rates to safety messages contingent upon whether one is a high-risk 18-to-34-year-old driver. Younger drivers have less exposure to key safety campaigns and traffic messages than all other driver groups. They also hold viewpoints that are drastically different than their 35+ year-old counterparts and regularly engage in dangerous practices behind-the-wheel. It may be worthwhile to make the 18-to-34-year-old target group more aware of traffic safety tools via focused safety campaigns and optimized advertisement placement. The *Code for the Road* campaign is one such program that appears to be making a positive impact on young drivers, particularly those who are male. More resources must continue to be allocated to this group to change their perceptions, and, ultimately, their behaviors on the roadway.

Further research involving North Dakota driving tendencies can be improved. For instance, future studies involving North Dakota driving habits will be more robust when the response sample more accurately reflects the North Dakota driver population. This particular study would have been more robust by having a higher percentage of 35-to-44-year-old drivers included in the response sample. Nonetheless, the response rate for this survey was satisfactory and most of the desired performance metrics were able to be extrapolated to represent the entire North Dakota driver population.

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APPENDIX A. SURVEY INSTRUMENT

2017 North Dakota Driver Survey		All Responses Are Confidential
1. How often do you use seat belts when you drive or ride in a vehicle? ☐ Never ☐ Rarely ☐ Sometimes ☐ Nearly Always ☐ Always		
2. What do you think the chance is of getting a ticket if you do not wear your seat belt? ☐ Very Unlikely ☐ Unlikely ☐ Somewhat Likely ☐ Likely ☐ Very Likely		
3. Do you favor or oppose a primary seat belt law where law enforcement can stop a vehicle and issue a citation for failure to wear a seat belt? ☐ Strongly Oppose ☐ Somewhat Oppose ☐ Do Not Favor or Oppose ☐ Somewhat Favor ☐ Strongly Favor		
4. What do you think the chance is of getting a ticket if you drive over the speed limit? ☐ Very Unlikely ☐ Unlikely ☐ Somewhat Likely ☐ Likely ☐ Very Likely		
5. On a road with a speed limit of 75 mph, how often do you drive faster than 80 mph? ☐ Never ☐ Rarely ☐ Sometimes ☐ Nearly Always ☐ Always		
6. Do you favor or oppose higher fees/fines for speeding violations? ☐ Strongly Oppose ☐ Somewhat Oppose ☐ Do Not Favor or Oppose ☐ Somewhat Favor ☐ Strongly Favor		
7. What do you think the chances are of someone getting arrested if they drive buzzed/drunken? ☐ Very Unlikely ☐ Unlikely ☐ Somewhat Likely ☐ Likely ☐ Very Likely		
8. In the past 60 days, how many times have you driven a motor vehicle within 2 hours after drinking 1 – 2 Alcoholic Drinks? ☐ none ☐ 1 – 5 times ☐ 6 – 10 times ☐ more than 10 times 3 or More Alcoholic Drinks? ☐ none ☐ 1 – 5 times ☐ 6 – 10 times ☐ more than 10 times ➤ If drinking or planning to drink, how often do you designate a sober driver? ☐ Never ☐ Rarely ☐ Sometimes ☐ Nearly Always ☐ Always ☐ Do not drink		
9. How often do you text while driving? ☐ Never ☐ Less than Once per Month ☐ Few Times per Month ☐ Few Times per Week ☐ Daily		
10. How likely do you think it is that a driver will be cited by law enforcement for texting while driving? ☐ Very Unlikely ☐ Unlikely ☐ Somewhat Likely ☐ Likely ☐ Very Likely		
11. How often do you talk on your cell phone while driving? (all phone types including hands-free) ☐ Never ☐ Less than Once per Month ☐ Few Times per Month ☐ Few Times per Week ☐ Daily		
12. What is your <u>main</u> concern when driving in ND? (select only one) ☐ Speeding Drivers ☐ Distracted Drivers ☐ Drunk Drivers ☐ Young/Inexperienced Drivers ☐ Other _____		
13. Within the last 6 months have you read, seen, or heard traffic safety messages relating to: Seat Belt Enforcement ☐ Yes ☐ No If yes, where? ☐ TV ☐ Radio ☐ Print ☐ Social Media ☐ Other _____ Speed Enforcement ☐ Yes ☐ No If yes, where? ☐ TV ☐ Radio ☐ Print ☐ Social Media ☐ Other _____ Drunk Driving Enforcement ☐ Yes ☐ No If yes, where? ☐ TV ☐ Radio ☐ Print ☐ Social Media ☐ Other _____ Distracted Driving Enforcement ☐ Yes ☐ No If yes, where? ☐ TV ☐ Radio ☐ Print ☐ Social Media ☐ Other _____ Code for the Road. Follow the Rules. Follow the Law. ☐ Yes ☐ No If yes, where? ☐ TV ☐ Radio ☐ Print ☐ Social Media ☐ Other _____ If yes, what do you remember about it/them? _____		
14. Your age: ☐ 18 – 24 ☐ 25 – 34 ☐ 35 – 44 ☐ 45 – 54 ☐ 55 – 64 ☐ 65 – 74 ☐ 75 or Older		
15. Type of Vehicle You <u>Most Often</u> Drive: (select only one) ☐ Car ☐ Pickup ☐ SUV ☐ Van ☐ Motorcycle ☐ Semi/Large Truck ☐ Other		
16. Approximate Miles Driven Last Year: _____		
17. Your Gender: ☐ Male ☐ Female		
18. In which county do you live? _____		
Thank you for your time and participation.		

APPENDIX B. MISSING/REFUSE TO ANSWER RESPONSES

Q#	Question	Total Responses	Missing Responses
Seat Belt			
Q1	Seat Belt Use	2,107	9
Q2	Chance Ticket Seat Belt	2,104	12
Q3	Primary Seat Belt Law	2,099	17
Speeding			
Q4	Chance Ticket Speeding	2,106	10
Q5	Speed, 75 MPH Zone	2,107	9
Q6	Higher Speeding Fines	2,107	9
Alcohol			
Q7	Chance Arrest Drinking	2,103	13
Q8a	Drive After 1-2 Drinks	2,076	40
Q8b	Drive After 3+ Drinks	1,949	167
Q8c	Designate Sober Driver	1,970	146
Distracted Driving			
Q9	Cell Phone Text	2,109	7
Q10	Cell Phone Text, Ticket	2,103	13
Q11	Cell Phone Talk	2,110	6
Driver Concerns			
Q12	Main Concern Driving	1,946	170
Awareness/Exposure			
Q13a	RSH Seat Belt	2,048	68
Q13b	RSH Speeding	1,994	122
Q13c	RSH Drunk Driving	2,063	53
Q13d	RSH Distracted Driving	2,045	71
Q13e	RSH <i>Code for the Road</i>	1,949	167
Total n=2,116			

APPENDIX C. DRIVER RESPONSES BY REGION AND GEOGRAPHY

Question	Region or Geography, Response					
What are the chances of getting a ticket if you...	Don't wear your seat belt		Drive over the Speed limit		Drive after drinking alcohol	
	EAST	WEST	EAST	WEST	EAST	WEST
V. Likely	12.0%	10.7%	15.2%	15.7%	30.1%	35.3%
Sw. Likely	42.0%	36.6%	34.9%	31.8%	28.1%	24.1%
Likely	22.6%	24.8%	43.8%	47.2%	36.4%	35.4%
Unlikely	17.3%	21.4%	5.0%	3.8%	4.4%	4.3%
V. Unlikely	6.2%	6.5%	1.2%**	1.5%**	1.1%**	0.9%**
What are the chances of getting a ticket if you...	Don't wear your seat belt		Drive over the speed limit		Drive after drinking alcohol	
	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL
V. Likely	11.3%	11.7%	14.1%	19.5%	31.1%	36.5%
Sw. Likely	38.7%	42.0%	34.5%	30.4%	27.4%	22.9%
Likely	24.1%	22.1%	45.9%	43.7%	36.1%	35.3%
Unlikely	19.6%	17.7%	4.3%	4.9%	4.6%	3.7%
V. Unlikely	6.3%	6.4%	1.3%**	1.6%**	0.8%**	1.5%**
Times driving after drinking 1-2 drinks in the past 60 days...			None	1-5 Times	6-10 Times	10+ Times
East			67.4%	30.0%	2.1%**	0.5%**
West			69.8%	28.0%	1.1%**	1.1%**
Urban			67.7%	30.4%	1.2%**	0.7%**
Rural			71.1%	25.2%	2.8%**	0.9%**
Times driving after drinking 3+ drinks in the past 60 days...			None	1-5 Times	6-10 Times	10+ Times
East			93.1%	6.3%	0.5%**	0.1%**
West			92.8%	7.1%	0.1%**	0.0%**
Urban			93.3%	6.6%	0.1%**	0.0%**
Rural			92.0%	6.7%	1.0%**	0.2%**
Seat Belt Use		Always	N. Always	Sometimes	Rarely	Never
East		75.5%	19.3%	4.4%	0.5%**	0.3%**
West		73.0%	19.8%	4.8%	2.1%**	0.3%**
Urban		79.9%	14.6%	4.2%	1.1%**	0.2%**
Rural		57.4%	34.6%	5.7%	1.7%**	0.6%**
Text messaging while driving		Daily	Few/Week	Few/Month	<1/Month	Never
East		6.1%	9.9%	19.9%	16.5%	47.6%
West		7.9%	13.0%	22.5%	19.5%	37.1%
Urban		6.5%	9.5%	20.5%	17.1%	46.4%
Rural		8.1%	16.9%	22.8%	20.5%	31.6%
Talking on cell phone while driving		Daily	Few/Week	Few/Month	<1/Month	Never
East		20.7%	21.2%	26.8%	13.8%	17.5%
West		24.5%	32.8%	24.8%	10.8%	7.2%
Urban		21.8%	25.8%	24.3%	13.2%	14.9%
Rural		24.2%	28.6%	30.7%	10.3%	6.2%
**Less than 30 responses in this group						

APPENDIX D. EXPOSURE TO TRAFFIC SAFETY MESSAGES

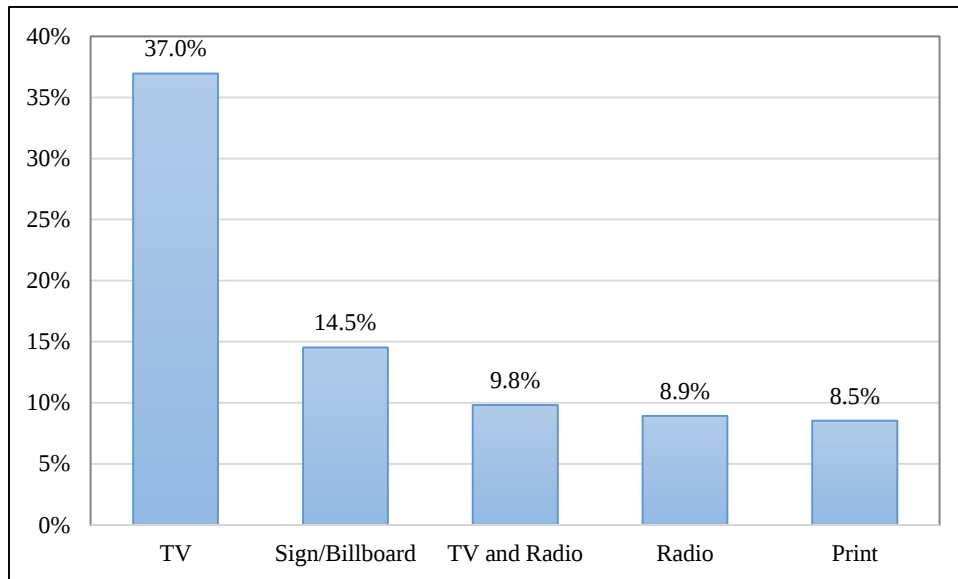


Figure D.1 Exposure to Messages about Seat Belt Use, by Source

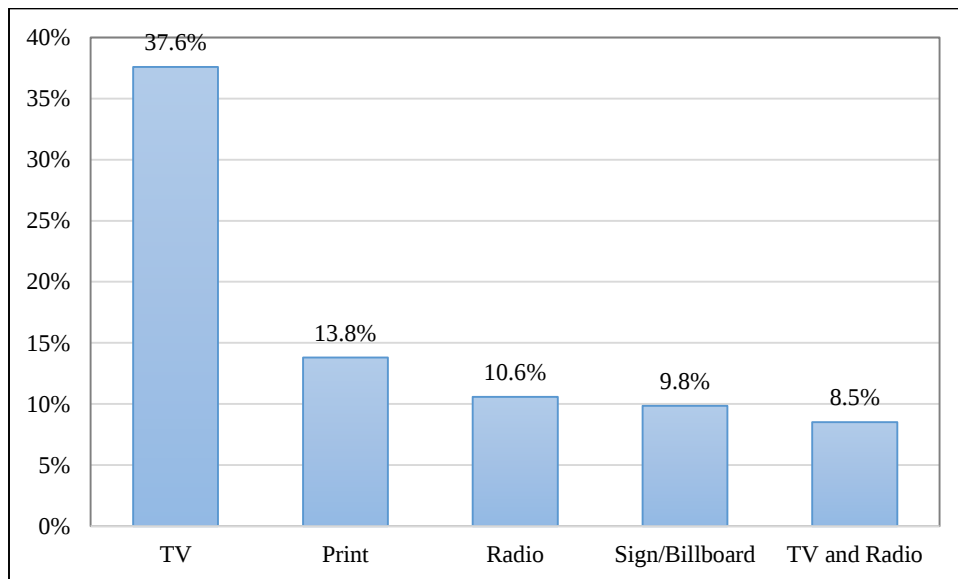


Figure D.2 Exposure to Messages about Speeding, by Source

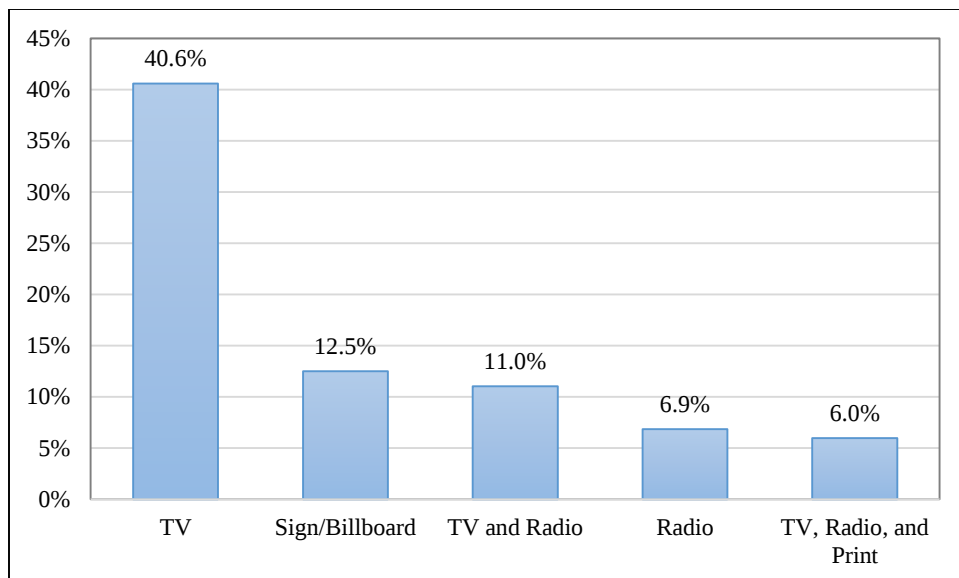


Figure D.3 Exposure to Messages about Impaired Driving, by Source

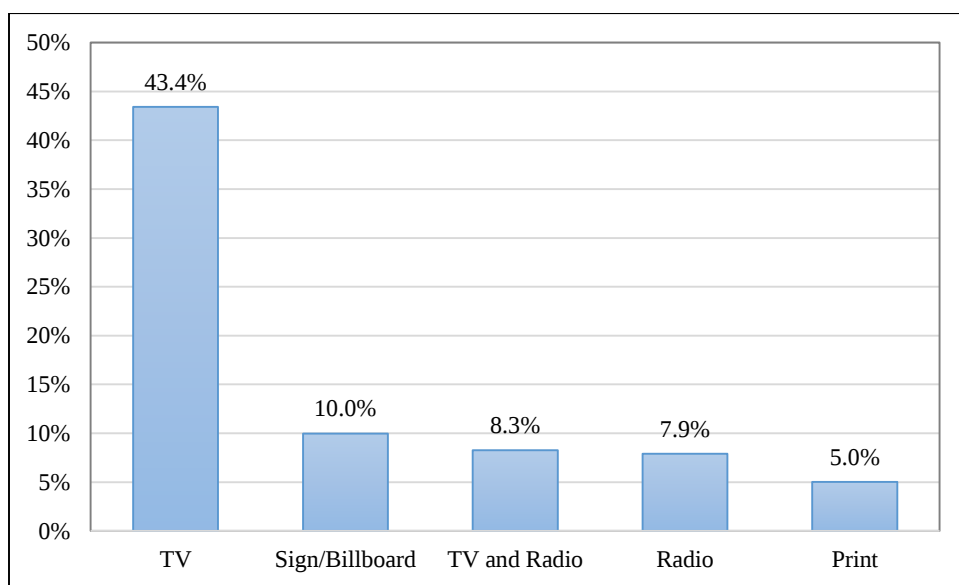


Figure D.4 Exposure to Messages about Distracted Driving, by Source

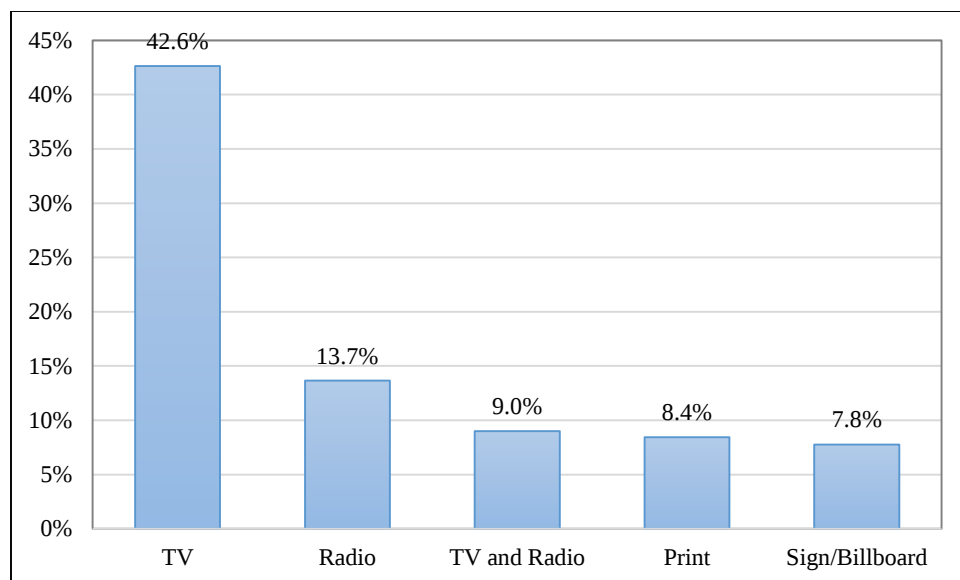


Figure D.5 Exposure to Messages about *Code for the Road*, by Source

APPENDIX E. EXPOSURE TO TRAFFIC SAFETY MESSAGES: THEMES REMEMBERED BY RESPONDENTS

Immediately after being asked if one had recently read, seen, or heard traffic safety messages relating to the five emphasis areas, the respondent was questioned what specifically they remembered about the messages. A total of 514 respondents answered the fill-in-the-blank style question. The answers were coded using emergent theme content analysis, organized by the lead analysis researcher, and collated based on frequency of responses. In sum, 618 themes were created by the 514 respondents (Table D.1).

Table D.1 What Respondents Remember Most about Traffic Safety Messages	
Theme	Number of Times Mentioned
Sober Driver/Drunk/Buzzed Driving	104
Effective Messages/Slogan/Reminder/Awareness	92
Click It Or Ticket	55
Don't Text/Distracted Driving	43
Not Effective	40
Consequences	38
Follow the Rules/Laws	31
Seat Belt	30
Reminder of Dangers/Tragedies/Graphic Reality	26
On Billboards/Signs	26
Clear/Attention Grabbing Signage	19
Jail Time	12
To the Point	11
We Need to Pay Attention to Messages	9
Tone of Commercial (Stern/Sad)	8
Cops Will Find You	8
Don't Speed/Do Slow Down	7
Don't Follow Snow Plows Closely	6
Drive Responsibly	5
Very Short Ads	5
Don't Be Stupid	5
Tigirlily	5
Waste of Tax Dollars	5
Need New Messages	5
Talking Orange	2
Motorcycle Safety	2
Too Many Commercials	2
Child In Back Seat/Car Seats	2
Higher Enforcement	1
Do Not Go	1
Only Shown During Safety Initiatives	1
Statistics	1
On TV	1
Stop for School Buses	1
See the Ads Regularly	1
Scout the Dog	1
Road Conditions	1
Must Be Enforced	1
Need More Messages	1
Make You Think	1
Low Budget	1
Need Drugged Driving Commercials	1
DMV Poster	1